EUROPEAN
COMMISSION

Brussels, 14.7.2021
COM(2021) 558 final

2021/0203 (COD)

Proposal for a

DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on energy efficiency (recast)

(Text with EEA relevance)

{SEC(2021) 558 final} - {SWD(2021) 623 final} - {SWD(2021) 624 final} - {SWD(2021) 625 final} - {SWD(2021) 626 final} - {SWD(2021) 627 final}

EXPLANATORY MEMORANDUM

1. CONTEXT OF THE PROPOSAL

With the adoption of the European Green Deal in December 2019[1], the Commission set out *"a new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use. It also aims to protect, conserve and enhance the EU's natural capital, and protect the health and well-being of citizens from environment-related risks and impacts"*. To reach these objectives, "*energy efficiency must be prioritised*".

At that occasion, the Commission also announced that it would present an impact-assessed plan to increase the Union's greenhouse gas (GHG) emissions reduction target for 2030 in a responsible way, and committed to "*review and propose to revise, where necessary, the relevant energy legislation by June 2021*"[2].

In March 2020, the Commission tabled a proposal for a European Climate Law to decarbonise Europe by 2050. In its Climate Target Plan (CTP)[3], the Commission proposed to raise the Union's ambition on reducing greenhouse gas emissions to at least 55% below 1990 levels by 2030, which is a substantial increase compared to the existing 40% target. The Climate Target Plan also outlined necessary actions required across all sectors of the economy, including the revisions of the key legislative instruments to achieve this increased ambition and to deliver on the commitment made in the Communication on the European Green Deal[4] to put forward a comprehensive plan to increase the European Union's target for 2030 towards 55% in a responsible way. The Climate Target Plan is also in line with the Paris Agreement' objective to keep the global temperature increase to well below 2°C and pursue efforts to keep it to 1,5°C. In December 2020, the European Council endorsed a binding EU target of a net domestic reduction of at least 55% in greenhouse gas emissions by 2030 compared to 1990.[5] The European Council concluded that climate ambition needed to be raised in a manner that would spur sustainable economic growth, create quality jobs, deliver health and environmental benefits for citizens of the Union, and contribute to the long-term global competitiveness of the Union's economy by promoting innovation in green technologies. On 22 April 2021, the European Parliament and the Council came to a provisional political agreement to achieve at least a 55% reduction in GHG emissions by 2030. This sets the framework for action to reduce GHG emissions over the coming decades, but needs to be implemented through specific legislation to ensure those reductions occur. Projections indicate that, if current policies are fully implemented, greenhouse gas emissions reductions

---

1 The European Green Deal, COM(2019) 640 final).

2 Annex to the Green Deal Communication, page 2.

3 COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Stepping up Europe's 2030 climate ambition Investing in a climate-neutral future for the benefit of our people, COM/2020/562 final.

4 COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE EUROPEAN COUNCIL, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS The European Green Deal, COM/2019/640 final.

5 https://www.consilium.europa.eu/media/47296/1011-12-20-euco-conclusions-en.pdf.

by 2030 would be around 45% compared to 1990 levels, when excluding land use emissions and absorptions, and around 47%, when including land use. The 2030 Climate Target Plan therefore previews a set of actions required across all sectors of the economy and the launch of revisions of the key legislative instruments to achieve this increased ambition.

To implement this, the European Commission 2021 Work Programme[6] announced a 'Fit for 55' package to reduce GHG emissions by at least 55% by 2030, and achieve a climate-neutral Europe by 2050. This package will cover a wide range of policy areas including energy efficiency, renewables, land use, energy taxation, effort sharing and emissions trading.

Energy efficiency is a key area of action, without which the full decarbonisation of the Union economy cannot be achieved[7]. The Energy Efficiency Directive has led to the Union's current energy efficiency policy to capture the cost-effective energy saving opportunities. In December 2018, the Energy Efficiency Directive was amended as part of the 'Clean Energy for All Europeans package', in particular to include a new headline 2030 Union energy efficiency target of at least 32,5% (compared to projected energy use in 2030), and to extend and strengthen the energy savings obligation beyond 2020.

While the 2020 energy efficiency target may have been achieved due to the exceptional circumstances created by the Covid-19 pandemic, the sum of national contributions communicated by Member States in the National Energy Climate Plans (NECP) falls short of the Union's level of ambition of 32,5% in 2030. The contributions collectively would lead to a reduction of 29,4% for final energy consumption (FEC) and 29,7% for primary energy consumption (PEC) compared to the projections from the 2007 reference scenario for 2030. This would translate in a collective ambition gap of 2,8 percentage points for primary energy consumption and 3.1 percentage points for final energy consumption for EU27. This gap also affects the level of efforts needed to reach the higher ambition of energy efficiency targets. The CTP Impact Assessment concludes that it is unlikely that the necessary higher levels of energy efficiency needed would be achieved through market forces, current market organisation and technology development alone, meaning that further efforts are needed. According to the impact assessment[8] accompanying this Directive, energy efficiency improvements will need to be significantly stepped from the current ambition level of 32,5%.

The higher ambition level requires a stronger promotion of energy efficiency, wherever cost-effective, in all areas of the energy system and in all relevant sectors, where activity affects energy demand, such as the transport, water and agriculture sectors. Addressing the water-energy nexus is particularly important, due to increasing water and energy needs, or increasing pressure on water resources due to climate change.

The Energy Efficiency Directive is an important element to progress towards climate neutrality by 2050, under which energy efficiency is to be treated as an energy source in its own right. The key role of energy efficiency is supported by the energy efficiency first principle. It is recognised as a guiding principle of the Union energy policy and should be

---

6 COM(2020) 690 final

7 Communication: A Clean Planet for all – A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy (COM/2018/773 final), where the role of energy efficiency as a condition sine qua non for all decarbonisation scenarios is assessed.

8 SWD(2021) 623.

taken into account across all sectors, going beyond the energy system, at all levels, including in the financial sector. Energy efficiency solutions should be considered as the first option in planning and investment decisions, when setting new rules for the supply side and other policy areas. The principle has been recognised as a key element of the Strategy for Energy Sector Integration[9].

While the energy savings potential remains large in all sectors, there is a particular challenge related to transport, as it is responsible for 30% of final energy consumption, and to buildings, since 75% of the Union building stock has a poor energy performance. Another important sector to which increasing attention is being paid is the information and communications technology (ICT) sector, which is responsible for 5-9% of the world's total electricity use and more than 2% of all emissions. In 2018, the energy consumption of data centres in the Union was 76,8 TWh. This is expected to rise to 98,5 TWh by 2030 a 28% increase. This increase in absolute terms can as well be seen in relative terms: within the EU, data centres accounted for 2,7% of electricity demand in 2018 and will reach 3,21% by 2030, if development continues on the current trajectory[10]. Europe's Digital Strategy[11] already highlighted the need for highly energy-efficient and sustainable data centres and transparency measures for telecoms operators on their environmental footprint.

The public sector is an important economic actor in its own right and is responsible for around 5 to 10% of the total Union final energy consumption.[12] Overall, the Union´s-share of public procurement contracts attributed to central government bodies is estimated to be approximately 16%. At Member States' level this varies between 5% and 86%[13]. Public buildings are estimated to use around 2% of the Union's final energy consumption. Cost effective savings potentials still exist in the entire public sector both in the renovation and energy management of existing buildings as well as the future procurement of energy efficient buildings, products and services.

Industry is one of the sectors that has achieved significant energy efficiency improvements over the last decade. Nevertheless, cost-effective savings potentials still exist[14]. Heating and cooling consumes half of Union FEC, making it the biggest energy end-use sector. There remains much potential for reducing energy use in this sector, while still achieving the temperatures needed[15]. Heating and cooling, therefore, plays a crucial role in the Union's ambition to transition into a clean and carbon-neutral economy by 2050. Much of the effort is needed in the field of better insulating buildings, but there is also potential in terms of more efficiently supplying the heat or cold needed[16]. Energy losses in energy transformation,

---

9 COM(2020) 299 final.

10 https://digital-strategy.ec.europa.eu/en/library/energy-efficient-cloud-computing-technologies-and-policies-eco-friendly-cloud-market.

11 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Shaping Europe's digital future (COM(2020) 67 final).

12 SWD(2021) 623, section 2.2.2.

13 Evaluation of Articles 6 and 7 of the Energy Efficiency Directive (2012/27/EU) (SWD(2016)403 final; https://ec.europa.eu/energy/sites/ener/files/documents/3_en_autre_document_travail_service_part1_v3.pdf).

14 SWD(2021) 623, Annex H.

15 SWD(2021) 623 , section 2.2.2.

16 An EU Strategy on Heating and Cooling (COM/2016/051 final).

transmission and distribution can be significant[17]. The absence of common methodologies and reporting makes it difficult to compare networks or operators or benchmark performance. In fact, there is no uniform definition of energy losses within the Union, which results in sub-optimal data quality, which needs to be addressed.

The household sector makes up around a quarter of all final energy consumption in the Union. The behaviour of consumers and citizens has an important impact on this energy consumption and the EED contains several provisions that support the empowerment of citizens and consumers. The lack of strong consumer behaviour and consumer empowerment aspects in promoting energy efficiency, in particular at more local levels, results in insufficient incentives for consumers to realise energy efficiency improvements and to tackle high upfront costs and the split incentives problem.[18]

While the Energy Efficiency Directive already provides incentives for Member States to address energy poverty, the Covid19 crisis has highlighted the urgency of addressing energy poverty, if the Union is to create a social Europe, as agreed by the joint Porto Social Commitment[19], that caters for the needs of all its citizens by enabling them to play an active role in the green transition, while mitigating adverse effects and leaving non one behind. Energy poverty levels across Member States will be in the spotlight as more Europeans may struggle to afford access to essential energy, particularly with rising energy costs and unemployment. Also medium-income households might be at increasing risk of facing energy poverty in the near future, as already today the majority of households affected by energy poverty are (lower) middle-income households. Energy efficiency has been identified as the most effective solution to alleviate energy poverty and to overcome some of the potential negative distributional impacts of pricing measures.[20] As required by the European Green Deal, the Energy Efficiency Directive together with the other initiatives under the `Fit for 55 Package´, most notably the Social Climate Fund, will addresses the twin-challenge and turn both, climate and social needs, into opportunities.

In this context, the amendments will help reinforce the Energy Efficiency Directive to better address remaining market barriers and failures by considering broader objectives of the European Green Deal, which aims to leave no one behind and to deliver a sustainable economy. The proposal thus will strengthen the different provisions of the Energy Efficiency Directive to ensure that it contributes optimally to the higher climate target of at least 55% GHG emissions reduction ambition for 2030, as set out in the Climate Target Plan.

- **Consistency with existing provisions in the policy area**

The Proposal is part of a broader policy framework of energy efficiency policies addressing energy efficiency potentials in specific policy areas, including buildings (Directive 2010/31/EC[21] (Energy Performance of Buildings Directive (EBPD)), products (Directive 2009/125/EC, Regulation (EU) 2017/1369 and Regulation (EU) 2020/740[22]) and Governance

---

17 See for example; 2nd CEER Report on Power Losses; Council of European Energy Regulators; 2020.

18 SWD(2021) 623, section 2.2.2.

19 https://www.consilium.europa.eu/en/press/press-releases/2021/05/08/the-porto-declaration/

20 SWD(2021) 623, section 2.2.2 and Annex L.

21 Directive 2010/31/EC of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings.

22 Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products; Regulation (EU)

Regulation (EU) 2018/1999. These policies play a very important role in delivering energy savings when products are replaced or buildings constructed or renovated[23]. The Proposal is consistent with the proposal for revision of the Renewable Energy Directive[24].[25]

This proposal for the Energy Efficiency Directive Recast sets a framework for other energy efficiency policies by laying down the energy efficiency targets and setting the main cross-sectoral measures as well as more specific ones. It targets energy savings in the public sector including via obligations to renovate public buildings annually and taking into account energy efficiency in procurement of goods, services, works and buildings. Its particular aim at public buildings is complementary to the EPBD, which sets the standards and specific technical obligations related to buildings. The public sector serves the population at large, including the vulnerable customers and those in risk of energy poverty, thus ensuring that no one is left behind in line with the objectives of the European Green Deal. The special focus on public sector in the Energy Efficiency Directive is vital to undertake its exemplary role in promoting energy efficiency. The Commission has started the review of the EPBD with a view to come forward with a proposal towards the end of 2021. While at this point in time it is not possible to prejudge the outcome of that review, this proposal respects the specific role of the EPBD in setting cost-optimal energy performance requirements, while strengthening the EED provisions pertaining to the exemplary role of public bodies, notably regarding buildings (Article 5 and Article 6), and public procurement (Article 7), which provides the necessary horizontal framework for action.

The Energy Efficiency Directive sets the framework for heating and cooling planning in terms of identifying the energy efficiency and renewable energy potential by the Members States. It also provides for monitoring policies and measures to exploit this potential. These policies and measures directly support the achievement of the renewable target in the heating and cooling sector target set out in Article 24 of the Renewable Energy Directive. For example, a revised definition of efficient district heating and cooling (Article 2(43) of the Energy Efficiency Directive) would directly promote the deployment of renewable energy in district heating and cooling. Vice versa, these sub-targets would contribute to the achievement of the energy efficiency objectives of the Energy Efficiency Directive.

Furthermore, the planning measures for the heating and cooling sector under the Energy Efficiency Directive will be synchronised with the timeline of the NECPs. This facilitates higher consistency between the NECPs, the Comprehensive Assessments and the assessments of the potential of energy from renewable sources and of the use of waste heat and cold in the heating and cooling sector pursuant to Article 15(7) of the Renewable Energy Directive.

2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and Regulation (EU) 2020/740 of the European Parliament and of the Council of 25 May 2020 on the labelling of tyres with respect to fuel efficiency and other parameters respectively.

23 Moreover, implementation of the product reviews under the Ecodesign Working Plan 2020-2024 and the "Renovation Wave" Action plan, together with the review of the EPBD, will make an important contribution to reaching the 2030 energy efficiency target.

24 Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources, PE/48/2018/REV/1, OJ L 328, 21.12.2018, p. 82–209.

25 SWD(2021) 623, Annex M.

The details for the reporting on various provisions of the Energy Efficiency Directive are set in the Governance Regulation (Regulation (EU) 2018/1999[26]). Under this Regulation, each Member State is required to establish a ten-year integrated national energy and climate plan (NECP) for 2021-2030, outlining how it intends to contribute, *inter alia*, to the 2030 target for energy efficiency. The Governance Regulation also includes specific requirements for setting the energy efficiency targets, reporting obligations, monitoring of progress, and corrective actions to be taken in case of insufficient ambition and progress. The impacts of the changes in this Directive will need to be analysed, which might require subsequent amendment of the Governance Regulation to ensure coherence between the two legal acts. New provisions, notably related to setting national indicative contributions, gap filling mechanisms and reporting obligations, should be transferred and streamlined with the Governance Regulation, once it is revised, to avoid overlapping requirements. Some provisions of the Governance Regulation might also need to be reassessed in view of the changes proposed in this Directive.

The Energy Efficiency Directive interacts with other energy efficiency legislation, *i.e.* the Energy Performance of Buildings Directive, the Union´s Ecodesign Directive, the Union's Energy and Tyre Labelling Regulations.[27] These instruments set minimum performance standards, but do not require any acceleration either of replacement rates or choosing more efficient outcomes above the minimum. The main mechanisms available to Member States to boost their energy savings above natural rates to meet the Energy Efficiency Directive requirements are to stimulate replacement of energy inefficient devices and stimulate more efficient choices. Each instrument is addressing different energy efficiency aspects, while ultimately leading to the same goal *i.e.* improving energy efficiency and achieving the overall Union energy efficiency target. In other areas, the Energy Efficiency Directive complements other legislation to increase the focus on energy efficiency and thus increase the overall amount of energy savings for example the measures on public procurement, energy networks and heating and cooling.

- **Consistency with other Union policies**

Changes to the policy architecture of the Energy Efficiency Directive interact with existing and planned policies and measures, including pricing and non-pricing mechanisms and measures. The Energy Efficiency Directive, which addresses existing market barriers hampering energy efficiency, works hand-in-hand with the introduction of emissions trading for fuels used in buildings, which will shorten payback time of energy efficiency investments and strengthen the business case for energy efficiency measures across the Union. The Climate Target Plan demonstrated that a mix of regulatory intervention and carbon pricing is needed to deliver the most cost effective pathway towards achieving the 55% GHG reduction target. Striking a balance between carbon pricing and the regulatory policies is crucial to achieve the increased climate target in a cost-efficient manner, while mitigating any impacts of carbon costs being passed on in particular on vulnerable customers and final users. At the same time, emissions trading will generate additional revenues from the allowance auctions that can be redistributed among Member States and within Member States in order to support

[26] OJ L 328, 21.12.2018, p. 1–77
[27] SWD(2021) 623, Annex M.

vulnerable and energy poor end-users in paying their bills and carrying out building renovation.

The 'Fit for 55' package brings together the relevant policy instruments that can contribute to the 55% GHG reduction target and aims to do so in a coherent and proportional manner among other relevant regulations and directives. This is notably the case for the Energy Efficiency Directive, the Renewable Energy Directive (REDII), the EU Emissions Trading System (ETS), Effort Sharing Regulation (ESR), Land use, Land Use Change and Forestry (LULUCF), energy taxation and CO2 emission standards for vehicles. The coherence between the different initiatives under the Fit for 55 package was recognised as key to ensure that the different policy instruments of the package including the Energy Efficiency Directive contribute to achieving the higher climate target of 55% in a most effective way. Those EU policies contribute to achieving the objectives of the Energy Efficiency Directive, in particular as regards the energy efficiency target. The targets and measures provided in the Energy Efficiency Directive will ensure more effective interlinks and synergies with the other Union policies.[28]

The EED has important interlinkages with the Renewable Energy Directive, notably in relation to heating and cooling as both also contribute to achieving the objectivise of the Strategy for Energy Sector Integration. The EED provides strengthened framework for planning in terms of identifying the energy efficiency and renewable energy potential in heating and cooling, and requires that Members States implement policies and measures to exploit this potential. These policies and measures directly support the achievement of the renewable energy target in heating and cooling laid out in Article 23 of Renewable Energy Directive. Vice versa, these targets contribute to the achievement of the energy efficiency objectives laid out in Article 23 of the EED and the whole EED.

The EU ETS establishes a cap on GHG emissions, which is declining over time. The ESR establishes binding annual GHG emissions targets for Member States targeting GHG emissions from sectors not covered by the EU ETS, including buildings, transport and agriculture. The ESR drives compliance with the Energy Efficiency Directive, in particular with the energy savings obligation. The additionality requirement under the energy savings obligation provides incentives to Member States to implement national policies and measures that exceed the minimum energy performance requirements levels set at Union level (e.g. stricter national building codes and programmes promoting higher classes of appliances). Pricing measures such as the EU ETS[29] and the Energy Taxation Directive[30] make investments in energy efficiency more financially attractive but do not resolve the market barriers that lead to a sub-optimal level of investments. They therefore complement the energy efficiency legislation but do not replace it.

Before all measures and targets proposed under the `Fit for 55' Package will fully take effect and relieve European citizens from dependencies from fossil fuels and increasing energy

---

28 SWD(2021) 623, Annex M.

29 Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a system for greenhouse gas emission allowance trading within the Union and amending Council Directive 96/61/EC.

30 Council Directive 2003/96/EC of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity, OJ L 283, 31.10.2003, p. 51–70.

costs, during the transition period some action can lead to significant distributional effects. The extension of the EU ETS to the buildings and transport sectors is expected to result in increasing energy prices as fuel suppliers are likely to pass on carbon costs to consumers, and may thus affect vulnerable customers and final users relying on fossil fuels, or people at risk of energy poverty. Targeted measures to ease the transition both at European and at national level. The `Fit for 55 Package´ proposes specific measures under the EED, and a new funding instrument based on the revenues from the new ETS to mitigate the impact of higher costs for consumers as a result of the introduction of a carbon price in the road transport and building sectors. It is key to ensure that energy efficiency investments take place amongst the most vulnerable in our societies. Support measures to strengthen the energy savings obligation and to empower and protect vulnerable customers, households affected by or at risk of energy poverty, and, where applicable, people living in social housing, can help to mitigate these effects. A combined effect of the proposed measures under the EED and the new funding tool based on the revenues from emissions trading in the new sectors will help addressing the possible negative social effects in an effective manner and in the spirit of solidarity. Revenues from the EU ETS, including from emissions trading in the new sectors, will also remain available to Member States to finance measures intended to improve energy efficiency, district heating systems and insulation, or to provide financial support to lower- and middle-income households.

To address the social impacts arising from the emissions trading for the two new sectors of buildings and road transport, a Social Climate Fund ('the Fund') is created. In order to ensure that the Union budget can sustain the additional expenditure for the Fund, the Commission puts forward in parallel to this Fund Regulation proposals to amend both the Regulation for the Multiannual Financial Framework for the years 2021 to 2027 and Council Decision (EU, Euratom) 2020/2053 ('the Own Resource Decision'). In particular, a part of the revenues from the emission trading for the road transport and buildings will accrue to the Union budget. The Fund should provide funding to Member States to support their measures and investments intended to increase energy efficiency of buildings, to carry out energy efficiency improvements, building renovation, and to decarbonise heating and cooling of buildings, including the integration of energy production from renewable energy sources and to finance zero- and low- emission mobility. Member States could also consider temporary direct support to vulnerable households alongside investments accelerating further structural change.

Moreover, in line with the Renovation Wave Strategy, the Union funding support to energy efficiency and buildings renovation investments that will help addressing or preventing energy poverty, is present in a number of new and existing programmes of the MFF and the Next Generation EU.

Another key source of funding for energy efficiency investments is provided through the Recovery and Resilience Facility, which will make available to Member States a total of 672,5 euro billion between grants and loans. Within the overall target of 37% of the RRF funds to be dedicated to climate actions, Member States plan to spend significant amounts on buildings renovation investments, in line with the guidance from the European Commission, specifically targeting worst performing buildings and energy poor households.

The Cohesion Policy funds, within the overall climate target of 30% and through the thematic concentration on Policy Objective 2, will continue allocating important share of Union budget to energy efficiency and buildings renovation investments, while InvestEU, through the dedicated financial instruments and technical assistance, especially the ELENA Facility, will mobilise at scale private and public investments in the Member States.

The Just Transition Fund, with the overall budget of 17,5 euro billion, will aim to alleviate the social and economic costs resulting from the transition to a climate-neutral economy, including through investments in energy efficiency and buildings renovation that will have the dual benefit of creating local jobs and addressing energy poverty in a durable manner.

Finally, the centrally managed programmes like LIFE or Horizon Europe will have funding priorities supporting a just and green transition, in line with the specific programmes' objectives and their nature, *i.e.* aiming at technology and market innovation and best practices development in energy efficiency policy implementation. The EU road vehicle CO_2 legislation requires manufacturers to reduce the new vehicle fleet average tail pipe CO_2 emissions from the vehicle mix they sell. Regulations have been put in place for Heavy Duty Vehicles and for passenger cars and light commercial vehicles[31]. These regulations mean that manufacturers must either deploy technology to improve the energy efficiency of the vehicles (for example by reducing their aerodynamic or rolling resistance or powertrain efficiency) or by using an energy source with reduced CO_2 emissions in use. Switching to fully electric powertrains avoids the energy losses from internal combustion engines and leads to a fraction of the final energy use per km. Reduction of energy use in the transport sector as a result of the vehicle CO_2 legislation is reflected in the quantification of the overall EU energy efficiency target. The Energy Efficiency Directive will create synergies with the measures of the Sustainable and Smart Mobility Strategy. While leaving the full flexibility and discretion to the Member States regarding the choice of measures for achieving the reduction in energy use in transport, the Directive will incentives the uptake of energy efficiency measures in the transport sector. The Circular Economy Action Plan is also complementary to the EED. Designing products and infrastructures for longer lifetimes, or re-using and recycling raw materials, leads to lower energy consumption and GHG emissions along the life-cycle of products and infrastructures. The Renovation Wave Strategy puts focus on ensuring that Europe's buildings are more energy-efficient, less carbon-intensive over their full life-cycle and more sustainable. Circular economy principles can help reduce pollution and materials-related greenhouse gas emissions of building renovation.

2. LEGAL BASIS, SUBSIDIARITY AND PROPORTIONALITY

• Legal basis

The Proposal is based on Article 194(2) of the Treaty on the Functioning of the European Union, which is the legal basis for measures on energy. The proposed measures aim at improving energy efficiency across sectors and throughout the full energy chain, and thus pursues one of the objectives listed in Article 194, namely, promoting energy efficiency and energy saving in accordance with Article 194(1)(c). As the Treaty contains a specific energy legal basis, it is appropriate to use it.

• Subsidiarity (for non-exclusive competence)

The subsidiarity principle is addressed in this Proposal as the Union does not have exclusive competences on energy policy. The Proposal builds on the growing importance of energy efficiency as a political and economic challenge and its close interrelation to the policy areas

[31] Regulation (EU) 2019/631 of 17 April 2019 of the European Parliament and of the Council setting CO_2 emission performance standards for new passenger cars and for new light commercial vehicles

of security of energy supply, climate change, internal market and economic and social development.

The need for EU action

EU action is thus justified on grounds of subsidiarity in line with Article 191 TFEU since coordination at the European level, in fact, enhances energy security and environmental and climate benefits. The underlying problems causing a shortfall in energy savings (compared to the optimal level from the perspective of society) are the same across the EU and are present everywhere.[32]

Union level action is needed to ensure that Member States contribute to the EU level binding energy efficiency target and that it is collectively and cost-effectively met. Member States are required to define their own ambition levels, including trajectories that correspond to their national circumstances and context. The nature of the instrument and the fact that the energy efficiency target is not binding at national level respects the principle of subsidiarity. By taking into account the national context and specificities, Member States will retain the same level of flexibility in terms of selecting their policy mix, sectors and the approach to achieve the required energy savings by 2030.

Given the higher climate target, Union action will supplement and reinforce national and local action towards increasing efforts in energy efficiency. The Governance Regulation already foresees the obligation for the Commission to act in case of a lack of ambition by the Member States to reach the Union targets, thus *de facto* formally recognising the essential role of Union action in this context, and EU action is thus justified on grounds of subsidiarity in line with Article 191 TFEU.

The underlying problems causing a shortfall in energy savings (compared to the optimal level from the perspective of society) are the same across the Union and are present everywhere. In view of the external costs of energy consumption (e.g. greenhouse gas emissions, air pollutant emissions, energy security), actions to increase energy efficiency and reduce energy use are likely to lead to benefits beyond national borders. For trans-boundary problems, Member State action is unlikely to lead to optimal outcomes. In the presence of a higher climate target, which requires a higher energy efficiency target, Union action must supplement and reinforce national and local action.

In addition, the nature of the instrument and of the fact that the energy efficiency target is not binding at national level respects the principle of subsidiarity. Member States retain the same level of flexibility in terms of selecting their policy mix, sectors and the approach to achieve the required energy savings by 2030, by taking into account the national context and specificities. However, energy is a policy field with high investment needs.

A coordinated approach at Union level can create trust, reliability and continuity, increasing the likelihood of different actors investing and getting involved. Policies at Union level can also create a just and fair transition for countries and regions with economies that may be significantly impacted by changes in industrial structure or employment as a result of the energy transition towards decarbonisation.

---

[32] SWD(2021) 623, section 2.

Coordinated action at the Union level, furthermore, enables better account to be taken of the different capabilities to act among Member States. An external cost occurs when producing or consuming a good or service imposes a cost (negative effect) on a third party.

EU added value

Energy efficiency policies are a crucial mechanism to reduce greenhouse gas emissions and contributes to bringing enviromental, economic and social benefits such as better air quality, reduced energy bills and better health. The Union's energy and climate targets for 2030 are collective targets. In this regard, coordinated Union policies have a better chance of transforming the Union to a climate neutral continent by 2050. A common approach is the most effective way to ensure the fulfillment of international commitments.

Concrete actions to reduce energy consumption need to be carried out at Member States' level. Nevertheless, an effective framework for those actions is needed at Union level. A coordinated and harmonised approach at the Union level will enable and enhance Member States' actions, and ensure the four freedoms. A common Union approach will help, for example, to create larger markets for European suppliers, workers and goods, and ensure that the same obligations and rules apply. This will protect and boost competition. A common approach at Union level will allow consumers to enjoy the same basic rights and to receive comparable and recognisable information across the Union. A common Union approach to energy efficiency will enable addressing specific common challenges such as the need to alleviate energy poverty.

The experience from the implementation of the Energy Efficiency Directive has shown that a common Union framework is socially just, reduces costs, increases benefits from the internal market and allows national policy-makers to learn from each other. The Energy Efficiency Directive effectively complements and catalyses other national and Union measures. Policies adopted at Union level reflect the close interrelation of the policy areas of climate change, security of supply, sustainability, environment, internal market, social and economic development. Effects on the single market concerning growth, investments and jobs creation can thus be considered when policies and measures are being decided and implemented. This was supported by the Task Force of mobilising Member States efforts to reach 2020 energy efficiency targets, which called for a strong, targeted and common energy efficiency policy framework to attract the necessary investments, ensure the energy savings are achieved in a just and fair way.

Moreover, the Union single market acts as a strong driver for cost-efficiency in achieving GHG emission reductions.

A common Union action will ensure that that the objectives of the policy are achieved collectively at the lowest possible cost. Therefore, to reach the overall targets collectively, the coordinated action at Union level can enable and enhance efforts at national level by ensuring a more harmonised approach, helping to create markets of scale for European suppliers, and ensuring that they are under the same obligations and rules.

An Union-level framework will also provide more investor certainty. It will provide a general impetus across the whole single market to invest in more energy efficient products of all types. The definition of Union and national objectives gives a clear indication on how much efforts are expected in energy efficiency, and it helps defining the size of the market for energy efficient products and services. This will send a signal to suppliers and manufacturers to put more effort into product development in this regard.

Delivering on energy efficiency while empowering consumers requires meaningful, accurate and understandable information on energy use, related costs, and easy access to a competitive market of building construction materials (windows, insulation, etc.), heating and cooling solutions, and other products that help improve energy efficiency.

Sector-specific measures, for example aimed at the heating and cooling sector, to ensure appropriate attention to sectors, where the largest reduction of GHG emissions need to be achieved. Harmonised planning ensures compareable quality of the national policies and measures. It also ensures availability of structured information on the sectoral objectives and plans in Member States, thus helping Member States and market participants to plan their activities. In the case of heating and cooling it helps ensuring a sufficient market with common standards for the suppliers of high efficiency equipment for district heating and cogeneration to lower costs and to motivate them to innovate and improve their offer.

By acting at Union -level, several barriers to public and private investments can be tackled, addressing the lack of coordination between various authorising bodies at national level and stimulating the administrative capacity to implement cross-border projects and support schemes.

The Energy Efficiency Directive essentially sets the overall energy efficiency objective, but leaves the majority of actions to be taken to achieve this objective to the Member States. The application of the `Energy Efficiency First´ principle leaves flexibility to the Member States. The Energy Efficiency Directive sets binding energy efficiency targets at Union level, but will not establish binding targets at national level in the 2020 and 2030 perspective. Member States should establish their contribution to the collective achievement of the Union's energy efficiency target taking into account the formula provided in the Energy Efficiency Directive. An obligation to achieve an annual reduction of the energy consumption in the public sector will ensure that the public sector fulfils its exemplary role, whereas Member States retain full flexibility regarding the choice of energy efficiency improvement measures to achieve the required reduction of the final energy consumption. In addition, the Energy Efficiency Directive will continue providing an annual rate of renovation required related to the floor area of buildings. The scope of this obligation is extended to buildings owned by all public bodies on the territory of a Member State. This measure shall ensure that Member States continue leading by example through upgrading the energy performance of buildings in their spheres, while retaining the flexibility regarding the choice of measures. Furthermore, the Energy Efficiency Directive will provide the necessary framework to ensure high energy efficiency performance of products, services, works and buildings purchased by public bodies, and to consider, where appropriate, wider sustainability, social, environmental and circular economy aspects. A harmonised approach, including considering energy efficiency aspects in tendering processes, will preserve competition, ensure long-term and cost-effective energy savings and allow for continuing markets of scale. The Energy Efficiency Directive will extend the energy savings by increasing the savings rate. Member States should continue achieving new annual energy savings from policy measures across all sectors. Since the energy savings obligation is an effective measure to improve energy efficiency in various sectors, it is also an effective tool to support Member States in the alleviation of energy poverty. Thus, the energy savings obligation will require Member States to achieve an individually calculated share of the total amount of energy savings required towards vulnerable customers and final users, people affected by energy poverty and, where applicable, people living in social housing. A harmonised approach can contribute to a just energy transition for all European citizens. The energy savings obligation retains full flexibility for Member States with regard to the types of policy measures, their size, scope and content. The Energy Efficiency Directive will ensure the same level of basic contractual rights

for all European citizens regarding heating, cooling and domestic hot water. Whereas the Energy Efficiency Directive will require the implementation of certain basic contractual rights of customers, the national competences would not be restricted. One level playing field across the EU is also required with regard to consumer information and awareness raising activities. Member States are required to take appropriate measures, whereas the concrete design of such actions remain at their discretion. The Union -wide impacts of economic and health crisis show that a harmonised approach is also required to empower and protect vulnerable customers and final users and those affected by energy poverty.

To ensure the same level of protection and empowerment, the Energy Efficiency Directive requires to implement and finance energy efficiency improvement measures as a priority among those people, which will also support Member States in mitigating distributional effects. Network of experts will facilitate Member States´ actions in this regard and should be established in all Member States. While requiring mandatory energy audits for large enterprises, as energy savings can be significant, Member States will retain flexibility to develop programmes to encourage SMEs to undergo energy audits. Regarding the heating and cooling sector, Member States retain their competences to carry out a comprehensive assessment of the potential for high-efficiency cogeneration and efficient district heating and cooling, and may grant exemptions in the area of waste heat recovery through high-efficiency cogeneration or by supplying a district heating or cooling network. The Energy Efficiency Directive will allow Member States to introduce measures and procedures to promote cogeneration installations. To contribute to the creation of a single market, all Member States, National Regulatory Authorities, transmission and distribution system operators should apply the `Energy Efficiency First´ principle and remove all regulatory, technical and non-regulatory measures for energy efficiency improvements in the operation of energy networks. The development of a market for energy services to ensure the availability of both the demand for and the supply of energy services would remain subject to Member States´ discretion. The Energy Efficiency Directive would retain the flexibility for Member States to take action to identify and address regulatory and non-regulatory barriers for energy efficiency improvements. Member States and regions would be encouraged to make full use of the Structural and Investments Funds and other financing facilities to trigger investments in energy efficiency improvement measures, to alleviate energy poverty, and to mitigate any distributional effects on vulnerable customers and final users, people affected by energy poverty, and those living in social housing.

The proposal therefore complies with the subsidiarity principle.

- **Proportionality**

Based on the accompanying Impact Assessment[33] and in accordance with the principle of proportionality, overall the proposed modifications do not go beyond what is necessary to achieve the objectives to reach the higher energy efficiency ambition in view of the increased climate target for 2030. As regards the energy efficiency targets, the amendments are proportional to the required Union ambition in line with the increased climate target of at least 55% GHG emissions reduction as proposed by the Climate Target Plan. Several amendments set specific targets and obligations for public administrations to achieve energy savings in certain areas – public sector and energy poverty, which will be overall proportionate. Regarding the energy savings obligation for the public sector, public bodies are defined in the

[33] SWD(2021) 623.

Public Procurement Directive 2014/24/EU (contracting authorities). Member States would need to establish a database with public bodies, including their annual energy consumption. The proposed energy consumption reduction obligation leaves significant flexibility to Member States as to where and how energy savings could be achieved. Given the cost-benefits that would accrue from implementing savings measures, this effort is considered effective and not excessive. The Proposal also aims to address distributional impacts from the extension of emission trading to buildings and transport. Setting definitions and obligations notably in relation to heating and cooling would be proportionate to the additional energy savings and synergies with the other instruments that could be achieved in this sector. Proportionality of additional monitoring and reporting requirements depend on the balance between increased cost and savings achieved due to a better understanding of the impacts of relevant measures.

The level of constraint imposed is thus proportionate to the objective.

- **Choice of the instrument**

The instrument chosen is a Directive that has to be implemented by the Member States. A Directive is the appropriate instrument as it clearly defines the Union objectives to be reached, while leaving sufficient flexibility to Member States to implement it in the way that suits their particular national circumstances.

The proposal combines a codification and an amendment of the Energy Efficiency Directive. In the context of a people's Europe, the Commission attaches great importance to simplifying and clarifying the law of the Union so as to make it clearer and more accessible to citizens, thus giving them new opportunities and the chance to make use of the specific rights it gives them. The proposal entails a substantive amendment to the Energy Efficiency Directive, which has been amended several times.

To align the two processes, the revision and the codification processes, the Commission proposes a Recast of the Energy Efficiency Directive. The recasting technique contributes to simplifying Union legislation by allowing the adoption of a single legislative text, which simultaneously makes the desired amendment, codifies that amendment and previous ones the unchanged provisions of the earlier act, and repeals that act and previous amending acts. Therefore, a recast Directive is the appropriate instrument and is in line with the Commission's commitment under paragraph 46 of the Inter-institutional Agreement on better law-making[34]. The new legal act will replace and repeal the earlier act 2012/27/EU.

Where the Articles have been given new numbers, the correlation between the old and the new numbers is shown in a table set out in Annex XVI to the recast Directive.

3. RESULTS OF EX-POST EVALUATIONS, STAKEHOLDER CONSULTATIONS AND IMPACT ASSESSMENTS

[34] OJ L 123, 12 May 2016, p.1.

- **Ex-post evaluation of existing legislation**[35]

The Energy Efficiency Directive remains relevant in delivering increased energy efficiency in the Union and contributing to an increased climate target of 55%. It also reaps other benefits such as decreasing dependence on energy imports and spur innovation and competitiveness. Evaluation has shown that it is for the Energy Efficiency Directive to ensure that Member States adequately undertake actions in specific energy consuming areas. Various studies carried out by the Commission, as well as evidence from stakeholders[36], show that, even with existing technologies, there is still significant scope for energy efficiency investments and cost-effective savings in Member States' economic sectors and in the society at large.

However, under business-as-usual, and even more so as a result of the adverse socio-economic impacts and income losses due to Covid-19 crisis, a large share of this energy efficiency and energy saving potential would remain unexploited, including due to market and regulatory failures, which prevent cost-effective energy efficiency investments and actions from taking place. Given the significant energy savings potential, further promotion of energy efficiency actions and the removal of continued existence of barriers to energy efficient behaviour, including for investments, are necessary.

The evaluation shows that there seems to be a reluctance in the public sectors to include energy efficiency requirements systematically in procurement, mainly because purchase price. Thus, there is a scope for strengthening and streamlining the Energy Efficiency Directive so that it contributes to achieving the higher climate target and the European Green Deal objectives. Furthermore, there is a potential for the Energy Efficiency Directive to better tackle socio-economic challenges like protecting and empowering vulnerable customers and final users and alleviating energy poverty. Regarding industries, the evaluation shows that a key barrier is likely to be that most businesses do not have the expertise to know what technical energy saving opportunities are available, or what their economic benefits might be for the business.

In terms of effectiveness, the Energy Efficiency Directive has led to energy efficiency improvements across the Union thanks to its targets (notably Article 3 and Article 5) and binding measures (notably Article 7 on energy savings obligations), even though the progress in achieving the Union energy efficiency targets for 2020 was not sufficient. Achieving the necessary level of energy efficiency improvements relies largely on Member States' ambition when setting objectives, and their efforts when developing and implementing energy efficiency measures at national level. Although the Energy Efficiency Directive sets final and primary energy consumption limits for the Union as a whole, and the Governance Regulation provides for further Union measures if the targets are not met, the indicative nature of the target does not support its achievement. Article 7 remains an effective measure responsible for generating energy savings mostly in the buildings sector. Obligations for public sector (Articles 5 and 6) proved key to demonstrate the exemplary role of central governments in promoting energy efficiency via renovations and public procurement. However, the measures were implemented at a limited scale, and a number of limitations prevent reaping energy savings potential in the public sector. The Energy Efficiency Directive was also key to promoting the use of energy audits across the Union (Article 8). However, important

---

35 SWD(2021) 623.

36 See e.g. https://www.eiif.org/sites/default/files/2020-12/EiiF_White%20paper_2020_REV.15.pdf.

limitations remain such as follow up to audits and challenges related to application of the SMEs definition, lack of requirements and incentives for implementing energy management systems. The requirements of Article 14 on heating and cooling, in particular the requirement to establish comprehensive assessments, helped to increase the overall importance and awareness of heating and cooling in all Member States. However, the analysis showed that the overall impact had rather been low, in particular due to the lack of follow up given to the findings from the comprehensive assessments carried out in line with Article 14, and the wide use of exemptions allowed. The Energy Efficiency Directive largely contributed to the development of energy services markets and energy performance contracting (Article 18). However, important barriers still remain to be tackled.

In terms of efficiency, overall, the Energy Efficiency Directive has contributed to achieving energy savings in the Union in a cost-effective manner. Several provisions subject to `conditionalities´ (e.g. in Articles 5, 6, 9-11, 14) required to act, if it is cost-effective/ economically or technically feasible. It gave significant flexibility to Member States to choose measures. However, Member States have not always demonstrated how the feasibility was established. There are no indications for significant differences in the magnitude of costs amongst the Member States for most of the provisions of the Energy Efficiency Directive, except for Article 7 (the costs depend on the design and scope of the measure).

In terms of coherence, the Energy Efficiency Directive is overall coherent with broader energy and climate policies, however, the increasing interlinkages with renewable energy and the EU ETS require proper streamlining and closer look at reducing administrative burden. In addition, the Energy Efficiency Directive provisions need to be adapted to support the decarbonisation and zero pollution objectives in the context of the initiatives under the European Green Deal.

In terms of Union added value, Union intervention was key to achieve energy efficiency improvements across the Union. It is clear that without the EU level target and binding measures it would not have been achieved to the scale observed. However, there is scope for strengthening and streamlining some provisions to ensure that the Energy Efficiency Directive delivers the required efforts in view the higher Union climate target of at least 55% for 2030.

- **Stakeholder consultations**

The evaluation roadmap/ inception impact assessment was published on 3 August 2020 and was available until 21 September 2020.

The Commission received 189 replies, and 99 stakeholders submitted supplementary statements and information to their replies. The largest number of replies were received from business associations (80 replies), followed by companies (36 replies) and NGOs (26 replies). In addition, nine dedicated stakeholder meetings were organised in the period from September to October 2020 with targeted stakeholder groups on specific topics, and a dedicated Energy Efficiency Directive expert group meeting was held on 10 November 2020. The Commission also launched the internet based public consultation from 17 November 2020 until 9 February 2021, in line with the Commission Better Regulation rules. The survey contained multiple choice and open questions covering a wide range of aspects concerning the ex-post evaluation and options for the revision of the Energy Efficiency Directive. In total 344 replies were received. The largest group of respondents covered was business associations (132 replies), individual businesses and companies (92 replies), followed by NGOs (34 submissions). 21 respondents submitted replies as individual citizen. 24 public authorities replied, including

national authorities from 9 Member States (Cyprus, Czechia, Estonia, Finland, France, Lithuania, Netherlands, Spain, and Sweden).

A clear majority of stakeholders (86% of respondents) expressed views that energy efficiency should play a key role in supporting more ambitious climate targets for 2030 and in view of achieving the Union's carbon neutrality by 2050. Stakeholders largely supported the strengthening of the Energy Efficiency Directive in this regard. A majority of stakeholders (53%) favoured binding energy efficiency targets, including at national level (47%). Stakeholders believed that additional energy efficiency efforts are needed in buildings (76%) and transport (62%), followed by industry (52%) and ICT (40%).

The views of the stakeholders as expressed in the public consultation and during the workshops have been taking into account when elaborating the various policy options on the respective policy areas in the Impact Assessment.

In June, the European Commission and hosted a hearing with European social partners on the `Fit for 55 Package´. European social partners were asked to share their initial reactions on this package and to express their view on which accompanying measures and mechanisms could be put in place to make sure nobody is left behind. The need for stronger interactions between the European Pillar of Social Rights and the European Green Deal were raised and explained that the objectives of both dimensions should be the two faces of the same coin.

- **Collection and use of expertise**

The COWI support study was the only contract explicitly intended to directly support the preparation of the Impact Assessment. Many other reports have provided relevant information. In the case of the energy audit requirements there was a specific assessment of the problems of implementing the definition used in Article 8(4) of the EED.

- **Impact assessments**

The overall energy saving ambition and the level of the energy saving obligations are consequences of a cost-effective approach to achieve the overall 55% GHG saving ambition. The measures explored in the impact assessment[37] are additional elements to support and enable energy saving measures that will facilitate investments in energy efficiency improvements and thus reduce the overall cost of achieving the energy saving and the GHG reduction targets.

Measures were considered in ten different areas that are not mutually exclusive. These vary and cover non-regulatory and regulatory measures. Different regulatory measures of varying stringency were explored. The identification of the preferred option requires a judgement about the optimal impact for each area contrasted with the regulatory effort and administrative burden.

The main impact of the measure will be that the Union uses less energy without affecting the delivering of desired services. This reduction in energy use will be accompanied by co-benefits such as improved energy security and reduced environmental impacts. The lower environmental impacts are primarily due to around 8% lower emissions of air pollutants, but there are also expected to be environmental benefits from the reduced need for fuel supply,

[37] SWD(2021) 623.

reduced infrastructure needs and lower emissions to water, for example from flue gas clearing equipment. Appropriately targeted public support for building renovations can also bring substantial social benefits thanks to alleviation of energy poverty and commensurate improvements in human health.

In all areas, the energy savings are mainly expected to be delivered by energy saving investments that return the capital cost in a few years. Information on the expected payback times is provided by sector and type of investment.

- **Regulatory fitness and simplification**

The revision is a Recast of the Directive. The Impact Assessment[38] identified possibilities for simplification of the existing legislation and reduction of regulatory costs while aiming at effectiveness of the proposed modifications. Removal of the alternative approach to renovation of public bodies' buildings will simplify the provisions as it would focus on renovations only. Specific technical aspects in relation to public buildings and certain exemptions are deleted given that they are regulated under the Energy Performance of Buildings Directive. Removing conditionalities of cost-effectiveness, technical or economic feasibility as regards energy efficiency requirements in public procurement will simplify the implementation of the energy efficiency requirements, as they will apply equally to all public authorities. IT development and procurement choices will be subject to pre-approval by the European Commission Information Technology and Cybersecurity Board.

Ensuring that energy audit efforts are focussed on larger energy users will lead to proportionately higher energy savings, which would result in a substantial reduction in burden for businesses with a lower energy use, as well as simplifying the burden on public administrations, since they would have a simpler criterion to assess the need for audits as well as a smaller number of businesses to verify. The increased compliance costs for those businesses remaining under the scope of the provision would be expected to be paid back through increased uptake of cost-effective improvement measures.

Amendments will strengthen the existing monitoring and reporting requirements notably regarding measures targeting energy poverty under energy savings obligation (Article 8) and building renovations for public sector, which would ensure a more effective outcomes, but will also result in a higher administrative burden for public authorities. Requiring additional monitoring and reporting requirements as regards public procurement and energy performance contracting would further improve the effectiveness of these provisions, but may increase administrative burden to some extent on businesses and public authorities.

Providing further guidance and support in view of Member States' actions, e.g. on awareness raising will result in a short-term increase of administrative burden, as the different information campaigns, knowledge exchanges or support schemes would have to be set up by Member States, but this is expected to be cost-effective in the medium term due to increased energy savings.

---

[38] SWD(2021) 623.

The additional reporting and monitoring requirements will not create any new reporting systems but would be subject to the existing monitoring and reporting framework under the Governance Regulation (EU/2018/1999).

- **Fundamental rights**

The Proposal is in line with Article 37 of the Charter of Fundamental Rights of the European Union, which requires that a high level of environmental protection and the improvement of the quality of the environment be integrated into the policies of the Union and ensured in accordance with the principle of sustainable development.

4. BUDGETARY IMPLICATIONS

The Proposal has no implication for the Union budget. The amendments would result in moderate administrative costs for public authorities.

5. OTHER ELEMENTS

- **Implementation plans and monitoring, evaluation and reporting arrangements**

After the adoption of this Recast Directive by the co-legislators, during the transposition period, the Commission will undertake the following actions to facilitate its transposition:

– Drafting of a correlation table that serves as transposition check-list for both Member States and the Commission.

– Organisation of meetings with Member States' experts in charge of transposing the different parts of the Directive to discuss how to transpose them and solve doubts, either in the context of the Concerted Action for Energy Efficiency Directive (CA-EED) or in a committee format.

– Availability for bilateral meetings and calls with Member States in case of specific question on the transposition of the Directive.

– After the transposition deadline, the Commission will carry out a comprehensive assessment of whether Member States have completely and correctly transposed the Directive.

Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action established an integrated energy and climate planning, monitoring and reporting framework, to monitor progress towards the climate and energy targets in line with the transparency requirements of the Paris Agreement. Member States had to submit to the Commission their integrated national energy and climate plans by the end of 2019, covering the five dimensions of the Energy Union for the period 2021-2030. Member States must report biennially on the progress made in implementing the plans and in addition, by 30 June 2023 they must notify the Commission of their draft updates of the plans, with the final updates due on 30 June 2024. This update would cover any new targets agreed in the revision of EED. This reporting system under the Governance Regulation is considered to have been effective in monitoring Member States' progress towards the Union and national level energy efficiency energy contributions.

New provisions, mainly related to setting national contributions, gap filling mechanisms and reporting obligations, have been provided with this proposal. These proposals should be transferred and streamlined with the Governance Regulation (EU) 2018/1999, once it is

revised to avoid overlapping requirements. Some provisions of the Governance Regulation might also need to be reassessed in view of the changes proposed in this Directive.

An evaluation of the ambition level of Articles 4, 5, 6 and 8 is proposed in Article 33 of this recast Directive.

- **Explanatory documents (for directives)**

The EED introduces a new article (Article 3) on the Energy Efficiency First principle to ensure that the principle is applied where relevant and properly monitored across the board. The Directive does not specify how this should be done given the wide scope of application of the principle. To facilitate the implementation of the Energy Efficiency Directive provisions, the European Commission will issue a recommendation to Member States including a guidance how the principle should be interpreted and applied in various contexts. This guidance document should help make the principle more operational.

Following the ruling of the European Court of Justice in Commission vs Belgium (case C-543/17), Member States must accompany their notifications of national transposition measures with sufficiently clear and precise information, indicating which provisions of national law transpose which provisions of a directive. This must be provided for each obligation, not only at `article level´.

- **Detailed explanation of the specific provisions of the proposal**

The main provisions which substantially change Directive 2012/27/EU or add new elements are the following:

Articles 1 and 4 set an increased Union binding energy efficiency target for final and primary consumption, as well as indicative national energy efficiency contributions and provides a formula to Member States to calculate their contributions. The Union targets are set in terms of the level of final and primary energy consumption to be achieved in 2030 and the level of ambition is expressed by comparing these levels to the 2020 Reference Scenario projections for 2030. The level of ambition expressed in such way reflects additional efforts compared to the efforts that are in place or indicated in the National Energy and Climate Plans. Comparisons to the previous baseline that is the 2007 Reference Scenario projections for 2030 and historical values from 2005 are kept in the recitals.

National contributions remain indicative given strong opposition by the majority of Member States towards binding national targets expressed in the public consultation and in other fora. However, benchmarks and new delivery gap mechanisms are proposed complementing those that were proposed in the Governance Regulation.

Article 3 introduces a new provision on the Energy Efficiency First principle, to provide the legal basis for the application of the principle, while minimising the administrative burden. It includes an obligation to consider energy efficiency solutions in policy and investment decisions in energy systems and non-energy sectors, including social housing.

Article 5 introduces an obligation for the public sector to reduce its energy consumption for public services and installations of public bodies. This can be reached in any subsector of the public sector, including transport, public buildings, spatial planning and water and waste management amongst others.

Article 6 broadens the scope of the renovation obligation. The obligation will now be applied to all public bodies at all administration levels and in all sectors of public bodies' activities,

including healthcare, education and public housing, where the buildings are owned by public bodies. This will bring the benefits of public buildings renovation closer to all people in all Member States and it will multiply the renovations in the public sector. Article 6 aims at renovations meeting the Near Zero Energy Buildings (NZEB) standard, which is an enhanced cost effective standard for renovations. The renovation rate remains at least 3%, which is the lowest common denominator for a minimum renovation rate, while it is recognised that some Member States, regions and cities have already adopted higher renovation requirements and standards in the public sector. Finally, the alternatives that allowed Member States to reach similar energy savings through other measures than renovations are deleted. Such measures can continue counting for the energy savings obligations under Article 8 and contribute to the achievements of the obligation under Article 8. Article 6 aims at renovations in line with the Renovation Wave Strategy.

Article 7 strengthens the public procurement provisions by extending the obligation to take into account the energy efficiency requirements by all public administration levels, and by removing conditionalities with regard to cost-effectiveness, technical and economic feasibility. The amendments will include a provision that Member States may require that public bodies consider where appropriate circular economy aspects and green public procurement criteria in public procurement practices. Member States will be required to support public bodies by providing guidelines and methodologies on the assessment of lifecycle costs, and by putting in place competence support centres and encouraging using aggregated procurement and digital procurement. Member States would be required to publish information on wining tenders (in line with the thresholds set out in the public procurement directives).

As part of the exemplary role of the public sector Article 7 also includes a provision that contracting authorities may require that tenders disclose a Global Warming Potential of new buildings (numeric indicator in kgCO2e/m² (of useful internal floor area) for each life cycle stage averaged for one year of a reference study period of 50 years), in particular for new buildings above 2000 square meters. It is linked to a provision aimed at increasing awareness to circular economy and whole life-cycle of carbon emissions in public procurement practices.

Amendments to Article 8 increase the annual energy savings obligation to 1.5% for all Member States (including Cyprus and Malta), and includes specific requirements for the alleviation of energy poverty. It requires to implement policy measures as a priority among vulnerable customers and final users, people affected by energy poverty and, where applicable, people living in social housing, and to make best possible use of public funding and, where applicable, to consider the use of revenues of ETS allowances. Article 8 requires Member States to ensure that national policy mix has no adverse effects on vulnerable customers and final users, people affected by energy poverty and, where applicable, people living in social housing and that those policies effectively alleviate and reduce energy poverty. Article 8 requires Member States to achieve a share of the total amount of required end-use energy savings among vulnerable customers and final users, people affected by energy poverty and, where applicable, people living in social housing. Article 8 establishes a delivery gap mechanism regarding the required amount of energy savings to be achieved in a given obligation period. The energy savings obligation does not foresee the application of the flexibilities to calculate the required amount of energy savings alternatively as of 1 January 2024 (Article 8(6) to (9)). Article 9 includes transmission system operators as potential obligated parties, and allows Member States to require obligated parties to achieve an amount of energy savings among vulnerable customers and final users, people affected by energy poverty and, where applicable, people living in social housing. Annex V excludes the accountability of energy saving from policy measures regarding the use of direct fossil fuel

combustion technologies, and clarifies that a reduction of the energy use through measures under the ETS Directive cannot count towards the fulfilment of the energy savings obligation, and strengthens the additionality requirement regarding taxation measures.

Article 11 shifts the criterion for energy audits and energy management systems from the type of enterprises to the levels of energy consumption and requires a sign off of the audit recommendations by the management of the company. It also requires energy management systems for the largest energy using companies, which are likely to be more effective at ensuring that more cost saving energy saving investments will be made while probably having a lower overall cost burden on the company. Finally, the Article introduces an obligation for the monitoring of the energy performance of data centres with the aim of later establishing a set of "data centre sustainability indicators".

Article 20 strengthens the protection of consumers introducing basic contractual rights for district heating, cooling and domestic hot water, in line to the rights that the Directive (EU) 2019/944 introduced for electricity.

Article 21 strengthens the obligations towards consumers, in particular the availability and provision of information, the awareness raising measures and the technical and financial advice or assistance offered. Creation of one-stop shops, single points of contact and out-of-court mechanisms for the settlement of disputes are structures that will significantly help to empower customers and final users. Finally, the Article includes obligations to identify and lift barriers relevant to the split incentives between tenants and owners or among owners.

Article 22 refers to the concept of vulnerable customers, which Member States should establish pursuant to Articles 28 and 29 of Directive (EU) 2019/944 and Article 3(3) of Directive 2009/73/EC. Article 22 requires Member States to establish that concept by taking also into account final users, who have no direct or individual contract with energy suppliers.

Article 22 introduces an obligation for Member States to implement energy efficiency improvement measures as a priority among vulnerable customers, people affected by energy poverty and, where applicable, people living in social housing, to alleviate energy poverty. Member States are required to implement energy efficiency improvement measures to mitigate distributional effects from other policies and measures, such as taxation measures implemented according to Article 9 of this Directive, or the application of emissions trading under the EU ETS Directive, and to foster the roll-out of enabling funding and financial tools. Article 22 strengthens the role of expert networks.

Articles 23 and 24 lay down stricter planning and follow up of comprehensive assessments on heating and cooling, including the promotion of local and regional levels. The Articles introduce minimum requirements for efficient district heating and cooling systems, broader cost-benefit requirements and obligations on reuse of waste heat. Minimum requirements for the efficient district heating will be gradually increased with a view to ensure fully decarbonised heat or cooling supply in efficient district heating or cooling systems by 2050. The requirements for the high-efficiency cogeneration will be complemented with a criterion on direct emissions of the CO_2 from cogeneration, when this is not fuelled with renewables or waste.

Article 25 clarifies and enhance the role of National Regulatory Authorities in implementing the 'energy efficiency first' principle in the planning and operation of energy networks. It also makes use of the knowledge of ENTSO-E, ENTSOG and the EU DSO Entity for monitoring progress. Due to the very high number of system operators, an indirect approach is preferable.

Article 26 clarifies and reinforces the provisions on availability on qualification, accreditation and certification schemes for different energy services providers, energy auditors, energy

managers and installers. New provisions will require Member States to assess the schemes every four years starting as of December 2024.

Article 27 introduces additional requirements to increase the uptake of energy performance contracting.

Article 28 introduces a requirement for Member States to report on energy efficiency investments, including on energy performance contracts concluded (as part of Governance Regulation). Member States will be required to set up project development assistance mechanisms at national, regional and local levels to promote energy efficiency investments to help reaching the higher energy efficiency targets.

↓ 2012/27/EU (adapted)

2021/0203 (COD)

Proposal for a

DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on energy efficiency~~, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC~~ (recast)

(Text with EEA relevance)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 194(2) thereof,

Having regard to the proposal from the European Commission,

After transmission of the draft legislative act to the national Parliaments,

Having regard to the opinion of the European Economic and Social Committee[39],

Having regard to the opinion of the Committee of the Regions[40],

Acting in accordance with the ordinary legislative procedure,

Whereas:

⇩ new

(1) Directive 2012/27/EU of the European Parliament and of the Council[41] has been substantially amended several times[42]. Since further amendments are to be made, that Directive should be recast in the interests of clarity.

↓ 2012/27/EU recital 1 (adapted)

~~The Union is facing unprecedented challenges resulting from increased dependence on energy imports and scarce energy resources, and the need to limit climate change and to overcome the economic crisis. Energy efficiency is a valuable means to address these challenges. It improves the Union's security of supply by reducing primary energy consumption and decreasing energy imports. It helps to reduce greenhouse gas emissions in a cost-effective~~

[39] OJ C […], […], p. […].

[40] OJ C […], […], p. […].

[41] Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC (OJ L 315, 14.11.2012, p. 1).

[42] See Annex XV, Part A.

~~way and thereby to mitigate climate change. Shifting to a more energy-efficient economy should also accelerate the spread of innovative technological solutions and improve the competitiveness of industry in the Union, boosting economic growth and creating high quality jobs in several sectors related to energy efficiency.~~

↓ 2012/27/EU recital 2 (adapted)

~~The Conclusions of the European Council of 8 and 9 March 2007 emphasised the need to increase energy efficiency in the Union to achieve the objective of saving 20 % of the Union's primary energy consumption by 2020 compared to projections. The conclusions of the European Council of 4 February 2011 emphasised that the 2020 20 % energy efficiency target as agreed by the June 2010 European Council, which is presently not on track, must be delivered. Projections made in 2007 showed a primary energy consumption in 2020 of 1842 Mtoe. A 20 % reduction results in 1474 Mtoe in 2020, i.e. a reduction of 368 Mtoe as compared to projections.~~

↓ 2012/27/EU recital 3 (adapted)

~~The Conclusions of the European Council of 17 June 2010 confirmed the energy efficiency target as one of the headline targets of the Union's new strategy for jobs and smart, sustainable and inclusive growth ('Europe 2020 Strategy'). Under this process and in order to implement this objective at national level, Member States are required to set national targets in close dialogue with the Commission and to indicate, in their National Reform Programmes, how they intend to achieve them.~~

↓ 2012/27/EU recital 4 (adapted)

~~The Commission Communication of 10 November 2010 on Energy 2020 places energy efficiency at the core of the Union energy strategy for 2020 and outlines the need for a new energy efficiency strategy that will enable all Member States to decouple energy use from economic growth.~~

↓ 2012/27/EU recital 5 (adapted)

~~In its resolution of 15 December 2010 on the Revision of the Energy Efficiency Action Plan, the European Parliament called on the Commission to include in its revised Energy Efficiency Action Plan measures to close the gap to reach the overall Union energy efficiency objective in 2020.~~

↓ 2012/27/EU recital 6 (adapted)

~~One of the initiatives of the Europe 2020 Strategy is the flagship resource-efficient Europe adopted by the Commission on 26 January 2011. This identifies energy efficiency as a major element in ensuring the sustainability of the use of energy resources.~~

↓ 2012/27/EU recital 7 (adapted)

~~The Conclusions of the European Council of 4 February 2011 acknowledged that the Union energy efficiency target is not on track and that determined action is required to tap the~~

~~considerable potential for higher energy savings in buildings, transport, products and processes. Those conclusions also provide that the implementation of the Union energy efficiency target will be reviewed by 2013 and further measures considered if necessary.~~

↓ 2012/27/EU recital 8 (adapted)

~~On 8 March 2011, the Commission adopted its Communication on an Energy Efficiency Plan 2011. The Communication confirmed that the Union is not on track to achieve its energy efficiency target. This is despite the progress in national energy efficiency policies outlined in the first National Energy Efficiency Action Plans submitted by Member States in fulfilment of the requirements of Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services[43]. Initial analysis of the second Action Plans confirms that the Union is not on track. To remedy that, the Energy Efficiency Plan 2011 spelled out a series of energy efficiency policies and measures covering the full energy chain, including energy generation, transmission and distribution; the leading role of the public sector in energy efficiency; buildings and appliances; industry; and the need to empower final customers to manage their energy consumption. Energy efficiency in the transport sector was considered in parallel in the White Paper on Transport, adopted on 28 March 2011. In particular, Initiative 26 of the White Paper calls for appropriate standards for CO_2 emissions of vehicles in all modes, where necessary supplemented by requirements on energy efficiency to address all types of propulsion systems.~~

↓ 2012/27/EU recital 9 (adapted)

~~On 8 March 2011, the Commission also adopted a Roadmap for moving to a competitive low carbon economy in 2050, identifying the need from this perspective for more focus on energy efficiency.~~

↓ 2012/27/EU recital 10 (adapted)

~~In this context it is necessary to update the Union's legal framework for energy efficiency with a Directive pursuing the overall objective of the energy efficiency target of saving 20 % of the Union's primary energy consumption by 2020, and of making further energy efficiency improvements after 2020. To that end, this Directive should establish a common framework to promote energy efficiency within the Union and lay down specific actions to implement some of the proposals included in the Energy Efficiency Plan 2011 and achieve the significant unrealised energy saving potentials it identifies.~~

↓ 2012/27/EU recital 11 (adapted)

~~Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020[44] requires the Commission to assess and report by 2012 on the progress of the Union and its Member States~~

---

43 ~~OJ L 114, 27.4.2006, p. 64.~~

44 ~~OJ L 140, 5.6.2009, p. 136.~~

~~towards the objective of reducing energy consumption by 20 % by 2020 compared to projections. It also states that, to help Member States meet the Union's greenhouse gas emission reduction commitments, the Commission should propose, by 31 December 2012, strengthened or new measures to accelerate energy efficiency improvements. This Directive responds to this requirement. It also contributes to meeting the goals set out in the Roadmap for moving to a competitive low carbon economy in 2050, in particular by reducing greenhouse gas emissions from the energy sector, and to achieving zero emission electricity production by 2050.~~

🡻 2012/27/EU recital 12 (adapted)

~~An integrated approach has to be taken to tap all the existing energy saving potential, encompassing savings in the energy supply and the end-use sectors. At the same time, the provisions of Directive 2004/8/EC of the European Parliament and of the Council of 11 February 2004 on promotion of cogeneration based on a useful heat demand in the internal energy market[45] and Directive 2006/32/EC should be strengthened.~~

⇩ new

(2) With the Climate Target Plan[46], the Commission proposed to raise the Union's ambition by increasing the greenhouse gas emissions (´GHG´) target to at least 55% below 1990 levels by 2030. That is a substantial increase compared to the existing 40% target. The proposal delivered on the commitment made in the Communication on the European Green Deal[47] to put forward a comprehensive plan to increase the Union's target for 2030 towards 55% in a responsible way. It is also in accordance with the objectives of the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (the 'Paris Agreement') to keep the global temperature increase to well below 2°C and pursue efforts to keep it to 1,5°C.

(3) In December 2020, the European Council endorsed a binding Union target of a net domestic reduction of at least 55% in greenhouse gas emissions by 2030 compared to 1990.[48] The European Council concluded that the climate ambition needed to be raised in a manner that would spur sustainable economic growth, create jobs, deliver health and environmental benefits for Union citizens, and contribute to the long-term global competitiveness of the Union´s economy by promoting innovation in green technologies.

---

45 ~~OJ L 52, 21.2.2004, p. 50.~~

46 COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Stepping up Europe's 2030 climate ambition Investing in a climate-neutral future for the benefit of our people, COM/2020/562 final.

47 COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE EUROPEAN COUNCIL, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS The European Green Deal, COM/2019/640 final.

48 https://www.consilium.europa.eu/media/47296/1011-12-20-euco-conclusions-en.pdf.

(4) To implement those objectives, the European Commission 2021 Work Programme[49] announced a 'Fit for 55' package to reduce GHG emissions by at least 55% by 2030, and to achieve a climate-neutral European Union by 2050. This package covers a range of policy areas including energy efficiency, renewable energy, land use, land change and forestry, energy taxation, effort sharing and emissions trading.

(5) Projections indicate that, with the full implementation of current policies, GHG emissions reductions by 2030 would be around 45% compared to 1990 levels, when excluding land use emissions and absorptions, and around 47%, when including these. The 2030 Climate Target Plan therefore foresees a set of actions required across all sectors of the economy and revisions of the key legislative instruments to reach that increased ambition.

(6) Energy efficiency is a key area of action, without which the full decarbonisation of the Union´s economy cannot be achieved[50]. The need to capture the cost-effective energy saving opportunities has led to the Union´s current energy efficiency policy. In December 2018, a new 2030 Union headline energy efficiency target of at least 32,5% (compared to projected energy use in 2030) was included as part of the 'Clean Energy for All Europeans package'.

(7) To achieve the increased climate ambition, the impact assessment accompanying the Climate Target Plan has shown that energy efficiency improvements will need to be significantly raised from the current level of ambition of 32,5%.

(8) The sum of national contributions communicated by Member States in their National Energy and Climate Plans (NECPs) falls short of the Union's level of ambition of 32,5%. The contributions collectively would lead to a reduction of 29,4% for final energy consumption and 29,7% for primary energy consumption compared to the projections from the 2007 reference scenario for 2030. That would translate in a collective gap of 2,8 percentage points for primary energy consumption and 3,1 percentage points for final energy consumption for the EU 27.

(9) While the energy savings potential remains large in all sectors, there is a particular challenge related to transport, as it is responsible for more than 30% of final energy consumption, and to buildings, since 75% of the Union´s building stock has a poor energy performance. Another increasingly important sector is the information and communications technology (ICT) sector, which is responsible for 5-9% of the world's total electricity use and more than 2% of all emissions. In 2018, data centres accounted for 2,7% of the electricity demand in the EU28. Energy-efficient Cloud Computing Technologies and Policies for an Eco-friendly Cloud Market. In that context, the Union's Digital Strategy[51] highlighted the need for highly energy-efficient and

---

[49] COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Commission Work Programme 2021 A Union of vitality in a world of fragility COM/2020/690 final.

[50] Communication A Clean Planet for all – A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy (COM/2018/773 final), where the role of energy efficiency as a condition sine qua non for all decarbonisation scenarios is assessed.

[51] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Shaping Europe's digital future (COM(2020) 67 final).

sustainable data centres and transparency measures for telecoms operators as regards their environmental footprint. Furthermore, the possible increase in industry's energy demand that may result from its decarbonisation, particularly for energy intensive processes, should also be taken into account.

(10) The higher level of ambition requires a stronger promotion of cost-effective energy efficiency measures in all areas of the energy system and in all relevant sectors where activity affects energy demand, such as the transport, water and agriculture sectors. Improving energy efficiency throughout the full energy chain, including energy generation, transmission, distribution and end-use, will benefit the environment, improve air quality and public health, reduce GHG emissions, improve energy security, cut energy costs for households and companies, help alleviate energy poverty, and lead to increased competitiveness, more jobs and increased economic activity throughout the economy, thus improving citizens' quality of life. That complies with the Union commitments made in the framework of the Energy Union and global climate agenda established by the 2015 Paris Agreement.

🡻 2018/2002 recital 1

~~Moderation of energy demand is one of the five dimensions of the Energy Union Strategy established by the Commission communication of 25 February 2015 entitled 'A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy'. Improving energy efficiency throughout the full energy chain, including energy generation, transmission, distribution and end-use, will benefit the environment, improve air quality and public health, reduce greenhouse gas emissions, improve energy security by reducing dependence on energy imports from outside the Union, cut energy costs for households and companies, help alleviate energy poverty, and lead to increased competitiveness, more jobs and increased economic activity throughout the economy, thus improving citizens' quality of life. This is in line with the Union commitments made in the framework of the Energy Union and global climate agenda established by the 2015 Paris Agreement on climate change following the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change[52] (the 'Paris Agreement'), committing to keep the increase of the global average temperature to well below 2 °C above pre-industrial levels and to pursuing efforts to limit the temperature increase to 1,5 °C above pre-industrial levels.~~

🡻 2018/2002 recital 2 (adapted)
⇨ new

(11) ⌦ This ⌫ Directive ~~2012/27/EU of the European Parliament and of the Council[53]~~ ~~is~~ ⇨ takes a step forward ⇦ ~~an element to progress~~ towards ~~the Energy Union~~ ⇨ climate neutrality by 2050 ⇦, under which energy efficiency is to be treated as an energy source in its own right. The energy efficiency first principle ⇨ is an overarching principle that ⇦ should be taken into account ⇨ across all sectors, going beyond the energy system, at all levels, including in the financial sector. Energy efficiency

---

52 ~~OJ L 282, 19.10.2016, p. 4.~~

53 ~~Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC (OJ L 315, 14.11.2012, p. 1).~~

solutions should be considered as the first option in policy, planning and investment decisions, ⇦ when setting new rules for the supply side and other policy areas. ⇨ While the energy efficiency first principle should be applied without prejudice to other legal obligations, objectives and principles, they should also not hamper its application or exempt from applying the principle. ⇦ The Commission should ensure that energy efficiency and demand-side response can compete on equal terms with generation capacity. ~~Energy efficiency needs to be considered whenever decisions relating to planning the energy system or to financing are taken.~~ Energy efficiency improvements need to be made whenever they are more cost-effective than equivalent supply-side solutions. ⌦ That should ⌫ ~~This ought to~~ help exploit the multiple benefits of energy efficiency for the Union, in particular for citizens and businesses. ⇨ Implementing energy efficiency improvement measures should also be a priority in alleviating energy poverty. ⇦

⬇ 2018/2002 recital 3 ⇨ new

(12) Energy efficiency should be recognised as a crucial element and a priority consideration in future investment decisions on the Union's energy infrastructure. ⇨ The energy efficiency first principle should be applied taking primarily the system efficiency approach and societal perspective into consideration. Consequently, it should help increase the efficiency of individual end-use sectors and of the whole energy system. Application of the principle should also support investments in energy-efficient solutions contributing to environmental objectives listed in Regulation (EU) 2020/852 of the European Parliament and of the Council[54]. ⇦

⇩ new

(13) The energy efficiency first principle was defined in the Regulation (EU) 2018/1999 of the European Parliament and of the Council[55] and is at the core of the Energy System Integration Strategy[56]. While the principle is based on cost-effectiveness, its application has wider implications, which can vary depending on the circumstances. The Commission prepared dedicated guidelines for the operation and application of the principle, by proposing specific tools and examples of application in various sectors. The Commission has also issued a recommendation to Member States that builds on the requirements of this Directive and calls for specific actions in relation to the application of the principle.

---

[54] OJ L 198, 22.6.2020, p. 13–43.

[55] Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council, PE/55/2018/REV/1, OJ L 328, 21.12.2018, p. 1–77.

[56] An EU Strategy for Energy System Integration COM(2020) 299 final.

(14) In order to have an impact, the energy efficiency first principle needs to be consistently applied by decision makers in all relevant policy, planning and major investment decisions – that is to say large-scale investments with a value of more than 50 euro million each or 75 euro million for transport infrastructure projects – affecting energy consumption or supply. The proper application of the principle requires using the right cost-benefit analysis methodology, setting enabling conditions for energy efficient solutions and proper monitoring. Demand side flexibility can bring significant benefits to consumers and to society at large, and can increase the efficiency of the energy system and decrease the energy costs, for example by reducing system operation costs resulting in lower tariffs for all consumers. Member States should take into account potential benefits from demand side flexibility in applying the energy efficiency first principle and where relevant consider demand response, energy storage and smart solutions as part of their efforts to increase efficiency of the integrated energy system.

(15) The energy efficiency first principle should always be applied in a proportional way and the requirements of this Directive should not entail overlapping or conflicting obligations on Member States, where the application of the principle is ensured directly by other legislation. This might be the case for the projects of common interest included in the Union list pursuant to [Article 3 of the revised TEN-E regulation], which introduces the requirements to consider the energy efficiency first principle in the development and assessment for those projects.

(16) A fair transition towards a climate-neutral Union by 2050 is central to the European Green Deal. Energy poverty is a key concept consolidated in the legislative package entitled 'Clean Energy for All Europeans' and designed to facilitate a just energy transition. Pursuant to Regulation (EU) 2018/1999 and Directive (EU) 2019/944 of the European Parliament and of the Council[57], the Commission provided indicative guidance on appropriate indicators for measuring energy poverty and defining what a 'significant number of households in energy poverty' is.[58] Directive (EU) 2019/944 and Directive 2009/73/EC of the European Parliament and of the Council[59] requires Member States to take appropriate measures to address energy poverty wherever it is identified, including measures addressing the broader context of poverty.

(17) Low and medium income households, vulnerable customers, including final users, people facing or risking energy poverty and people living in social housing should benefit from the application of the energy efficiency first principle. Energy efficiency measures should be implemented as a priority to improve the situations of those individuals and households or to alleviate energy poverty. A holistic approach in policy making and in implementing policies and measures requires Member States to ensure that other policies and measures have no adverse effect on these individuals and households.

---

[57] Directive (EU) 2019/944 of the European Parliament and of the Council on common rules for the internal market for electricity and amending Directive 2012/27/EU (OJ L 158, 14.6.2019, p. 125).

[58] Commission Recommendation on energy poverty, C(2020) 9600 final.

[59] Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC (OJ L 211, 14.8.2009, p. 94).

(18) This Directive is part of a broader policy framework of energy efficiency policies addressing energy efficiency potentials in specific policy areas, including buildings (Directive 2010/31/EC[60]), products (Directive 2009/125/EC, Regulation (EU) 2017/1369 and Regulation (EU) 2020/740[61]) and governance mechanism (Regulation (EU) 2018/1999). Those policies play a very important role in delivering energy savings when products are replaced or buildings constructed or renovated[62].

🡻 2018/2002 recital 4 (adapted)
⇨ new

~~(19)~~ Reaching an ambitious energy efficiency target requires barriers to be removed in order to facilitate investment in energy efficiency measures. ⇨ The LIFE Clean Energy Transition sub-programme will dedicate funding to support development of the European best practice in energy efficiency policy implementation addressing behavioural, market, and regulatory barriers to energy efficiency. ⇦ ~~One step in that direction is the clarification provided by Eurostat on 19 September 2017 on how to record energy performance contracts in national accounts, which removes uncertainties and facilitates the use of such contracts,~~

🡻 2018/2002 recital 5 (adapted)

(20) The European Council of 23 and 24 October 2014 supported a 27% energy efficiency target for 2030 at Union level, to be reviewed by 2020 having in mind a Union-level target of 30%. In its resolution of 15 December 2015 entitled 'Towards a European Energy Union', the European Parliament called on the Commission to assess, in addition, the viability of a 40% energy efficiency target for the same timeframe. ~~It is therefore appropriate to amend Directive 2012/27/EU, in order to adapt it to the 2030 perspective.~~

⇩ new

(21) It is projected that the 32,5% Union´s energy efficiency target for 2030 and the other policy instruments of the existing framework would lead to a reduction in GHG emission of about 45% by 2030.[63] For an increased climate ambition of a 55%

---

60 Directive 2010/31/EC of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings.

61 Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products; Regulation (EU) 2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and Regulation (EU) 2020/740 of the European Parliament and of the Council of 25 May 2020 on the labelling of tyres with respect to fuel efficiency and other parameters respectively.

62 Moreover, implementation of the product reviews under the Ecodesign Working Plan 2020-2024 and the "Renovation Wave" Action plan, together with the review of the EPBD, will make an important contribution to reaching the 2030 energy saving target.

63 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank – A Clean Planet for all A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy (COM(2018) 773 final).

decrease of GHG emissions by 2030, the impact assessment of the 2030 Climate Target Plan assessed what level of efforts would be needed in the different policy areas. It concluded that, in relation to the baseline, achieving the GHG emissions target in a cost-optimal way meant that final and primary energy consumption are to decreased by at least 36-37% and to 39-41% respectively.

(22) The Union's energy efficiency target was initially set and calculated using the 2007 Reference Scenario projections for 2030 as a baseline. The change in the Eurostat energy balance calculation methodology and improvements in subsequent modelling projections call for a change of the baseline. Thus, using the same approach to define the target, that is to say comparing it to the future baseline projections, the ambition of the Union's 2030 energy efficiency target is set compared to the 2020 Reference Scenario projections for 2030 reflecting national contributions from the NECPs. With that updated baseline, the Union will need to further increase its energy efficiency ambition by at least 9% in 2030 compared to the level of efforts under the 2020 Reference Scenario. The new way of expressing the level of ambition for the Union's targets does not affect the actual level of efforts needed and corresponds to a reduction of 36% for final and 39% for primary energy consumption respectively when compared to the 2007 Reference Scenario projections for 2030.

(23) The methodology for calculation of final and primary energy consumption is aligned with the new Eurostat methodology, but the indicators used for the purpose of this Directive have different scope - that is they exclude ambient heat and include energy consumption in international aviation for the target in final energy. The use of new indicators also implies that any changes in energy consumption of blast furnaces are now only reflected in primary energy consumption.

↓ 2018/2002 recital 6 (adapted)
⇨ new

(24) The need for the Union to ~~achieve~~ ⇨ improve ⇦ its energy efficiency ~~targets at Union level,~~ ⇨ should be ⇦ expressed in primary and~~/or~~ final energy consumption, ~~should be clearly set out in the form of a target of at least 32,5 % for 2030. Projections made in 2007 showed a primary energy consumption in 2030 of 1887 Mtoe and a final energy consumption of 1416 Mtoe. A 32,5 % reduction results in 1273 Mtoe and 956 Mtoe in 2030 respectively. That target, which is of the same nature as the Union's 2020 target, should be assessed by the Commission for the purpose of revising it upwards by 2023 in the case of substantial cost reductions or, where needed, to meet the Union's international commitments for decarbonisation.~~ ⇨ to be achieved in 2030, indicating additional level of efforts required when compared to the measures in place or planned measures in the national energy and climate plans. The 2020 Reference Scenario projects 864 Mtoe of final energy consumption and 1124 Mtoe of primary energy consumption to be reached in 2030 (excluding ambient heat and including international aviation). An additional reduction of 9% results in 787 Mtoe and 1023 Mtoe in 2030 respectively. Compared to 2005 levels, it means that final energy consumption in the Union should be reduced by some 23% and primary and energy consumption should be reduced by some 32%. ⇦ There are no binding targets at Member State level in the 2020 and 2030 perspective~~s~~, and ⇨ Member States should establish their contributions to the achievement of the Union's energy efficiency target taking into account the formula provided in this Directive. ⇦ ~~the freedom of~~ Member States ⌦ should be free ⌫ to set their national ~~contributions~~ ⇨ objectives ⇦ based

either on primary or final energy consumption or primary or final energy savings, or on energy intensity~~, should continue not to be restricted~~. ⇨ This Directive amends the way how Member States should express their national contributions to the Union´s target. Member States' contributions to the Union's target should be expressed in final and primary energy consumption to ensure consistency and monitoring of progress. ⇦ ~~Member States should set their national indicative energy efficiency contributions taking into account that the Union's 2030 energy consumption has to be no more than 1273 Mtoe of primary energy and/or no more than 956 Mtoe of final energy. This means that primary energy consumption in the Union should be reduced by 26 %, and final energy consumption should be reduced by 20 % compared to the 2005 levels.~~ A regular evaluation of progress towards the achievement of the Union's 2030 targets is necessary and is provided for in Regulation (EU) 2018/1999.

🡻 2012/27/EU recital 13
⇨ new

(25) It would be preferable for the ~~20 %~~ energy efficiency target to be achieved as a result of the cumulative implementation of specific national and European measures promoting energy efficiency in different fields. Member States should be required to set ~~indicative~~ national energy efficiency ~~targets, schemesand programmes~~ ⇨ policies and measures ⇦. Those ⇨ policies and measures ⇦ ~~targets~~ and the individual efforts of each Member State should be evaluated by the Commission, alongside data on the progress made, to assess the likelihood of achieving the overall Union target and the extent to which the individual efforts are sufficient to meet the common goal. ~~The Commission should therefore closely monitor the implementation of national energy efficiency programmes through its revised legislative framework and within the Europe 2020 process. When setting the indicative national energy efficiency targets, Member States should be able to take into account national circumstances affecting primary energy consumption such as remaining cost-effective energy-saving potential, changes in energy imports and exports, development of all sources of renewable energies, nuclear energy, carbon capture and storage, and early action. When undertaking modelling exercises, the Commission should consult Member States on model assumptions and draft model results in a timely and transparent manner. Improved modelling of the impact of energy efficiency measures and of the stock and performance of technologies is needed.~~

🡻 2012/27/EU recital 14 (adapted)

~~Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources~~[64] ~~states that Cyprus and Malta, due to their insular and peripheral character, rely on aviation as a mode of transport, which is essential for their citizens and their economy. As a result, Cyprus and Malta have a gross final consumption of energy in national air transport which is disproportionately high, i.e. more than three times the Community average in 2005, and are thus disproportionately affected by the current technological and regulatory constraints.~~

---

64 ~~OJ L 140, 5.6.2009, p. 16.~~

🡻 2012/27/EU recital 15
⇨ new

(26) ~~The total volume of public spending is equivalent to 19 % of the Union's gross domestic product.~~ ⇨ The public sector is responsible for around 5 to 10% of total Union's final energy consumption. Public authorities spend approximately 1.8 trillion euro annually. This represents around 14% of the Union's gross domestic product. ⇦ For that reason the public sector constitutes an important driver to stimulate market transformation towards more efficient products, buildings and services, as well as to trigger behavioural changes in energy consumption by citizens and enterprises. Furthermore, decreasing energy consumption through energy efficiency improvement measures can free up public resources for other purposes. Public bodies at national, regional and local level should fulfil an exemplary role as regards energy efficiency.

🡻 2012/27/EU recital 16 (adapted)

~~Bearing in mind that the Council conclusions of 10 June 2011 on the Energy Efficiency Plan 2011 stressed that buildings represent 40 % of the Union's final energy consumption, and in order to capture the growth and employment opportunities in the skilled trades and construction sectors, as well as in the production of construction products and in professional activities such as architecture, consultancy and engineering, Member States should establish a long-term strategy beyond 2020 for mobilising investment in the renovation of residential and commercial buildings with a view to improving the energy performance of the building stock. That strategy should address cost-effective deep renovations which lead to a refurbishment that reduces both the delivered and the final energy consumption of a building by a significant percentage compared with the pre-renovation levels leading to a very high energy performance. Such deep renovations could also be carried out in stages.~~

⇩ new

(27) To lead by example, the public sector should set its own decarbonisation and energy efficiency goals. Energy efficiency improvements in the public sector should reflect the efforts required at Union level. To comply with the final energy consumption target, the Union should decrease its final energy consumption by 19% by 2030 as compared to the average energy consumption in years 2017, 2018 and 2019. An obligation to achieve an annual reduction of the energy consumption in the public sector by at least 1,7% should ensure that the public sector fulfils its exemplary role. Member States retain full flexibility regarding the choice of energy efficiency improvement measures to achieve a reduction of the final energy consumption. Requiring an annual reduction of final energy consumption has a lower administrative burden than establishing measurement methods for energy savings.

(28) To fulfil their obligation, Member States should target the final energy consumption of all public services and installations of public bodies. To determine the scope of addressees, Member States should apply the definition of contracting authorities provided in the Directive 2014/24/EU of the European Parliament and of the

Council[65]. The obligation can be fulfilled by the reduction of final energy consumption in any area of the public sector, including transport, public buildings, healthcare, spatial planning, water management and wastewater treatment, sewage and water purification, waste management, district heating and cooling, energy distribution, supply and storage, public lighting, infrastructure planning. To lower the administrative burden for public bodies, Member States should establish digital platforms or tools to collect the aggregated consumption data from public bodies, make them publicly available, and report the data to the Commission.

(29) Member States should exercise an exemplary role by ensuring that all energy performance contracts and energy management systems are carried out in the public sector in line with European or international standards, or that energy audits are used to a large extent in the intense energy consuming parts of the public sector.

(30) Public authorities are encouraged to obtain support from entities such as sustainable energy agencies, where applicable established at regional or local level. The organisation of those agencies usually reflect the individual needs of public authorities in a certain region or operating in a certain area of the public sector. Centralised agencies can serve the needs better and work more effectively in other respects, for example, in smaller or centralised Member States or regarding complex or cross-regional aspects such as district heating and cooling. Sustainable energy agencies can serve as one-stop-shops pursuant to Article 21. Those agencies are often responsible for developing local or regional decarbonisation plans, which may also include other decarbonisation measures, such as the exchange of fossil fuels boilers, and to support public authorities in the implementation of energy related policies. Sustainable energy agencies or other entities to assist regional and local authorities mayhave clear competences, objectives and resources in the field of sustainable energy. Sustainable energy agencies could be encouraged to consider initiatives taken in the framework of the Covenant of Mayors, which brings together local governments voluntarily committed to implementing the Union´s climate and energy objectives, and other existing initiatives for this purpose. The decarbonisation plans should be linked to territorial development plans and take into account the comprehensive assessment which the Member States should carry out.

(31) Member States should support public bodies in planning and the uptake of energy efficiency improvement measures, including at regional and local levels, by providing guidelines promoting competence building and training opportunities and encouraging cooperation amongst public bodies including amongst agencies. For that purpose, Member States could set up national competence centres on complex issues, such as advising local or regional energy agencies on district heating or cooling.

🡻 2012/27/EU recital 17 (adapted)
⇨ new

~~(32) The rate of building renovation needs to be increased, as the existing building stock represents the single biggest potential sector for energy savings.~~ ⇨ Buildings and

[65] Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC, OJ L 94 28.3.2014, p. 65.

transport, alongside industry, are the main energy users and main source of emissions.[66] Buildings are responsible for about 40% of the Union's total energy consumption and for 36% of its GHG from energy.[67] The Commission Communication entitled Renovation Wave[68] addresses the twin challenge of energy and resource efficiency and affordability in the building sector and aims at doubling the renovation rate. It focusses on the worst performing buildings, energy poverty and on public buildings. ⇦ Moreover, buildings are crucial to achieving the Union objective of ~~reducing greenhouse gas emissions by 80-95 %~~ ⇨ reaching climate neutrality ⇦ by 2050 ~~compared to 1990~~. Buildings owned by public bodies account for a considerable share of the building stock and have high visibility in public life. It is therefore appropriate to set an annual rate of renovation of buildings owned by ~~central government~~ ⇨ public bodies ⇦ on the territory of a Member State to upgrade their energy performance. ⇨ Member States are invited to set a higher renovation rate, where that is cost-effective in the framework of the renovation of their buildings stock in conformity with their Long Term Renovation Strategies or national renovation programmes. ⇦ That renovation rate should be without prejudice to the obligations with regard to nearly-zero energy buildings ⌦ (NZEBs) ⌫ set in Directive 2010/31/EU of the European Parliament and of the Council ~~of 19 May on the energy performance of buildings~~[69]. ⇨ During the next review of Directive 2010/31/EU, the Commission should assess the progress Member States achieved regarding the renovation of public bodies' buildings. The Commission should consider submitting a legislative proposal to revise the renovation rate, while taking into account the progress achieved by the Member States, substantial economic or technical developments, or where needed, the Union´s commitments for decarbonisation and zero pollution. ⇦ The obligation to renovate ~~central government~~ ⇨ public bodies' ⇦ buildings in this Directive complements that Directive, which requires Member States to ensure that when existing buildings undergo major renovation their energy performance is upgraded so that they meet ~~minimum energy performance~~ ⌦ the ⌫ requirements ⇨ on NZEBs ⇦. ~~It should be possible for Member States to take alternative cost-efficient measures to achieve an equivalent improvement of the energy performance of the buildings within their central government estate. The obligation to renovate floor area of central government buildings should apply to the administrative departments whose competence extends over the whole territory of a Member State. When in a given Member State and for a given competence no such relevant administrative department exists that covers the whole territory, the obligation should apply to those administrative departments whose competences cover collectively the whole territory.~~

---

66 COM/2020/562 final.

67 See IRP, Resource Efficiency and Climate Change, 2020, and UN Environment Emissions Gap Report, 2019. These figures refer to the use and operation of buildings, including indirect emissions in the power and heat sector, not their full life cycle. The embodied carbon in construction is estimated to account for about 10% of total yearly greenhouse gas emissions worldwide, see IRP, Resource Efficiency and Climate Change, 2020, and UN Environment Emissions Gap Report 2019.

68 COM/2020/662 final.

69 Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (OJ L 153, 18.6.2010, p. 13).

⇩ new

(33) To set the rate of renovations, Member States need to have an overview of the buildings that do not reach the NZEB level. Therefore, Member States should publish and keep updated an inventory of public buildings as part of an overall database of energy performance certificates. That inventory should enable also private actors including energy service companies to propose renovation solutions and they can be aggregated by the Union Building Stock Observatory.

🡻 2012/27/EU recital 18
⇨ new

(34) ⇨ In 2020, more than half of the world's population lives in urban areas. That figure is expected to reach 68% by 2050[70]. In addition, half of the urban infrastructures by 2050 are still to be built[71]. Cities and metropolitan areas are centres of economic activity, knowledge generation, innovation and new technologies. Cities influence the quality of life of the citizens who live or work in them. Member States should support municipalities technically and financially. ⇦ A number of municipalities and other public bodies in the Member States have already put into place integrated approaches to energy saving and energy supply, for example via sustainable energy action plans, such as those developed under the Covenant of Mayors initiative, and integrated urban approaches which go beyond individual interventions in buildings or transport modes.

🡻 2012/27/EU recital 19
⇨ new

(35) With regard to the purchase of certain products and services and the purchase and rent of buildings, ~~central governments~~ ⇨ contracting authorities and contracting entities ⇦ which conclude public works, supply or service contracts should lead by example and make energy-efficient purchasing decisions ⇨ and apply the energy efficiency first principle, including for those public contracts and concessions for which no specific requirements are not provided in Annex IV ⇦. This should apply to the administrative departments whose competence extends over the whole territory of a Member State. When in a given Member State and for a given competence no such relevant administrative department exists that covers the whole territory, the obligation should apply to those administrative departments whose competences cover collectively the whole territory. The provisions of the Union's public procurement directives should not however be affected. ⇨ Member States should remove barriers to joint procurement within a Member State or across borders if those can reduce the costs, enhance the benefits of the internal market by creating business opportunities for suppliers and energy service providers. ⇦

[70] https://www.unfpa.org/world-population-trends
[71] https://www.un.org/en/ecosoc/integration/pdf/fact_sheet.pdf

⇩ new

(36) All public entities investing public resources through procurement should lead by example when awarding contracts and concessions by choosing products, services works and buildings with the highest energy efficiency performance, also in relation to those procurements that are not subject to specific requirements under Directive 2009/30/EC. In that context, all award procedures for public contracts and concessions with the value above the thresholds set out in Articles 6 and 7 of Directive 2014/23/EU of the European Parliament and of the Council[72], Article 2(1) of Directive 2014/24/EU of the European Parliament and of the Council[73], and Articles 3 and 4 of Directive 2014/25/EU of the European Parliament and of the Council, need to take into account the energy efficiency performance of the products, buildings and services set by Union or national law, by considering as priority the energy efficiency first principle in their procurement procedures,

(37) It is also important that Member States monitor how the energy efficiency requirements are taken into account by contracting authorities and contracting entities in the procurement of products, buildings, works and services by ensuring that information about the impact on energy efficiency of those wining tenders above the thresholds referred to in the procurement directives are made publically available. That allows stakeholders and citizens to assess the role of public sector towards ensuring energy efficiency first in public procurement in a transparent manner.

(38) The European Green Deal recognises the role of circular economy in contributing to overall Union decarbonisation objectives. The public sector can contribute to those objectives by using their purchasing power to, where appropriate, choose environmentally friendly products, buildings, services and works via available tools for green public procurement, and thus making an important contribution to reduce energy consumption and environmental impacts.

(39) It is important that Member States provide the necessary support to public bodies in the uptake of energy efficiency requirements in public procurement and, where appropriate, use of green public procurement, by providing necessary guidelines and methodologies on carrying out the assessment of life-cycle costs, and environment impacts and costs. Well-designed tools, in particular digital tools, are expected to facilitate the procurement procedures and reduce the administrative costs especially in smaller Member States that may not have sufficient capacity to prepare tenders. In this regard, Member States should actively promote the use of digital tools and cooperation amongst contracting authorities including across borders for the purpose of exchanging best practice.

(40) Given that buildings are responsible for greenhouse gas emissions before and after their operational lifetime, Member States should also consider the whole life-cycle of carbon emissions of buildings. That takes place in the context of efforts to increase attention to whole life cycle performance, circular economy aspects and environmental

[72] Directive 2014/23/EU of the European Parliament and of the Council of 26 February 2014 on the award of concession contracts, OJ L 94, 28.3.2014, p. 1.

[73] Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC (OJ L 94, 28.3.2014, p. 65).

impacts, as part of the exemplary role of the public sector. Public procurement can thus serve as an opportunity to address the embodied carbon in buildings over their life-cycle. In this regard, contracting authorities are important actors that can take action as part of procurement procedures by purchasing new buildings that address global warming potential over the full life-cycle.

(41) The global warming potential over the full life-cycle measures the greenhouse gas emissions associated with the building at different stages along its life cycle. It therefore measures the building's overall contribution to emissions that lead to climate change. That is sometimes referred to as a carbon footprint assessment or the whole life carbon measurement. It brings together carbon emissions embodied in building materials with direct and indirect carbon emissions from use stage. Buildings are a significant material bank, being repositories for carbon intensive resources over many decades, and so it is important to explore designs that facilitate future reuse and recycling at the end of the operational life.

(42) The global warming potential is expressed as a numeric indicator in kgCO2e/m² (of useful internal floor area) for each life-cycle stage averaged for one year of a reference study period of 50 years. The data selection, scenario definition and calculations are carried out in accordance with standard EN 15978. The scope of building elements and technical equipment are set out in indicator 1,2 of the Level(s) common Union framework. Where a national calculation tool exists, or is required for making disclosures or for obtaining building permits, it should be possible to use that national tool to provide the required information. It should be possible to use other calculation tools, if they fulfil the minimum criteria laid down by the Level(s) common Union framework.

↓ 2012/27/EU recital 20 (adapted)

~~An assessment of the possibility of establishing a 'white certificate' scheme at Union level has shown that, in the current situation, such a system would create excessive administrative costs and that there is a risk that energy savings would be concentrated in a number of Member States and not introduced across the Union. The objective of such a Union level scheme could be better achieved, at least at this stage, by means of national energy efficiency obligation schemes for energy utilities or other alternative policy measures that achieve the same amount of energy savings. It is appropriate for the level of ambition of such schemes to be established in a common framework at Union level while providing significant flexibility to Member States to take fully into account the national organisation of market actors, the specific context of the energy sector and final customers' habits. The common framework should give energy utilities the option of offering energy services to all final customers, not only to those to whom they sell energy. This increases competition in the energy market because energy utilities can differentiate their product by providing complementary energy services. The common framework should allow Member States to include requirements in their national scheme that pursue a social aim, in particular in order to ensure that vulnerable customers have access to the benefits of higher energy efficiency. Member States should determine, on the basis of objective and non-discriminatory criteria, which energy distributors or retail energy sales companies should be obliged to achieve the end-use energy savings target laid down in this Directive.~~

~~Member States should in particular be allowed not to impose this obligation on small energy distributors, small retail energy sales companies and small energy sectors to avoid disproportionate administrative burdens. The Commission Communication of 25 June 2008~~

~~sets out principles that should be taken into account by Member States that decide to abstain from applying this possibility. As a means of supporting national energy efficiency initiatives, obligated parties under national energy efficiency obligation schemes could fulfil their obligations by contributing annually to an Energy Efficiency National Fund an amount that is equal to the investments required under the scheme.~~

↓ 2012/27/EU recital 21 (adapted)

~~Given the over-arching imperative of restoring sustainability to public finances and of fiscal consolidation, in the implementation of particular measures falling within the scope of this Directive, due regard should be accorded to the cost-effectiveness at Member State level of implementing energy efficiency measures on the basis of an appropriate level of analysis and evaluation.~~

↓ 2012/27/EU recital 22 (adapted)

~~The requirement to achieve savings of the annual energy sales to final customers relative to what energy sales would have been does not constitute a cap on sales or energy consumption. Member States should be able to exclude all or part of the sales of energy, by volume, used in industrial activities listed in Annex I to Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community[74] for the calculation of the energy sales to final customers, as it is recognised that certain sectors or subsectors within these activities may be exposed to a significant risk of carbon leakage. It is appropriate that Member States are aware of the costs of schemes in order to be able to accurately assess the costs of measures.~~

↓ 2012/27/EU recital 23 (adapted)

~~Without prejudice to the requirements in Article 7 and with a view to limiting the administrative burden, each Member State may group all individual policy measures to implement Article 7 into a comprehensive national energy efficiency programme.~~

↓ 2018/2002 recital 7
⇨ new

(43) ⇨ Directive 2010/75/EU of the European Parliament and of the Council[75] governs installations that contribute to energy production or use energy for production purposes, and information on the energy used in or generated by the installation must be included in applications for integrated permits (Article 12(1)(b)). Moreover, that Directive specifies in Article 11 of that Directive that efficient use of energy is one of the general principles governing the basic obligations of the operator and one of the criteria for determining best available techniques pursuant to Annex III of the Directive 2010/75/EU. ⇦ The operational efficiency of energy systems at any given

---

74 ~~OJ L 275, 25.10.2003, p. 32.~~

75 Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control), OJ L 334, 17.12.2010, p. 17.

moment is influenced by the ability to feed power generated from different sources — with different degrees of inertia and start-up times — into the grid smoothly and flexibly. Improving efficiency will enable better use to be made of renewable energy.

↓ 2018/2002 recital 8

(44) Improvement in energy efficiency can contribute to higher economic output. Member States and the Union should aim to decrease energy consumption regardless of levels of economic growth.

↓ 2018/2002 recital 10 (adapted)
⇨ new*

(45) ~~In view of the climate and energy framework for 2030,~~ T~~t~~he energy savings obligation established by ⌦ this ⌫ Directive ~~2012/27/EU~~ should ⇨ be increased and ⇦ ~~be extended beyond~~ ⌦ should also apply after ⌫ ~~2020~~ ⇨ 2030 ⇦. That ~~extension would create greater~~ ⌦ ensures ⌫ stability for investors and thus encourage long-term investments and long-term energy efficiency measures, such as the deep renovation of buildings with the long-term objective of facilitating the cost effective transformation of existing buildings into NZEBs. The energy savings obligation has an important role in the creation of local growth, ~~and~~ jobs, ⇨ competitiveness and alleviating energy poverty. ⇦ ~~and~~ ⌦ It ⌫ should ~~be maintained to~~ ensure that the Union can achieve its energy and climate objectives by creating further opportunities and to break the link between energy consumption and growth. Cooperation with the private sector is important to assess the conditions on which private investment for energy efficiency projects can be unlocked and to develop new revenue models for innovation in the field of energy efficiency.

↓ 2018/2002 recital 11

(46) Energy efficiency improvement measures also have a positive impact on air quality, as more energy efficient buildings contribute to reducing the demand for heating fuels, including solid heating fuels. Energy efficiency measures therefore contribute to improving indoor and outdoor air quality and help achieve, in a cost effective manner, the objectives of the Union's air quality policy, as established in particular by Directive (EU) 2016/2284 of the European Parliament and of the Council[76].

↓ 2018/2002 recital 12 (adapted)
⇨ new

~~(47)~~ Member States are required to achieve cumulative end-use energy savings for the entire obligation period ~~2021~~ ⌦ up ⌫ to 2030, equivalent to new annual savings of at least 0,8% of final energy consumption ⇨ up to 31 December 2023 and of at least

---

[76] Directive (EU) 2016/2284 of the European Parliament and of the Council of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC (OJ L 344, 17.12.2016, p. 1).

[xx]% as of 1 January 2024 ⇦. That requirement could be met by new policy measures that are adopted during the ~~new~~ obligation period from 1 January 2021 to 31 December 2030 or by new individual actions as a result of policy measures adopted during or before the previous period, provided that the individual actions that trigger energy savings are introduced during the ⌦ following ⌫~~new~~ period. To that end, Member States should be able to make use of an energy efficiency obligation scheme, alternative policy measures, or both. ~~In addition, various options, including whether energy used in transport is included, in whole or in part, in the calculation baseline, should be provided in order to give Member States flexibility in how they calculate the amount of their energy savings, whilst ensuring that the required cumulative end-use energy savings equivalent to new annual savings of at least 0,8 % are reached.~~

🡻 2018/2002 recital 13 (adapted) ⇨ new

(48) ~~It would, however, be disproportionate to impose such a requirement on Cyprus and on Malta. The energy market of those small island Member States exhibits specific characteristics which substantially limit the range of measures available to meet the energy savings obligation, such as the existence of a single electricity distributor, the absence of natural gas networks and of district heating and district cooling systems, as well as the small size of petroleum distribution companies. Those specific characteristics are compounded by the small size of the energy markets of those Member States. Therefore,~~ ⇨ For the period 2021 to 31 December 2023, ⇦ Cyprus and Malta should be required ~~only~~ to achieve cumulative end-use energy savings equivalent to new savings of 0,24 % of final energy consumption ⌦ only ⌫ for the period 2021 to 2030. ⇨ That individual savings rate should cease to apply from 1 January 2024. ⇦

🡻 2018/2002 recital 14 (adapted) ⇨ new

(49) Where ~~they use~~ ⌦ using ⌫ an obligation scheme, Member States should designate obligated parties among ⇨ transmission system operators, ⇦ energy distributors, retail energy sales companies and transport fuel distributors or retailers on the basis of objective and non-discriminatory criteria. The designation or exemption from designation of certain categories of such distributors or retailers should not be understood to be incompatible with the principle of non-discrimination. Member States are therefore able to choose whether such ⇨ transmission system operators, ⇦ distributors or retailers or only certain categories thereof are designated as obligated parties. ⇨ To empower and protect vulnerable customers, people affected by energy poverty and people living in social housing, and to implement policy measures as a priority among those people, Member States can require obligated parties to achieve energy savings among vulnerable customers, people affected by energy poverty and people living in social housing. For that purpose, Member States can also establish energy cost reduction targets. Obligated parties could achieve these targets by promoting the installation of measures that lead to energy savings and financial savings on energy bills, such as the installation of insulation and heating measures. ⇦

⇩ new

(50) When designing policy measures to fulfil the energy savings obligation, Member States should respect the climate and environmental standards and priorities of the Union and comply with the principle of 'do no significant harm' within the meaning of Regulation (EU) 2020/852[77]. Member States should not promote activities that are not environmentally sustainable such as use of solid fossil fuels. The energy savings obligation aims at strengthening the response to climate change by promoting incentives to Member States to implement a sustainable and clean policy mix, which is resilient, and mitigates climate change. Therefore, energy savings from policy measures regarding the use of direct fossil fuel combustion will not be eligible energy savings under energy savings obligation as of transposition of this Directive. It will allow aligning the energy savings obligation with the objectives of the European Green Deal, the Climate Target Plan, the Renovation Wave Strategy, and mirror the need for action identified by the IEA in its net zero report[78]. The restriction aims at encouraging Member States to spend public money into future-proof, sustainable technologies only. It is important that Member States provide a clear policy framework and investment certainty to market actors. The implementation of the calculation methodology under energy savings obligation should allow all market actors to adapt their technologies in a reasonable timeframe. Where Member States support the uptake of efficient fossil fuel technologies or early replacement of such technology, for example through subsidy schemes or energy efficiency obligation schemes, energy savings may not be eligible anymore under the energy savings obligation. While energy savings resulting, for example, from the promotion of natural gas-based cogeneration would not be eligible, the restriction would not apply for indirect fossil fuel usage, for example where the electricity production includes fossil fuel generation. Policy measures targeting behavioural changes to reduce the consumption of fossil fuel, for example through information campaigns, eco-driving, should remain eligible. The energy savings from policy measures targeting building renovations may contain measures such as a replacement of fossil fuel heating systems together with building fabric improvements, which should be limited to those technologies that allow achieving the required energy savings according to the national building codes established in a Member State. Nevertheless, Member States should promote upgrading heating systems as part of deep renovations in line with the long-term objective of carbon neutrality, i.e. reducing the heating demand and covering the remaining heating demand with a carbon-free energy source.

🡻 2018/2002 recital 15 (adapted)
⇨ new

(51) Member States' energy efficiency improvement measures in transport are eligible to be taken into account for achieving their end-use energy savings obligation. Such

[77] Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088, OJ L 198, 22.6.2020, p. 13–43.

[78] IEA (International Energy Agency) (2021), Net Zero by 2050 A Roadmap for the Global Energy Sector, https://www.iea.org/reports/net-zero-by-2050.

measures include policies that are, inter alia, dedicated to promoting more efficient vehicles, a modal shift to cycling, walking and collective transport, or mobility and urban planning that reduces demand for transport. In addition, schemes which accelerate the uptake of new, more efficient vehicles or policies fostering a shift to ~~better performing~~ fuels ⇨ with reduced levels of emissions, except policy measures regarding the use of direct fossil fuel combustion, ⇦ that reduce energy use per kilometre are also capable of being eligible, subject to compliance with the rules on materiality and additionality set out in Annex V to ~~Directive 2012/27/EU as amended by~~ this Directive. ⇨ Policy measures promoting the uptake of new fossil fuel vehicles should not qualify as eligible measures under the energy savings obligation. ⇦ ~~Such measures should, if appropriate, be consistent with Member States' national policy frameworks established pursuant to Directive 2014/94/EU of the European Parliament and of the Council[79].~~

↓ 2018/2002 recital 16 (adapted)

(52) Measures taken by Member States pursuant to Regulation (EU) 2018/842 of the European Parliament and of the Council[80] and which result in verifiable, and measurable or estimable, energy efficiency improvements can be considered to be a cost-effective way for Member States to fulfil their energy-saving obligation under ~~Directive 2012/27/EU as amended by~~ this Directive.

↓ 2018/2002 recital 17 (adapted)
⇨ new

(53) As an alternative to requiring obligated parties to achieve the amount of cumulative end-use energy savings required under Article 8~~7~~(1) of ~~Directive 2012/27/EU as amended by~~ this Directive, it should be possible for Member States, in their obligation schemes, to permit or require obligated parties to contribute to an Energy Efficiency National Fund ⇨ , which could be used to implement policy measures as a priority among vulnerable customers, people affected by energy poverty and people living in social housing. ⇦

↓ 2018/2002 recital 18 (adapted)
⇨ new

(54) ~~Without prejudice to Article 7(4) and (5) as introduced by this Directive,~~ Member States and obligated parties should make use of all available means and technologies ⇨ , except regarding the use of direct fossil fuel combustion technologies, ⇦ to achieve the cumulative end-use energy savings required, including by promoting sustainable technologies in efficient district heating and cooling systems, efficient

---

[79] ~~Directive 2014/94/EU of the European Parliament and of the Council of 22 October 2014 on the deployment of alternative fuels infrastructure (OJ L 307, 28.10.2014, p. 1).~~

[80] Regulation (EU) 2018/842 of the European Parliament and of the Council of 30 May 2018 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013 (OJ L 156, 19.6.2018, p. 26).

heating and cooling infrastructure and energy audits or equivalent management systems, provided that the energy savings claimed comply with the requirements laid down in Article 8~~7~~ and Annex V to ~~Directive 2012/27/EU as amended by~~ this Directive. Member States should aim for a high degree of flexibility in the design and implementation of alternative policy measures. ⇨ Member States should encourage actions resulting in energy savings over the long lifetimes. ⇦

↓ 2018/2002 recital 19

(55) Long-term energy efficiency measures will continue to deliver energy savings after 2020 but, in order to contribute to the Union's 2030 energy efficiency target, those measures should deliver new savings after 2020. On the other hand, energy savings achieved after 31 December 2020 should not count towards the cumulative end-use energy savings required for the period from 1 January 2014 to 31 December 2020.

↓ 2018/2002 recital 20
⇨ new

(56) New savings should be additional to 'business as usual', so that savings that would have occurred in any event should not count towards the achievement of the energy savings requirements. In order to calculate the impact of the measures introduced, only net savings, measured as the change of energy consumption that is directly attributable to the energy efficiency measure in question ⇨ implemented for the purpose of Article 8 of this Directive ⇦, should be counted. To calculate net savings, Member States should establish a baseline scenario of how the situation would evolve in the absence of the measure in question. The policy measure in question should be evaluated against that baseline. Member States ⇨ should take into account minimum requirements provided by the relevant legislative framework at Union level, and ⇦ should take into account the fact that other policy measures may be carried out in the same time frame which may also have an impact on the amount of energy savings, so that not all changes observed since the introduction of a particular policy measure being evaluated can be attributed to that policy measure alone. The actions of the obligated, participating or entrusted party should in fact contribute to the achievement of the energy savings claimed in order to ensure the fulfilment of the materiality requirement.

↓ 2018/2002 recital 21
⇨ new

(57) It is important to consider, where relevant, all steps in the energy chain in the calculation of energy savings in order to increase the energy savings potential in the transmission and distribution of electricity. ⇨ Studies carried out and consultation of stakeholders have revealed a significant potential. However, the physical and economic conditions are quite different among Member States, and often within several Member States, and there is a large number system operators. Those circumstances point to a decentralized approach, pursuant to the subsidiarity principle. National Regulatory Authorities have the required knowledge, legal competences and the administrative capacity to promote the development of an energy efficient electricity grid. Entities such as the European Network of Transmission System Operators for Electricity (ENTSO-E) and the European Entity for Distribution System

Operators (the EU DSO Entity) can also provide useful contributions and should support their members in the uptake of energy efficiency measures. ⇦

⇩ new

(58) Similar considerations apply for the very large number of natural gas system operators. The role of natural gas and the rate of supply and coverage of the territory is highly variable among Member States. In those cases National Regulatory Authorities are best placed to monitor and steer the system evolution towards an increased efficiency, and entities such as European Network of Transmission System Operators for Gas (ENTSOG) can provide useful contributions and should support their members in the uptake of energy efficiency measures.

🡻 2018/2002 recital 22
⇨ new

(59) The effective management of water can make a significant contribution to energy savings. The water and wastewater sectors account for 3,5% of electricity use in the Union and that share is expected to rise. At the same time, water leaks account for 24% of total water consumed in the Union and the energy sector is the largest consumer of water, accounting for 44% of consumption. The potential for energy savings through the use of smart technologies and processes should be fully explored ⇨ and applied whenever cost-effective and the energy efficiency first principle should be considered. Conversely, advanced irrigation technologies could substantially reduce water consumption in agriculture and the energy used for treating and transporting it ⇦.

🡻 2018/2002 recital (adapted)
⇨ new

(60) In accordance with Article 9 of the Treaty ~~on the Functioning of the European Union~~, the Union's energy efficiency policies should be inclusive and should therefore ensure ⇨ equal ⇦ access~~ibility~~ to energy efficiency measures for ⌦ all ⌫ consumers affected by energy poverty. Improvements ~~to the~~ ⌦ in ⌫ energy efficiency ~~of buildings~~ should, ~~in particular, benefit~~ ⇨ be implemented as a priority among ⇦ vulnerable ~~households~~ ⇨ customers and final users ⇦, ~~including those~~ ⇨ people ⇦ affected by energy poverty, and, where appropriate, ⇨ among medium-income households and ⇦ ~~those~~ ⇨ people ⇦ living in social housing, ⇨ elderly people and those living in rural and remote areas . ⇦ ⇨ In this context, specific attention should be paid to particular groups which are more at risk of being affected by energy poverty or more susceptible to the adverse impacts of energy poverty, such as women, persons with disabilities, elderly people, children, and persons with a minority racial or ethnic background. ⇦ Member States can ~~already~~ require obligated parties to include social aims in energy-saving measures in relation to energy poverty and this possibility ~~should be~~ ⌦ had already been ⌫ extended to alternative policy measures and ⌦ European ⌫ Energy Efficiency National Funds. ~~and~~ ⌦ That ⌫ should be transformed into an obligation ⇨ to protect and empower vulnerable customers and final users and to alleviate energy poverty ⇦, while allowing Member States to retain full flexibility with regard to ⇨ the type of policy measure, ⇦ their size, scope and content. If an energy efficiency obligation scheme does not permit measures relating

to individual energy consumers, the Member State may take measures to alleviate energy poverty by means of alternative policy measures alone. ⇨ Within its policy mix, Member States should ensure that other policy measures do not have an adverse effect on vulnerable customers, final users, people affected by energy poverty and, where applicable, people living in social housing. Member States should make best possible use of public funding investments into energy efficiency improvement measures, including funding and financial facilities established at Union level. ⇦

⇩ new

(61) This Directive refers to the concept of vulnerable customers, which Member States are to establish pursuant to Directive (EU) 2019/944. In addition, pursuant to Directive 2012/27/EU, the notion of 'final users' alongside the notion of 'final customer' clarifies that the rights to billing and consumption information also apply to consumers without individual or direct contracts with the supplier of energy used for collective heating, cooling or domestic hot water production systems in multi-occupant buildings. The concept of vulnerable customers does not necessarily ensure the targeting of final users. Therefore, in order to ensure that the measures set out in this Directive reach all individuals and households in a situation of vulnerability, Member States should include not only customers, in its strict sense, but also final users, in establishing their definition of vulnerable customers.

🡻 2018/2002 recital 24
⇨ new

(62) Around ~~50~~ ⇨ 34 ⇦ million households in the Union ~~are affected by energy poverty~~ ⇨ were unable to keep their home adequately warm in 2019[81] ⇦. ⇨ The European Green Deal prioritises the social dimension of the transition by committing to the principle that `no one is left behind´. The green transition, including the clean transition, affects women and men differently and may have a particular impact on some disadvantaged groups including people with disabilities. ⇦ Energy efficiency measures must therefore be central to any cost-effective strategy to address energy poverty and consumer vulnerability and are complementary to social security policies at Member State level. To ensure that energy efficiency measures reduce energy poverty for tenants sustainably, the cost-effectiveness of such measures, as well as their affordability to property owners and tenants, should be taken into account, and adequate financial ⇨ and technical ⇦ support for such measures should be guaranteed at Member State level. ⇨ Member States should support the local and regional level in identifying and alleviating energy poverty. ⇦ The Union's building stock needs, in the long term, to be converted to NZEBs in accordance with the objectives of the Paris Agreement. Current building renovation rates are insufficient and buildings occupied by citizens on low incomes who are affected by energy poverty are the hardest to reach. The measures laid down in this Directive with regard to energy savings obligations, energy efficiency obligation schemes and alternative policy measures are therefore of particular importance.

---

[81] COMMISSION RECOMMENDATION of 14.10.2020 on energy poverty, C(2020) 9600 final.

↓ 2012/27/EU recital 24
⇨ new

(63) To tap the energy savings potential in certain market segments where energy audits are generally not offered commercially (such as small and medium-sized enterprises (SMEs)), Member States should develop programmes to encourage SMEs to undergo energy audits. Energy audits should be mandatory and regular for large enterprises, as energy savings can be significant. Energy audits should take into account relevant European or International Standards, such as EN ISO 50001 (Energy Management Systems), or EN 16247-1 (Energy Audits), or, if including an energy audit, EN ISO 14000 (Environmental Management Systems) and thus be also in line with the provisions of Annex VI to this Directive as such provisions do not go beyond the requirements of these relevant standards. ⇨ A specific European standard on energy audits is currently under development. Energy audits may be carried out on a stand-alone basis or be part of a broader environmental management system or an energy performance contract. In all such cases those systems should comply with the minimum requirements of Annex VI. In addition, specific mechanisms and schemes established to monitor emissions and fuel consumption by certain transport operators, for example under EU law the EU ETS, may be considered compatible with energy audits, including in energy management systems, if they comply with the minimum requirements set out in Annex VI. ⇦

⇩ new

(64) The enterprise's average consumption should be the criterion to define the application of energy management systems and of energy audits in order to increase the sensitivity of those mechanisms in identifying relevant opportunities for cost-effective energy savings. Enterprises that are below the consumption thresholds defined for energy management systems and energy audits should be encouraged to undergo energy audits and to implement the recommendations resulting from those audits.

↓ 2012/27/EU recital 25

(65) Where energy audits are carried out by in-house experts, the necessary independence would require these experts not to be directly engaged in the activity audited.

⇩ new

(66) The information and communications technology (ICT) sector another important sector which receives increasing attention. In 2018 the energy consumption of data centres in the EU was 76,8 TWh. This is expected to rise to 98.5 TWh by 2030, a 28% increase. This increase in absolute terms can as well be seen in relative terms: within the EU, data centres accounted for 2,7% of electricity demand in 2018 and will reach 3,21% by 2030 if development continues on the current trajectory[82]. Europe's Digital

[82] https://digital-strategy.ec.europa.eu/en/library/energy-efficient-cloud-computing-technologies-and-policies-eco-friendly-cloud-market

Strategy already highlighted the need for highly energy-efficient and sustainable data centres and calls for transparency measures for telecommunication operators on their environmental footprint. To promote sustainable development in the ICT sector, particularly of data centres, Member States should collect and publish data, which is relevant for the energy performance and water footprint of data centres. Member States should collect and publish data only about data centres with a significant footprint, for which appropriate design or efficiency interventions, for new or existing installations respectively, can result in a considerable reduction of the energy and water consumption or in the reuse of waste heat in nearby facilities and heat networks. A data centre sustainability indicator can be established on the basis of that data collected

(67) The data centre sustainability indicators can be used to measure four basic dimensions of a sustainable data centre, namely how efficiently it uses energy, how much of that energy comes from renewable energy sources, the reuse of any waste heat that it produces and the usage of freshwater. The data centre sustainability indicators should raise awareness amongst data centre owners and operators, manufactures of equipment, developers of software and services, users of data centre services at all levels as well as entities and organisations that deploy, use or procure cloud and data centre services. It should also give confidence about the actual improvements following efforts and measures to increase the sustainability in new or existing data centres. Finally, it should be used as a basis for transparent and evidence-based planning and decision-making. Use of the data centre sustainability indicators should be optional for Member States. Use of the data centre sustainability indicator should be optional for Member States.

↓ 2018/2002 recital 25

(68) Lower consumer spending on energy should be achieved by assisting consumers in reducing their energy use by reducing the energy needs of buildings and improvements in the efficiency of appliances, which should be combined with the availability of low-energy transport modes integrated with public transport and cycling. Member States should also consider improving connectivity in rural and remote areas.

↓ 2018/2002 recital 26

(69) It is crucial to raise the awareness of all Union citizens about the benefits of increased energy efficiency and to provide them with accurate information on the ways in which it can be achieved. Citizens of all ages should also be involved in the energy transition via the European Climate Pact and the Conference on the Future of Europe. Increased energy efficiency is also highly important for the security of energy supply of the Union through lowering its dependence on import of fuels from third countries.

↓ 2018/2002 recital 27

(70) The costs and benefits of all energy efficiency measures taken, including pay-back periods, should be made fully transparent to consumers.

↓ 2018/2002 recital 28 (adapted)

(71) When implementing ~~Directive 2012/27/EU as amended by~~ this Directive and taking other measures in the field of energy efficiency, Member States should pay particular attention to synergies between energy efficiency measures and the efficient use of natural resources in line with the principles of the circular economy.

↓ 2018/2002 recital 29

(72) Taking advantage of new business models and technologies, Member States should endeavour to promote and facilitate the uptake of energy efficiency measures, including through innovative energy services for large and small customers.

↓ 2018/2002 recital 30 (adapted)

(73) ~~As part of the measures set out in the Commission's Communication of 15 July 2015 entitled 'Delivering a New Deal for Energy Consumers', in the context of the Energy Union and the Heating and Cooling strategy, consumers' minimum rights to accurate, reliable, clear and timely information about their energy consumption need to be strengthened. Articles 9 to 11 of, and Annex VII to, Directive 2012/27/EU should be amended~~ ⌦ It is necessary ⌫ to provide for frequent and enhanced feedback on energy consumption where technically feasible and cost-efficient in view of the measurement devices in place. This Directive clarifies that whether sub-metering is cost-efficient or not depends on whether the related costs are proportionate to the potential energy savings. The assessment of whether sub-metering is cost-efficient may take into account the effect of other concrete, planned measures in a given building, such as any forthcoming renovation.

↓ 2018/2002 recital 31 (adapted)

(74) This Directive also clarifies that rights relating to billing, and information about billing or consumption should apply to consumers of heating, cooling or domestic hot water supplied from a central source even where they have no direct, individual contractual relationship with an energy supplier. ~~The definition of the term 'final customer' is capable of being understood as referring only to natural or legal persons purchasing energy based on a direct, individual contract with an energy supplier. For the purposes of the relevant provisions, the term 'final user' should therefore be introduced to refer to a broader group of consumers and should, in addition to final customers purchasing heating, cooling or domestic hot water for their own end-use, also cover occupants of individual buildings or of individual units of multi-apartment or multi-purpose buildings where such units are supplied from a central source and where the occupants have no direct or individual contract with the energy supplier. The term 'sub-metering' should refer to measuring consumption in individual units of such buildings.~~

↓ 2018/2002 recital 32

(75) In order to achieve the transparency of accounting for individual consumption of thermal energy and thereby facilitate the implementation of sub-metering, Member States should ensure they have in place transparent, publicly available national rules

on the allocation of the cost of heating, cooling and domestic hot water consumption in multi-apartment and multi-purpose buildings. In addition to transparency, Member States could consider taking measures to strengthen competition in the provision of sub-metering services and thereby help ensure that any costs borne by the final users are reasonable.

↓ 2018/2002 recital 33 (adapted)

(76) ~~By 25 October 2020,~~ N~~n~~ewly installed heat meters and heat cost allocators should be remotely readable to ensure cost-effective, frequent provision of consumption information. The ⌦ provisions of ⌫ ~~amendments to Directive 2012/27/EU introduced by~~ this Directive relating to metering for heating, cooling and domestic hot water; sub-metering and cost allocation for heating, cooling and domestic hot water; remote reading requirement; billing and consumption information for heating and cooling and domestic hot water; cost of access to metering and billing and consumption information for heating, cooling and domestic hot water; and the minimum requirements for billing and consumption information for heating, cooling and domestic hot water are intended to apply only to heating, cooling and domestic hot water supplied from a central source. Member States are free to decide whether walk-by or drive-by technologies are to be considered remotely readable or not. Remotely readable devices do not require access to individual apartments or units to be read.

↓ 2018/2002 recital 34

(77) Member States should take into account the fact that the successful implementation of new technologies for measuring energy consumption requires enhanced investment in education and skills for both users and energy suppliers.

↓ 2018/2002 recital 35

(78) Billing information and annual statements are an important means by which customers are informed of their energy consumption. Data on consumption and costs can also convey other information that helps consumers to compare their current deal with other offers and to make use of complaint management and alternative dispute resolution mechanisms. However, considering that bill-related disputes are a common source of consumer complaints and a factor which contributes to persistently low levels of consumer satisfaction and engagement with their energy providers, it is necessary to make bills simpler, clearer and easier to understand, while ensuring that separate instruments, such as billing information, information tools and annual statements, provide all the necessary information to enable consumers to regulate their energy consumption, compare offers and switch suppliers.

↓ 2012/27/EU recital 26

~~When designing energy efficiency improvement measures, account should be taken of efficiency gains and savings obtained through the widespread application of cost-effective technological innovations such as smart meters. Where smart meters have been installed, they should not be used by companies for unjustified back-billing.~~

↓ 2012/27/EU recital 27 (adapted)

~~In relation to electricity, and in accordance with Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity[83], where the roll-out of smart meters is assessed positively, at least 80 % of consumers should be equipped with intelligent metering systems by 2020. In relation to gas, and in accordance with Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas[84], where the roll-out of intelligent metering systems is assessed positively, Member States or any competent authority they designate, should prepare a timetable for the implementation of intelligent metering systems.~~

↓ 2012/27/EU recital 28 (adapted)

~~Use of individual meters or heat cost allocators for measuring individual consumption of heating in multi-apartment buildings supplied by district heating or common central heating is beneficial when final customers have a means to control their own individual consumption. Therefore, their use makes sense only in buildings where radiators are equipped with thermostatic radiator valves.~~

↓ 2012/27/EU recital 29 (adapted)

~~In some multi-apartment buildings supplied by district heating or common central heating, the use of accurate individual heat meters would be technically complicated and costly due to the fact that the hot water used for heating enters and leaves the apartments at several points. It can be assumed that individual metering of heat consumption in multi-apartment buildings is, nevertheless, technically possible when the installation of individual meters would not require changing the existing in-house piping for hot water heating in the building. In such buildings, measurements of individual heat consumption can then be carried out by means of individual heat cost allocators installed on each radiator.~~

↓ 2012/27/EU recital 30 (adapted)

~~Directive 2006/32/EC requires Member States to ensure that final customers are provided with competitively priced individual meters that accurately reflect their actual energy consumption and provide information on actual time of use. In most cases, this requirement is subject to the conditions that it should be technically possible, financially reasonable, and proportionate in relation to the potential energy savings. When a connection is made in a new building or a building undergoes major renovations, as defined in Directive 2010/31/EU, such individual meters should, however, always be provided. Directive 2006/32/EC also requires that clear billing based on actual consumption should be provided frequently enough to enable consumers to regulate their own energy use.~~

83 ~~OJ L 211, 14.8.2009, p. 55.~~

84 ~~OJ L 211, 14.8.2009, p. 94.~~

↓ 2012/27/EU recital 31 (adapted)

~~Directives 2009/72/EC and 2009/73/EC require Member States to ensure the implementation of intelligent metering systems to assist the active participation of consumers in the electricity and gas supply markets. As regards electricity, where the roll-out of smart meters is found to be cost-effective, at least 80 % of consumers must be equipped with intelligent metering systems by 2020. As regards natural gas, no deadline is given but the preparation of a timetable is required. Those Directives also state that final customers must be properly informed of actual electricity/gas consumption and costs frequently enough to enable them to regulate their own consumption.~~

↓ 2012/27/EU recital 32 (adapted)

~~The impact of the provisions on metering and billing in Directives 2006/32/EC, 2009/72/EC and 2009/73/EC on energy saving has been limited. In many parts of the Union, these provisions have not led to customers receiving up-to-date information about their energy consumption, or billing based on actual consumption at a frequency which studies show is needed to enable customers to regulate their energy use. In the sectors of space heating and hot water in multi-apartment buildings the insufficient clarity of these provisions has also led to numerous complaints from citizens.~~

↓ 2012/27/EU recital 33 (adapted)

~~In order to strengthen the empowerment of final customers as regards access to information from the metering and billing of their individual energy consumption, bearing in mind the opportunities associated with the process of the implementation of intelligent metering systems and the roll out of smart meters in the Member States, it is important that the requirements of Union law in this area be made clearer. This should help reduce the costs of the implementation of intelligent metering systems equipped with functions enhancing energy saving and support the development of markets for energy services and demand management. Implementation of intelligent metering systems enables frequent billing based on actual consumption. However, there is also a need to clarify the requirements for access to information and fair and accurate billing based on actual consumption in cases where smart meters will not be available by 2020, including in relation to metering and billing of individual consumption of heating, cooling and hot water in multi-unit buildings supplied by district heating/cooling or own common heating system installed in such buildings.~~

↓ 2012/27/EU recital 34 (adapted)

(79) When designing energy efficiency improvement measures, Member States should take due account of the need to ensure the correct functioning of the internal market and the coherent implementation of the acquis, in accordance with the ⌦ TFEU ⌫ ~~Treaty on the Functioning of the European Union~~.

↓ 2012/27/EU recital 35 (adapted)
⇨ new

(80) High-efficiency cogeneration and ⌦ efficient ⌫ district heating and cooling ~~has~~ ⌦ have ⌫ significant potential for saving primary energy~~,~~ ~~which is largely untapped~~

in the Union. Member States should carry out a comprehensive assessment of the potential for high-efficiency cogeneration and ⌦ efficient ⌫ district heating and cooling. Those assessments should be ~~updated, at the request of the Commission, to provide investors with information concerning national development plans and contribute to a stable and supportive investment environment~~ ⇨ coherent with the integrated national energy and climate plans and long term renovation strategies ⇦. New electricity generation installations and existing installations which are substantially refurbished or whose permit or licence is updated should, subject to a cost-benefit analysis showing a cost-benefit surplus, be equipped with high-efficiency cogeneration units to recover waste heat stemming from the production of electricity. ⇨ Similarly, other facilities with substantial annual average energy input should be equipped with technical solutions to deploy waste heat from the facility where the cost-benefit analysis shows a cost-benefit surplus. ⇦ This waste heat could ~~then~~ be transported where it is needed through district heating networks. The events that trigger a requirement for authorisation criteria to be applied will generally be events that also trigger requirements for permits under Directive 2010/75/EU of the European Parliament and of the Council ~~of 24 November 2010 on industrial emissions~~[85] and for authorisation under ~~Directive 2009/72/EC~~ Directive (EU) 2019/944.

↓ 2012/27/EU recital 36

(81) It may be appropriate for ~~nuclear power installations, or~~ electricity generation installations that are intended to make use of geological storage permitted under Directive 2009/31/EC of the European Parliament and of the Council ~~of 23 April 2009 on the geological storage of carbon dioxide~~[86], to be located in places where the recovery of waste heat through high-efficiency cogeneration or by supplying a district heating or cooling network is not cost-effective. Member States should therefore be able to exempt those installations from the obligation to carry out a cost-benefit analysis for providing the installation with equipment allowing the recovery of waste heat by means of a high-efficiency cogeneration unit. It should also be possible to exempt peak-load and back-up electricity generation installations which are planned to operate under 1500 operating hours per year as a rolling average over a period of five years from the requirement to also provide heat.

↓ 2012/27/EU recital 37
⇨ new

(82) It is appropriate for Member States to encourage the introduction of measures and procedures to promote cogeneration installations with a total rated thermal input of less than ~~20~~ ⇨ 5 ⇦ MW in order to encourage distributed energy generation.

---

85 Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (OJ L 334, 17.12.2010, p. 17).

86 Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide (OJ L 140, 5.6.2009, p. 114).

⇩ new

(83) To implement national comprehensive assessments, Member States should encourage the assessments of the potential for high-efficiency cogeneration and efficient district heating and cooling in regional and local level. Member States should take steps to promote and facilitate deployment of identified cost-efficient potential of the high-efficiency cogeneration and efficient district heating and cooling.

(84) Requirements for efficient district heating and cooling should be consistent with long-term climate policy goals, the climate and environmental standards and priorities of the Union, and should comply with the principle of 'do no significant harm' within the meaning of Regulation (EU) 2020/85. All the district heating and cooling systems should aim for improved ability to interact with other parts of the energy system in order to optimise the use of energy and prevent energy waste by using the full potential of buildings to store heat or cold, including the excess heat from service facilities and nearby data centres. For that reason, efficient district heating and cooling system should ensure the increase of primary energy efficiency and a progressive integration of renewable energy and waste heat or cold. Therefore, this Directive stricter requirements for heating and cooling supply should be introduced progressively and should be applicable during specific established time periods and should be permanently applicable from 1 January 2050 onwards.

🡻 2012/27/EU recital 38 (adapted)
⇨ new

(85) High-efficiency cogeneration ~~should be~~ ⌦ has been ⌫ defined by the energy savings obtained by combined production instead of separate production of heat and electricity. ⇨ Requirements for high-efficiency cogeneration should be consistent with long-term climate policy goals. ⇦ The definitions of cogeneration and high-efficiency cogeneration used in Union legislation should be without prejudice to the use of different definitions in national legislation for purposes other than those of the Union legislation in question. To maximise energy savings and avoid energy saving opportunities being missed, the greatest attention should be paid to the operating conditions of cogeneration units.

🡻 2012/27/EU recital 39 (adapted)

(86) To ~~increase~~ ⌦ ensure ⌫ transparency ~~for~~ ⌦ and allow ⌫ the final customer ~~to be able~~ to choose between electricity from cogeneration and electricity produced by other techniques, the origin of high-efficiency cogeneration should be guaranteed on the basis of harmonised efficiency reference values. Guarantee of origin schemes do not by themselves imply a right to benefit from national support mechanisms. It is important that all forms of electricity produced from high-efficiency cogeneration can be covered by guarantees of origin. Guarantees of origin should be distinguished from exchangeable certificates.

🡻 2012/27/EU recital 40

(87) The specific structure of the cogeneration and district heating and cooling sectors, which include many small and medium-sized producers, should be taken into account,

especially when reviewing the administrative procedures for obtaining permission to construct cogeneration capacity or associated networks, in application of the 'Think Small First' principle.

↓ 2012/27/EU recital 41

(88) Most Union businesses are SMEs. They represent an enormous energy saving potential for the Union. To help them adopt energy efficiency measures, Member States should establish a favourable framework aimed at providing SMEs with technical assistance and targeted information.

↓ 2012/27/EU recital 42 (adapted)

~~Directive 2010/75/EU includes energy efficiency among the criteria for determining the Best Available Techniques that should serve as a reference for setting the permit conditions for installations within its scope, including combustion installations with a total rated thermal input of 50 MW or more. However, that Directive gives Member States the option not to impose requirements relating to energy efficiency on combustion units or other units emitting carbon dioxide on the site, for the activities listed in Annex I to Directive 2003/87/EC. Member States could include information on energy efficiency levels in their reporting under Directive 2010/75/EU.~~

↓ 2012/27/EU recital 43

(89) Member States should establish, on the basis of objective, transparent and non-discriminatory criteria, rules governing the bearing and sharing of costs of grid connections and grid reinforcements and for technical adaptations needed to integrate new producers of electricity produced from high-efficiency cogeneration, taking into account guidelines and codes developed in accordance with Regulation ~~(EC) No 714/2009~~ (EU) 2019/943 of the European Parliament and of the Council[87] ~~of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity~~[88] and Regulation (EC) No 715/2009 of the European Parliament and of the Council ~~of 13 July 2009 on conditions for access to the natural gas transmission networks~~[89]. Producers of electricity generated from high-efficiency cogeneration should be allowed to issue a call for tender for the connection work. Access to the grid system for electricity produced from high-efficiency cogeneration, especially for small scale and micro-cogeneration units, should be facilitated. In accordance with Article 9~~3~~9(2) of Directive (EU) 2019/944~~2009/72/EC~~ and Article 3(2) of Directive 2009/73/EC, Member States may impose public service obligations, including in relation to energy efficiency, on undertakings operating in the electricity and gas sectors.

---

87 Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (OJ L 158, 14.6.2019, p. 54).

88 ~~OJ L 211, 14.8.2009, p. 15.~~

89 Regulation (EC) No 715/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the natural gas transmission networks (OJ L 211, 14.8.2009, p. 36).

⇩ new

(90) It is necessary to set out provisions related to billing, single point of contact, out-of-court dispute settlement, energy poverty and basic contractual rights, with the aim of aligning them, where appropriate, with the relevant provisions regarding electricity pursuant to Directive (EU) 2019/944, in order to strengthen consumer protection and enable final customers to receive more frequent, clear and up-to-date information about their heating, cooling or domestic hot water consumption and to regulate their energy use.

(91) Greater consumer protection should be guaranteed by the availability of effective, independent out-of-court dispute settlement mechanisms for all consumers, such as an energy ombudsperson, a consumer body or a regulatory authority. Member States should, therefore, introduce speedy and effective complaint-handling procedures.

⇩ new

(92) The contribution of renewable energy communities, pursuant to Directive (EU) 2018/2001 of the European Parliament and of the Council[90], and citizen energy communities, according to Directive (EU) 2019/944 towards the objectives of the European Green Deal and the 2030 Climate Target Plan, should be recognised. Member States should, therefore, consider and promote the role of renewable energy communities and citizen energy communities. Those communities can help Member States to achieve the objectives of this Directive by advancing energy efficiency at local or household level. They can empower and engage consumers and enable certain groups of household customers, including in rural and remote areas to participate in energy efficiency projects and interventions. Energy communities can help fighting energy poverty through facilitation of energy efficiency projects, reduced energy consumption and lower supply tariffs.

(93) The contribution of one-stop shops or similar structures as mechanisms that can enable multiple target groups, including citizens, SMEs and public authorities, to design and implement projects and measures related to the clean energy transition, should be recognised. That contribution can include the provision of technical, administrative and financial advice and assistance, facilitation of the necessary administrative procedures or of access to financial markets, or guidance with the national and European legal framework, including public procurement rules and criteria, and the EU Taxonomy.

(94) The Commission should review the impact of its measures to support the development of platforms or fora, involving, inter alia, the European social dialogue bodies in fostering training programmes for energy efficiency, and shall bring forward further measures where appropriate. The Commission should also encourage European social partners in their discussions on energy efficiency, especially for vulnerable customers and final users, including those in energy poverty.

[90] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (OJ L 328, 21.12.2018, p. 82).

(95) A fair transition towards a climate-neutral Union by 2050 is central to the European Green Deal. The European Pillar of Social Rights, jointly proclaimed by the European Parliament, the Council and the Commission on 17 November 2017, includes energy among the essential services which everyone is entitled to access. Support for access to such services must be available for those in need[91].

(96) It is necessary to ensure that people affected by energy poverty, vulnerable customers and, where applicable, people living in social housing are protected and, to this end, empowered to actively participate in the energy efficiency improvement interventions, measures and related consumer protection or information measures that Member States implement.

(97) Public funding available at national and Union level should be strategically invested into energy efficiency improvement measures, in particular for the benefit of vulnerable customers, people affected by energy poverty and those living in social housing. Member States should take advantage of any financial contribution they might receive from the Social Climate Fund [Social Climate Fund Regulation], and of revenues from allowances from the EU Emissions Trading System. These revenue will support Member States in fulfilling their obligation to implement energy efficiency measures and policy measures under the energy savings obligation as a priority among vulnerable customers and people affected by energy poverty, which may include those living in rural and remote regions.

(98) National funding schemes should be complemented by suitable schemes of better information, technical and administrative assistance, easier access to finance that will enable the best use of the available funds especially by people affected by energy poverty, vulnerable customers and, where applicable, people living in social housing.

(99) Member States should empower and protect all people equally, irrespective of their sex, gender, age, disability, race or ethnic origin, sexual orientation, religion or belief, and ensure that those most affected or put at greater risk of being affected by energy poverty, or most exposed to the adverse impacts of energy poverty, are adequately protected. In addition, Member States should ensure that energy efficiency measures do not exacerbate any existing inequalities, notably with respect to energy poverty.

↓ 2012/27/EU recital 44 (adapted)

~~Demand response is an important instrument for improving energy efficiency, since it significantly increases the opportunities for consumers or third parties nominated by them to take action on consumption and billing information and thus provides a mechanism to reduce or shift consumption, resulting in energy savings in both final consumption and, through the more optimal use of networks and generation assets, in energy generation, transmission and distribution.~~

[91] EPSR, Principle 20 “Access to essential services”: https://ec.europa.eu/commission/priorities/deeper-and-fairer-economic-and-monetary-union/european-pillar-social-rights/european-pillar-social-rights-20-principles_en

🡻 2012/27/EU recital 45
⇨ new

(100) ~~Demand response can be based on final customers' responses to price signals or on building automation. Conditions for, and access to, demand response should be improved, including for small final consumers. Taking into account the continuing deployment of smart grids, Member States should therefore ensure that national energy regulatory authorities are able to ensure that network tariffs and regulations incentivise improvements in energy efficiency and support dynamic pricing for demand response measures by final customers. Market integration and equal market entry opportunities for demand-side resources (supply and consumer loads) alongside generation should be pursued. In addition,~~ Member States should ensure that national energy regulatory authorities take an integrated approach encompassing potential savings in the energy supply and the end-use sectors. ⇨ Without prejudice to security of supply, market integration and anticipatory investments in offshore grids necessary for the deployment of offshore renewable energy, national energy regulatory authorities should ensure that the energy efficiency first principle is applied in the planning and decision making processes and that network tariffs and regulations incentivise improvements in energy efficiency. Member States should also ensure that transmission and distribution system operators consider the energy efficiency first principle. That would help transmission and distribution system operators to consider better energy efficiency solutions and incremental costs incurred for the procurement of demand side resources, as well as the environmental and socio-economic impacts of different network investments and operation plans. Such an approach requires a shift from the narrow economic efficiency perspective to maximised social welfare. The energy efficiency first principle should in particular be applied in the context of scenario building for energy infrastructure expansion where demand side solutions could be considered as viable alternatives and need to be properly assessed, and it should become an intrinsic part of the assessment of network planning projects. Its application should be scrutinised by national regulatory authorities. ⇦

🡻 2012/27/EU recital 46
⇨ new

(101) A sufficient number of reliable professionals competent in the field of energy efficiency should be available to ensure the effective and timely implementation of this Directive, for instance as regards compliance with the requirements on energy audits and implementation of energy efficiency obligation schemes. Member States should therefore put in place certification ⇨ and /or equivalent qualification and suitable training ⇦ schemes for the providers of energy services, energy audits and other energy efficiency improvement measures ⇨ in close cooperation with social partners, training providers and other relevant stakeholders. The schemes should be assessed every four years starting as of December 2024 and if needed be updated to ensure the necessary level of competences for energy services providers, energy auditors, energy managers and installers of building elements. ⇦

🡻 2012/27/EU recital 47 (adapted)
⇨ new

(102) It is necessary to continue developing the market for energy services to ensure the availability of both the demand for and the supply of energy services. Transparency, for example by means of lists of ⇨ certified ⇦ energy services providers, ~~can contribute to this.~~ ⇨ and available ⇦ m~~M~~odel contracts, exchange of best practice and guidelines, ~~in particular for~~ ⇨ greatly contribute to the uptake of energy services and ⇦ energy performance contracting, ⌧ and ⌫ can also help stimulate demand ⇨ and increase the trust in energy services providers ⇦. ~~As in other forms of third-party financing arrangements,~~ I~~i~~n an energy performance contract the beneficiary of the energy service avoids investment costs by using part of the financial value of energy savings to repay the investment fully or partially carried out by a third party. ⇨ That can help attracting private capital which is key for increasing building renovation rates in the Union, bring expertise into the market and create innovative business models. Therefore, non-residential buildings with the useful floor area above 1000 m2 should be required to assess the feasibility of using energy performance contracting for renovation. That is a step ahead to increase the trust in energy services companies and pave the way for increasing such projects in the future. ⇦

⇩ new

(103) Given the ambitious renovation objectives over the next decade in the context of the Commission's Communication entitled Renovation Wave it is necessary to increase the role of independent market intermediaries including one stop shops or similar support mechanisms in order to stimulate market development on the demand and supply sides and to promote energy performance contracting for renovation of both private and public buildings. Local energy agencies could play a key role in this regard, and identify and support setting up potential facilitators or one-stop-shops.

(104) Energy performance contracting still faces important barriers in several Member States due to remaining regulatory and non-regulatory barriers. It is therefore necessary to address the ambiguities of the national legislative frameworks, lack of expertise, especially as regards to tendering procedures, and competing loans and grants.

(105) Member States should continue supporting the public sector in the uptake of energy performance contracting by providing model contracts that take into account the available European or international standards, tendering guidelines and the Guide to the Statistical Treatment of Energy Performance Contracts[92] published in May 2018 by Eurostat and the European Investment Bank on the treatment of energy performance contracting in government accounts, which have provided opportunities for addressing remaining regulatory barriers to these contracts in Member States.

[92] https://ec.europa.eu/eurostat/documents/1015035/8885635/guide_to_statistical_treatment_of_epcs_en.pdf/f74b474b-8778-41a9-9978-8f4fe8548ab1

🡻 2012/27/EU recital 48 (adapted)
⇨ new

~~(106)~~ ⇨ Member States have taken measures to identify and address the regulatory and non-regulatory barriers. However, ⇦ t~~T~~here is a need to ~~identify and~~ ⇨ increase the effort to ⇦ remove regulatory and non-regulatory barriers to the use of energy performance contracting and ~~other~~ third-party financing arrangements ~~for~~ ⇨ which help achieving ⇦ energy savings. These barriers include accounting rules and practices that prevent capital investments and annual financial savings resulting from energy efficiency improvement measures from being adequately reflected in the accounts for the whole life of the investment. ~~Obstacles to the renovating of the existing building stock based on a split of incentives between the different actors concerned should also be tackled at national level.~~

⇩ new

(107) Member States used the 2014 and 2017 National Energy Efficiency Action Plans (NEEAPs) to report progress in removing regulatory and non-regulatory barriers to energy efficiency, as regards the split of incentives between the owners and tenants or among owners of a building or building units. However, Member States should continue working in that direction and tap the potential for energy efficiency in the context of the 2016 Eurostat statistics, represented by the fact that more than four out of ten Europeans live in flats and more than three out of ten Europeans are tenants.

🡻 2012/27/EU recital 49 (adapted)
⇨ new

(108) Member States and regions should be encouraged to make full use of the ⇨ European funds available in the MFF and Next Generation EU including the Recovery and Resilience Facility, ⇦ ~~Structural Funds and~~ the Cohesion ⌦ Policy ⌫ Fund ⌦ s ⌫ ⇨ , the Rural Development Fund and the Just Transition Fund, as well as the financial instruments and technical assistance available under InvestEU, ⇦ to trigger ⇨ private and public ⇦ investments in energy efficiency improvement measures. Investment in energy efficiency has the potential to contribute to economic growth, employment, innovation and a reduction in ~~fuel~~ ⇨ energy ⇦ poverty in households, and therefore makes a positive contribution to economic, social and territorial cohesion ⇨ and green recovery ⇦. Potential areas for funding include energy efficiency measures in public buildings and housing, and providing new skills to promote employment in the energy efficiency sector. ⇨ The Commission will ensure synergies between the different funding instruments, in particular the funds in the shared management and in the direct management (like the centrally-managed programmes: Horizon Europe or LIFE), as well as between grants, loans and technical assistance to maximise their leverage effect on private financing and their impact on the achievement of energy efficiency policy objectives. ⇦

🡻 2012/27/EU recital 50 (adapted)

(109) Member States should encourage the use of financing facilities to further the objectives of this Directive. Such financing facilities could include financial

contributions and fines from non-fulfilment of certain provisions of this Directive; resources allocated to energy efficiency under Article 10(3) of Directive 2003/87/EC of the European Parliament and of the Council[93]; resources allocated to energy efficiency in the ⌦ European funds and programmes, ⌫ ~~multiannual financial framework, in particular cohesion, structural and rural development funds,~~ and dedicated European financial instruments, such as the European Energy Efficiency Fund.

↓ 2012/27/EU recital 51

(110) Financing facilities could be based, where applicable, on resources allocated to energy efficiency from Union project bonds; resources allocated to energy efficiency from the European Investment Bank and other European financial institutions, in particular the European Bank for Reconstruction and Development and the Council of Europe Development Bank; resources leveraged in financial institutions; national resources, including through the creation of regulatory and fiscal frameworks encouraging the implementation of energy efficiency initiatives and programmes; revenues from annual emission allocations under Decision No 406/2009/EC of the European Parliament and of the Council[94].

↓ 2012/27/EU recital 52

(111) The financing facilities could in particular use those contributions, resources and revenues to enable and encourage private capital investment, in particular drawing on institutional investors, while using criteria ensuring the achievement of both environmental and social objectives for the granting of funds; make use of innovative financing mechanisms (e.g. loan guarantees for private capital, loan guarantees to foster energy performance contracting, grants, subsidised loans and dedicated credit lines, third party financing systems) that reduce the risks of energy efficiency projects and allow for cost-effective renovations even among low and medium revenue households; be linked to programmes or agencies which will aggregate and assess the quality of energy saving projects, provide technical assistance, promote the energy services market and help to generate consumer demand for energy services.

↓ 2012/27/EU recital 53

(112) The financing facilities could also provide appropriate resources to support training and certification programmes which improve and accredit skills for energy efficiency; provide resources for research on and demonstration and acceleration of uptake of small-scale and micro- technologies to generate energy and the optimisation of the connections of those generators to the grid; be linked to programmes undertaking

---

93 Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC (OJ L 275, 25.10.2003, p. 32).

94 Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020 (OJ L 140, 5.6.2009, p. 136).

action to promote energy efficiency in all dwellings to prevent energy poverty and stimulate landlords letting dwellings to render their property as energy-efficient as possible; provide appropriate resources to support social dialogue and standard-setting aiming at improving energy efficiency and ensuring good working conditions and health and safety at work.

↓ 2012/27/EU recital 54
⇨ new

(113) Available Union ⇨ funding programmes, ⇦ financial instruments and innovative financing mechanisms should be used to give practical effect to the objective of improving the energy performance of public bodies' buildings. In that respect, Member States may use their revenues from annual emission allocations under Decision No 406/2009/EC in the development of such mechanisms on a voluntary basis and taking into account national budgetary rules.

↓ 2012/27/EU recital 55 (adapted)

(114) In the implementation of the ~~20 %~~ energy efficiency target, the Commission ~~will have to~~ ⌧ should ⌫ monitor the impact of ~~new~~ ⌧ the relevant ⌫ measures on Directive 2003/87/EC establishing the Union's emissions trading scheme (ETS) in order to maintain the incentives in the emissions trading system rewarding low carbon investments and preparing the ETS sectors for the innovations needed in the future. It will need to monitor the impact on those industry sectors which are exposed to a significant risk of carbon leakage as determined in Commission Decision 2014/746/EU[95] ~~Commission Decision 2010/2/EU of 24 December 2009 determining, pursuant to Directive 2003/87/EC of the European Parliament and of the Council, a list of sectors and subsectors which are deemed to be exposed to a significant risk of carbon leakage~~[96], in order to ensure that this Directive promotes and does not impede the development of these sectors.

↓ 2012/27/EU recital 56 (adapted)

~~Directive 2006/32/EC requires Member States to adopt, and aim to achieve, an overall national indicative energy savings target of 9 % by 2016, to be reached by deploying energy services and other energy efficiency improvement measures. That Directive states that the second Energy Efficiency Plan adopted by the Member States shall be followed, as appropriate and where necessary, by Commission proposals for additional measures, including extending the period of application of targets. If a report concludes that insufficient progress has been made towards achieving the indicative national targets laid down by that Directive, these proposals are to address the level and nature of the targets. The impact assessment accompanying this Directive finds that the Member States are on track to achieve~~

---

95 Commission Decision 2014/746/EU of 27 October 2014 determining, pursuant to Directive 2003/87/EC of the European Parliament and of the Council, a list of sectors and subsectors which are deemed to be exposed to a significant risk of carbon leakage, for the period 2015 to 2019 (OJ L 308, 29.10.2014, p. 114).

96 ~~OJ L 1, 5.1.2010, p. 10.~~

~~the 9 % target, which is substantially less ambitious than the subsequently adopted 20 % energy saving target for 2020, and therefore there is no need to address the level of the targets.~~

↓ 2012/27/EU recital 57 (adapted)

~~The Intelligent Energy Europe Programme established by Decision No 1639/2006/EC of the European Parliament and of the Council of 24 October 2006 establishing a Competitiveness and Innovation Framework Programme (2007 to 2013)[97] has been instrumental in creating an enabling environment for the proper implementation of the Union's sustainable energy policies, by removing market barriers such as insufficient awareness and capacity of market actors and institutions, national technical or administrative barriers to the proper functioning of the internal energy market or underdeveloped labour markets to match the low-carbon economy challenge. Many of those barriers are still relevant.~~

↓ 2012/27/EU recital 58 (adapted)

~~In order to tap the considerable energy-saving potential of energy-related products, the implementation of Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products[98] and Directive 2010/30/EU of the European Parliament and of the Council of 19 May 2010 on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products[99] should be accelerated and widened. Priority should be given to products offering the highest energy-saving potential as identified by the Ecodesign Working Plan and the revision, where appropriate, of existing measures.~~

↓ 2012/27/EU recital 59 (adapted)

~~In order to clarify the conditions under which Member States can set energy performance requirements under Directive 2010/31/EU whilst respecting Directive 2009/125/EC and its implementing measures, Directive 2009/125/EC should be amended accordingly.~~

↓ 2018/2002 recital 36 (adapted)
⇨ new

(115) Member State measures should be supported by well-designed and effective Union financial instruments ⌦ under ⌫ ~~, such as~~ the ~~European Structural and Investment Funds, the European Fund for Strategic Investments~~ InvestEU programme, and by financing from the European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD), which should support investments in energy efficiency at all stages of the energy chain and use a comprehensive cost-benefit analysis with a model of differentiated discount rates. Financial support should focus on cost-effective methods for increasing energy efficiency, which would lead to

---

97 ~~OJ L 310, 9.11.2006, p. 15.~~
98 ~~OJ L 285, 31.10.2009, p. 10.~~
99 ~~OJ L 153, 18.6.2010, p. 1.~~

a reduction in energy consumption. The EIB and the EBRD should, together with national promotional banks, design, generate and finance programmes and projects tailored for the efficiency sector, including for energy-poor households.

⇩ new

(116) Cross–sectorial law provides a strong basis for consumer protection for a wide range of current energy services, and is likely to evolve. Nevertheless, certain basic contractual rights of customers should be clearly established. Plain and unambiguous information should be made available to consumers concerning their rights in relation to the energy sector.

(117) Greater consumer protection is guaranteed by the availability of effective, independent out-of-court dispute settlement mechanisms for all consumers, such as an energy ombudsman, a consumer body or a regulatory authority. Member States should therefore introduce speedy and effective complaint-handling procedures.

🡻 2018/2002 recital 38 (adapted)
⇨ new

(118) In order to be able to evaluate the effectiveness of ~~Directive 2012/27/EU as amended by~~ this Directive, a requirement to conduct a general review of ~~that~~ ⌦ this ⌫ Directive and to submit a report to the European Parliament and to the Council by 28 February ⇨ 2027 ⇦ ~~2024~~ should be ⌦ laid down ⌫ ~~introduced~~. That review should ~~take place after the global stocktake by the United Nations Framework Convention on Climate Change in 2023, in order to~~ allow necessary alignments to that ~~process to be introduced~~, also taking into account economic and innovation developments.

🡻 2018/2002 recital 39 (adapted)

(119) Local and regional authorities should be given a leading role in the development and design, execution and assessment of the measures laid down in ⌦ this ⌫ Directive ~~2012/27/EU~~, so that they are able properly to address the specific features of their own climate, culture and society.

🡻 2018/2002 recital 40 (adapted)
⇨ new

(120) Reflecting technological progress and the growing share of renewable energy sources in the electricity generation sector, the default coefficient for savings in kWh electricity should be reviewed in order to reflect changes in the primary energy factor (PEF) for electricity ⇨ and other energy carriers ⇦ . Calculations reflecting the energy mix of the PEF for electricity are based on annual average values. The ‘physical energy content’ accounting method is used for nuclear electricity and heat generation and the ‘technical conversion efficiency’ method is used for electricity and heat generation from fossil fuels and biomass. For non-combustible renewable energy, the method is the direct equivalent based on the ‘total primary energy’ approach. To calculate the primary energy share for electricity in cogeneration, the method set out in Annex II to ⌦ this ⌫ Directive ~~2012/27/EU~~ is applied. An average rather than a

marginal market position is used. Conversion efficiencies are assumed to be 100 % for non-combustible renewables, 10 % for geothermal power stations and 33 % for nuclear power stations. The calculation of total efficiency for cogeneration is based on the most recent data from Eurostat. As for system boundaries, the PEF is 1 for all energy sources. The PEF value refers to 2018 and is based on data interpolated from the most recent version of the PRIMES Reference Scenario for 2015 and 2020 and adjusted with Eurostat data until 2016. The analysis covers the Member States and Norway. The dataset for Norway is based on the ~~European Network of Transmission System Operators for Electricity~~ ⌦ ENTSO-E ⌫ data.

↓ 2018/2002 recital 41

(121) Energy savings which result from the implementation of Union law should not be claimed unless they result from a measure that goes beyond the minimum required by the Union legal act in question, whether by setting more ambitious energy efficiency requirements at Member State level or by increasing the take-up of the measure. Buildings present a substantial potential for further increasing energy efficiency, and the renovation of buildings is an essential and long-term element with economies of scale in increasing energy savings. It is therefore necessary to clarify that it is possible to claim all energy savings stemming from measures promoting the renovation of existing buildings, provided that they exceed the savings that would have occurred in the absence of the policy measure and provided that the Member State demonstrates that the obligated, participating or entrusted party has in fact contributed to the achievement of the energy savings claimed.

↓ 2018/2002 recital 42 (adapted)

(122) In accordance with the Energy Union Strategy and the principles of better regulation, monitoring and verification rules for the implementation of energy efficiency obligation schemes and alternative policy measures, including the requirement to check a statistically representative sample of measures, should be given greater prominence. In ~~Directive 2012/27/EU, as amended by~~ this Directive, a statistically significant proportion and representative sample of the energy efficiency improvement measures should be understood to require the establishment of a subset of a statistical population of the energy-saving measures in question in such a way that it accurately reflects the entire population of all energy-saving measures, and thus allows for reasonably reliable conclusions regarding confidence in the totality of the measures.

↓ 2018/2002 recital 43
⇨ new

(123) Energy generated on or in buildings from renewable energy technologies reduces the amount of energy supplied from fossil fuels. The reduction of energy consumption and the use of energy from renewable sources in the buildings sector are important measures to reduce the Union's energy dependence and greenhouse gas emissions, especially in view of ambitious climate and energy objectives set for 2030 as well as the global commitment made in the context of the Paris Agreement. For the purposes of their cumulative energy savings obligation Member States may take into account, ~~where applicable,~~ energy savings from ⇨ policy measures promoting ⇦ renewable ~~energy generated on or in buildings for own use~~ ⇨ technologies ⇦ to meet their

energy savings requirements ⇨ in accordance with the calculation methodology provided in this Directive ⇦. ⇨ Energy savings from policy measures regarding the use of direct fossil fuel combustion should not be counted. ⇦

⇩ new

(124) Some of the changes introduced by this Directive might require a subsequent amendment to Regulation (EU) 2018/1999 in order to ensure coherence between the two legal acts. New provisions, mainly related to setting national contributions, gap filling mechanisms and reporting obligations, should be streamlined and transferred to that Regulation, once it is amended. Some provisions of Regulation (EU) 2018/1999 might also need to be reassessed in view of the changes proposed in this Directive. The additional reporting and monitoring requirements should not create any new parallel reporting systems but would be subject to the existing monitoring and reporting framework under Regulation (EU) 2018/1999.

(125) To foster the practical implementation of this Directive at national, regional and local levels, the Commission should continue to support the exchange of experiences on practices, benchmarking, networking activities, as well as innovative practices by an online platform.

🡻 2012/27/EU recital 60 (adapted)

~~Since the objective of this Directive, namely to achieve the Union's energy efficiency target of 20 % by 2020 and pave the way towards further energy efficiency improvements beyond 2020, cannot be sufficiently achieved by the Member States without taking additional energy efficiency measures, and can be better achieved at Union level, the Union may adopt measures, in accordance with the principle of subsidiarity as set out in Article 5 of the Treaty on European Union. In accordance with the principle of proportionality, as set out in that Article, this Directive does not go beyond what is necessary in order to achieve that objective.~~

🡻 2018/2002 recital 45 (adapted)
⇨ new

(126) Since the objectives of this Directive, namely to achieve the Union's energy efficiency target~~s~~ ~~of 20 % by 2020 and of at least 32,5 % by 2030, and to~~ pave the way towards further energy efficiency improvements ~~beyond those dates,~~ ⇨ and towards climate neutrality, ⇦ cannot be sufficiently achieved by the Member States but can rather, by reason of the scale and effects of the action, be better achieved at Union level, the Union may adopt measures, in accordance with the principle of subsidiarity as set out in Article 5 of the Treaty on European Union. In accordance with the principle of proportionality as set out in that Article, this Directive does not go beyond what is necessary in order to achieve those objectives.

🡻 2012/27/EU recital 61 (adapted)

(127) In order to permit adaptation to technical progress and changes in the distribution of energy sources, the power to adopt acts in accordance with Article 290 ⌦ TFEU ⌫ ~~of the Treaty on the Functioning of the European Union~~ should be delegated to the Commission in respect of the review of the harmonised efficiency reference values

laid down on the basis of ⌦ this ⌫ Directive ~~2004/8/EC~~ and in respect of the values, calculation methods, default primary energy coefficient and requirements in the Annexes to this Directive. ~~It is of particular importance that the Commission carry out appropriate consultations during its preparatory work, including at expert level. The Commission, when preparing and drawing up delegated acts, should ensure a simultaneous, timely and appropriate transmission of relevant documents to the European Parliament and the Council.~~

↓ 2018/2002 recital 37 (adapted)

(128) ~~In order to make it possible for the Annexes to Directive 2012/27/EU and the harmonised efficiency reference values to be updated, it is necessary to extend the delegation of powers granted to the Commission.~~ It is of particular importance that the Commission carry out appropriate consultations during its preparatory work, including at expert level, and that those consultations be conducted in accordance with the principles laid down in the Interinstitutional Agreement of 13 April 2016 on Better Law-Making[100]. In particular, to ensure equal participation in the preparation of delegated acts, the European Parliament and the Council receive all documents at the same time as Member States' experts, and their experts systematically have access to meetings of Commission expert groups dealing with the preparation of delegated acts.

↓ 2012/27/EU recital 62

(129) In order to ensure uniform conditions for the implementation of this Directive, implementing powers should be conferred on the Commission. Those powers should be exercised in accordance with Regulation (EU) No 182/2011 of the European Parliament and of the Council ~~of 16 February 2011 laying down the rules and general principles concerning mechanisms for control by Member States of the Commission's exercise of implementing powers~~[101].

↓ 2012/27/EU recital 63 (adapted)

~~All substantive provisions of Directives 2004/8/EC and 2006/32/EC should be repealed, except Article 4(1) to (4) of, and Annexes I, III and IV to Directive 2006/32/EC. Those latter provisions should continue to apply until the deadline for the achievement of the 9 % target. Article 9(1) and (2) of Directive 2010/30/EU, which provides for an obligation for Member States only to endeavour to procure products having the highest energy efficiency class, should be deleted.~~

↓ 2012/27/EU recital 64 (adapted)

~~The obligation to transpose this Directive into national law should be limited to those provisions that represent a substantive change as compared with Directives 2004/8/EC and~~

---

100 OJ L 123, 12.5.2016, p. 1.

101 Regulation (EU) No 182/2011 of the European Parliament and of the Council of 16 February 2011 laying down the rules and general principles concerning mechanisms for control by Member States of the Commission's exercise of implementing powers (OJ L 55, 28.2.2011, p. 13).

~~2006/32/EC. The obligation to transpose the provisions which are unchanged arises under those Directives.~~

⇩ new

(130) The obligation to transpose this Directive into national law should be limited to those provisions which represent a substantive amendment as compared to the earlier Directive. The obligation to transpose the provisions which are unchanged arises under that earlier Directive.

🡻 2012/27/EU recital 65 (adapted)
⇨ new

(131) This Directive ~~should be without prejudice to~~ ⇨ does not affect ⇦ the obligations of the Member States relating to the time-limits for ⌦ the ⌫ transposition into national law ~~and application~~ of ⌦ the ⌫ Directives ⌦ set out in Annex XV, Part B ⌫ ~~2004/8/EC and 2006/32/EC~~,

🡻 2012/27/EU recital 66 (adapted)

~~In accordance with the Joint Political Declaration of Member States and the Commission on explanatory documents of 28 September 2011, Member States have undertaken to accompany, in justified cases, the notification of their transposition measures with one or more documents explaining the relationship between the components of a directive and the corresponding parts of national transposition instruments. With regard to this Directive, the legislator considers the transmission of such documents to be justified,~~

🡻 2012/27/EU

HAVE ADOPTED THIS DIRECTIVE:

CHAPTER I

SUBJECT MATTER, SCOPE, DEFINITIONS AND ENERGY EFFICIENCY TARGETS

Article 1

Subject matter and scope

🡻 2018/2002 Art. 1.1 (adapted)
⇨ new

1. This Directive establishes a common framework of measures to promote energy efficiency within the Union in order to ensure that the Union's ~~2020 headline~~ target~~s~~ on energy efficiency ~~of 20 % and its 2030 headline targets on energy efficiency of at least 32,5 %~~ ⌦ is ⌫ ~~are~~ met and ~~paves the way for~~ ⌦ enables ⌫ further energy efficiency improvements ~~beyond those dates~~.

This Directive lays down rules designed to ⇨ implement energy efficiency as a priority across all sectors, ⇦ remove barriers in the energy market and overcome market failures that impede efficiency in the supply and use of energy,~~;~~ ~~and~~ ⌦ It also ⌫ provides for the establishment of indicative national energy efficiency ~~targets and~~ contributions for ~~2020 and~~ 2030.

This Directive contributes to the implementation of the energy efficiency first principle, ⇨ thus contributing to the Union as an inclusive, fair and prosperous society with a modern, resource-efficient and competitive economy ⇦.

🡻 2012/27/EU

2. The requirements laid down in this Directive are minimum requirements and shall not prevent any Member State from maintaining or introducing more stringent measures. Such measures shall be compatible with Union law. Where national legislation provides for more stringent measures, the Member State shall notify such legislation to the Commission.

Article 2

Definitions

For the purposes of this Directive, the following definitions shall apply:

(1) ‘energy’ means all forms of energy products, combustible fuels, heat, renewable energy, electricity, or any other form of energy, as defined in Article 2(d) of Regulation (EC) No 1099/2008 of the European Parliament and of the Council ~~of 22 October 2008 on energy statistics~~[102];

⇩ new

(2) ‘energy efficiency first’ means ‘energy efficiency first’ as defined in point (18) of Article 2 of Regulation (EU) 2018/1999.

(3) `energy system´ means a system primarily designed to supply energy-services to satisfy the demand of end-use sectors for energy in the forms of heat, fuels, and electricity.

🡻 2012/27/EU (adapted)
⇨ new

(~~1~~2) ‘primary energy consumption’ means gross ⇨ available energy ⇦ ~~inland consumption~~, excluding ⇨ international maritime bunkers, final ⇦ non-energy ⇨ consumption ⇦ ~~uses~~ ⇨ and ambient heat ⇦;

(~~5~~3) ‘final energy consumption’ means all energy supplied to industry, transport ⇨ (including energy consumption in international aviation) ⇦, households, ⇨ public and private ⇦ services, ~~and~~ agriculture ⇨ , forestry and fishing and other end-users (final consumers of energy). It excludes energy consumption in international

---

[102] Regulation (EC) No 1099/2008 of the European Parliament and of the Council of 22 October 2008 on energy statistics (OJ L 304, 14.11.2008, p. 1).

maritime bunkers, ambient heat and deliveries to the transformation sector, the energy sector and losses due to transmission and distribution (definitions in Annex A of Regulation (EC) No 1099/2008 apply) ⇦ ~~It excludes deliveries to the energy transformation sector and the energy industries themselves~~;

(6~~4~~) ‘energy efficiency’ means the ratio of output of performance, service, goods or energy, to input of energy;

(7~~5~~) ‘energy savings’ means an amount of saved energy determined by measuring and/or estimating consumption before and after implementation of an energy efficiency improvement measure, whilst ensuring normalisation for external conditions that affect energy consumption;

(8~~6~~) ‘energy efficiency improvement’ means an increase in energy efficiency as a result of technological, behavioural and/or economic changes;

(9~~7~~) ‘energy service’ means the physical benefit, utility or good derived from a combination of energy with energy-efficient technology or with action, which may include the operations, maintenance and control necessary to deliver the service, which is delivered on the basis of a contract and in normal circumstances has proven to result in verifiable and measurable or estimable energy efficiency improvement or primary energy savings;

(10~~8~~) ‘public bodies’ means ‘contracting authorities’ as defined in Directive 2014/24/EU~~2004/18/EC~~ of the European Parliament and of the Council[103] ~~of 31 March 2004 on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts~~[104];

~~(9) ‘central government’ means all administrative departments whose competence extends over the whole territory of a Member State;~~

(11~~10~~) ‘total useful floor area’ means the floor area of a building or part of a building, where energy is used to condition the indoor climate;

⇩ new

(12) ‘contracting authorities’ means contracting authorities as defined in Article Articles 6(1), 2(1) and 3(1) of Directives 2014/23/EU, Directive 2014/24/EU and Directive 2014/25/EU respectively;

(13) ‘contracting entities’ means contracting entities as defined in Directives 2014/23/EU, 2014/24/EU and 2014/25/EU respectively;

🡻 2012/27/EU (adapted)
⇨ new

(14~~11~~) ‘energy management system’ means a set of interrelated or interacting elements of a plan which sets an energy efficiency objective and a strategy to achieve that

---

103 Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC (OJ L 94, 28.3.2014, p. 65).

104 ~~OJ L 134, 30.4.2004, p. 114.~~

objective ⇨ , including monitoring of actual energy consumption, actions taken to increase energy efficiency and measurement of progress ⇦;

(15~~12~~) ‘European standard’ means a standard adopted by the European Committee for Standardisation, the European Committee for Electrotechnical Standardisation or the European Telecommunications Standards Institute and made available for public use;

(16~~13~~) ‘international standard’ means a standard adopted by the International Standardisation Organisation and made available to the public;

(17~~14~~) ‘obligated party’ means an energy distributor or retail energy sales company ⇨ or transmission system operator ⇦ that is bound by the national energy efficiency obligation schemes referred to in Article 8~~7~~;

(18~~15~~) ‘entrusted party’ means a legal entity with delegated power from a government or other public body to develop, manage or operate a financing scheme on behalf of the government or other public body;

(19~~16~~) ‘participating party’ means an enterprise or public body that has committed itself to reaching certain objectives under a voluntary agreement, or is covered by a national regulatory policy instrument;

(20~~17~~) ‘implementing public authority’ means a body governed by public law which is responsible for the carrying out or monitoring of energy or carbon taxation, financial schemes and instruments, fiscal incentives, standards and norms, energy labelling schemes, training or education;

(21~~18~~) ‘policy measure’ means a regulatory, financial, fiscal, voluntary or information provision instrument formally established and implemented in a Member State to create a supportive framework, requirement or incentive for market actors to provide and purchase energy services and to undertake other energy efficiency improvement measures;

(22~~19~~) ‘individual action’ means an action that leads to verifiable, and measurable or estimable, energy efficiency improvements and is undertaken as a result of a policy measure;

(23~~20~~) ‘energy distributor’ means a natural or legal person, including a distribution system operator, responsible for transporting energy with a view to its delivery to final customers or to distribution stations that sell energy to final customers;

(24~~21~~) ‘distribution system operator’ means ‘distribution system operator’ as defined in ⌦ Article 2(29) of ⌫ Directive (EU) 2019/944~~2009/72/EC~~ ⇨ as regards electricity, ⇦ and ⌦ Article 2(6) of ⌫ Directive 2009/73/EC ⇨ , as regards gas ⇦ respectively;

(25~~22~~) ‘retail energy sales company’ means a natural or legal person who sells energy to final customers;

(26~~23~~) ‘final customer’ means a natural or legal person who purchases energy for own end use;

(27~~24~~) ‘energy service provider’ means a natural or legal person who delivers energy services or ~~other~~ energy efficiency improvement measures in a final customer’s facility or premises;

(28~~25~~) ‘energy audit’ means a systematic procedure with the purpose of obtaining adequate knowledge of the ~~existing~~ energy consumption profile of a building or group of

buildings, an industrial or commercial operation or installation or a private or public service, identifying and quantifying ⌦ opportunities for ⌫ cost-effective energy savings ~~opportunities,~~ ⇨ identifying the potential for cost-effective use or production of renewable energy ⇦ and reporting the findings;

~~(26) 'small and medium-sized enterprises' or 'SMEs' means enterprises as defined in Title I of the Annex to Commission Recommendation 2003/361/EC[105]; the category of micro, small and medium-sized enterprises is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million;~~

(29~~27~~) 'energy performance contracting' means a contractual arrangement between the beneficiary and the provider of an energy efficiency improvement measure, verified and monitored during the whole term of the contract, where ~~investments~~ ~~(~~work, supply or service~~)~~ in that measure are paid for in relation to a contractually agreed level of energy efficiency improvement or other agreed energy performance criterion, such as financial savings;

(30~~28~~) 'smart metering system' or 'intelligent metering system' means ~~an electronic system that can measure energy consumption, providing more information than a conventional meter, and can transmit and receive data using a form of electronic communication~~ ⇨ 'smart metering system' as defined in Directive (EU) 2019/944 ⇦;

(31~~29~~) 'transmission system operator' means 'transmission system operator' as defined in ⌦ in Article 2(35) of ⌫ Directive (EU) 2019/944~~2009/72/EC~~ and Directive 2009/73/EC ⇨ , for electricity and gas, ⇦ respectively;

(32~~30~~) 'cogeneration' means the simultaneous generation in one process of thermal energy and electrical or mechanical energy;

(33~~31~~) 'economically justifiable demand' means demand that does not exceed the needs for heating or cooling and which would otherwise be satisfied at market conditions by energy generation processes other than cogeneration;

(34~~32~~) 'useful heat' means heat produced in a cogeneration process to satisfy economically justifiable demand for heating or cooling;

(35~~33~~) 'electricity from cogeneration' means electricity generated in a process linked to the production of useful heat and calculated in accordance with the methodology laid down in Annex II~~I~~;

(36~~34~~) 'high-efficiency cogeneration' means cogeneration meeting the criteria laid down in Annex III~~II~~;

(37~~35~~) 'overall efficiency' means the annual sum of electricity and mechanical energy production and useful heat output divided by the fuel input used for heat produced in a cogeneration process and gross electricity and mechanical energy production;

(38~~36~~) 'power-to-heat ratio' means the ratio of electricity from cogeneration to useful heat when operating in full cogeneration mode using operational data of the specific unit;

(39~~37~~) 'cogeneration unit' means a unit that is able to operate in cogeneration mode;

~~105 OJ L 124, 20.5.2003, p. 36~~

(40~~38~~) ‘small-scale cogeneration unit’ means a cogeneration unit with installed capacity below 1 MW_e;

(41~~39~~) ‘micro-cogeneration unit’ means a cogeneration unit with a maximum capacity below 50 kW_e;

~~(40) ‘plot ratio’ means the ratio of the building floor area to the land area in a given territory;~~

(42~~41~~) ‘efficient district heating and cooling’ means a district heating or cooling system ~~using at least 50 % renewable energy, 50 % waste heat, 75 % cogenerated heat or 50 % of a combination of such energy and heat~~ ⇨ meeting the criteria laid down in Article 24 ⇦;

(43~~42~~) ‘efficient heating and cooling’ means a heating and cooling option that, compared to a baseline scenario reflecting a business-as-usual situation, measurably reduces the input of primary energy needed to supply one unit of delivered energy within a relevant system boundary in a cost-effective way, as assessed in the cost-benefit analysis referred to in this Directive, taking into account the energy required for extraction, conversion, transport and distribution;

(44~~43~~) ‘efficient individual heating and cooling’ means an individual heating and cooling supply option that, compared to efficient district heating and cooling, measurably reduces the input of non-renewable primary energy needed to supply one unit of delivered energy within a relevant system boundary or requires the same input of non-renewable primary energy but at a lower cost, taking into account the energy required for extraction, conversion, transport and distribution;

⇩ new

(45) ‘data centre’ means a structure, or group of structures, with the purpose of centralized accommodation, interconnection and operation of information technology and network telecommunications equipment providing data storage, processing and transport services together with all the facilities and infrastructures for power distribution and environmental control and the necessary levels of resilience and security required to provide the desired service availability.

🡻 2012/27/EU
⇨ new

(46~~44~~) ‘substantial refurbishment’ means a refurbishment whose cost exceeds 50 % of the investment cost for a new comparable unit;

(47~~45~~) ‘aggregator’ ~~means~~ ~~a demand service provider that combines multiple short-duration consumer loads for sale or auction in organised energy markets~~ ⇨ has the meaning attributed to ‘independent aggregator’ as defined by Article 2(19) of Directive (EU) 2019/944 ⇦.

⇩ new

(49) ‘energy poverty’ means a household’s lack of access to essential energy services that underpin a decent standard of living and health, including adequate warmth, cooling,

lighting, and energy to power appliances, in the relevant national context, existing social policy and other relevant policies.

(50) ´final user´ means natural or legal person purchasing heating, cooling or domestic hot water for their own end-use, or natural or legal person occupying an individual building or a unit in a multi-apartment or multi-purpose building supplied with heating, cooling or domestic hot water from a central source who has no direct or individual contract with the energy supplier.

(52) ‘split incentives’ means a the lack of fair and reasonable distribution of financial obligations and rewards related to energy efficiency investments among the actors concerned, for example the owners and tenants or the different owners of building units, or owners and tenants or different owners of multi-apartment or multi-purpose buildings.

Article 3

Energy efficiency first principle

1. In conformity with the energy efficiency first principle, Member States shall ensure that energy efficiency solutions are taken into account in the planning, policy and major investment decisions related to the following sectors:

(a) energy systems, and

(b) non-energy sectors, where those sectors have an impact on energy consumption and energy efficiency.

2. Member States shall ensure that the application of the energy efficiency first principle is verified by the relevant entities where policy, planning and investment decisions are subject to approval and monitoring requirements.

3. In applying the energy efficiency first principle, Member States shall:

(a) promote and, where cost-benefit assessments are required, ensure the application of cost-benefit methodologies that allow proper assessment of wider benefits of energy efficiency solutions from the societal perspective;

(b) identify an entity responsible for monitoring the application of the energy efficiency first principle and the impacts of planning, policy and investment decisions on energy consumption and energy efficiency;

(c) report to the Commission, as part of the integrated national energy and climate progress reports in accordance with Article 17 of Regulation (EU) 2018/1999 on how the principle was taken into account in the national and regional planning, policy and major investment decisions related to the national and regional energy systems.

↓ 2012/27/EU

Article ~~43~~

Energy efficiency targets

⇩ new

1. Member States shall collectively ensure a reduction of energy consumption of at least 9 % in 2030 compared to the projections of the 2020 Reference Scenario so that the Union’s final

energy consumption amounts to no more than 787 Mtoe and the Union's 2030 primary energy consumption amounts to no more than 1023 Mtoe in 2030.[106]

↓ 2012/27/EU (adapted)
⇨ new

2~~1~~. Each Member State shall set ~~an indicative~~ national energy efficiency ~~target, based on either primary or~~ ⇨ contributions for ⇦ final ~~energy consumption,~~ ⌦ and ⌫ primary ~~or final~~ energy ~~savings, or energy intensity~~ ⇨ consumption to meet, collectively, the binding Union target set in paragraph 1 ⇦. Member States shall notify those ~~targets~~ ⇨ contributions together with an indicative trajectory for those contributions ⇦ to the Commission ~~in accordance with Article 24(1) and Annex XIV Part 1~~ ⇨ as part of the updates of their integrated national energy and climate plans in accordance with Article 14 of Regulation (EU) 2018/1999, and as part of their integrated national energy and climate plans as referred to in, and in accordance with, the procedure set out in Article 3 and Articles 7 to 12 of Regulation (EU) 2018/1999 ⇦. When doing so, ~~they~~ ⌦ Member States ⌫ shall ~~also express those targets in terms of an absolute level of primary energy consumption and final energy consumption in 2020 and shall~~ ⇨ use the formula defined in Annex I of this Directive and ⇦ explain how, and on the basis of which data, ~~this has~~ ⇨ the contributions have ⇦ been calculated.

⇩ new

Member States shall also provide the shares of energy consumption of energy end-use sectors, as defined in Regulation (EC) No 1099/2008 on energy statistics, including industry, residential, services and transport, in their national energy efficiency contributions. Projections for energy consumption in information and communications technology (ICT) shall also be indicated.

↓ 2012/27/EU (adapted)
⇨ new

⌦ In ⌫ ~~When~~ setting those ~~targets~~ ⇨ contributions ⇦, Member States shall take into account:

---

[106] The Union's energy efficiency target was initially set and calculated using the 2007 Reference Scenario projections for 2030 as a baseline. The change in the Eurostat energy balance calculation methodology and improvements in subsequent modelling projections call for a change of the baseline. Thus, using the same approach to define the target, that is to say comparing it to the future baseline projections, the ambition of the Union's 2030 energy efficiency target is set compared to the 2020 Reference Scenario projections for 2030 reflecting national contributions from the NECPs. With that updated baseline, the Union will need to further increase its energy efficiency ambition by at least 9 % in 2030 compared to the level of efforts under the 2020 Reference Scenario. The new way of expressing the level of ambition for the Union's targets does not affect the actual level of efforts needed.

↓ 2013/12/EU Art. 1 and Annex .a
⇨ new

(a) that the Union's ⇨ 2030 ⇦ ~~2020~~ energy consumption has to be no more than ~~1483~~ ⇨ 787 Mtoe of final energy or no more than 1023 ⇦ Mtoe of primary energy ~~or no more than 1086 Mtoe of final energy~~ ⇨ consumption ⇦;

↓ 2012/27/EU (adapted)

(b) the measures provided for in this Directive;

~~(c) the measures adopted to reach the national energy saving targets adopted pursuant to Article 4(1) of Directive 2006/32/EC; and~~

(c~~d~~) other measures to promote energy efficiency within Member States and at Union level;~~.~~

~~When setting those targets, Member States may also take into account national circumstances affecting primary energy consumption, such as:~~

⇩ new

(d) any relevant factors affecting efficiency efforts, such as:

i. the collective level of ambition necessary to reach climate objectives;

ii. the equitable distribution of efforts across the Union;

iii. the energy intensity of the economy;

↓ 2012/27/EU

(iv~~a~~) the remaining cost-effective energy-saving potential;

⇩ new

(e) other national circumstances affecting energy consumption, in particular:

↓ 2012/27/EU
⇨ new

(i~~b~~) GDP evolution and forecast;

(ii~~c~~) changes of energy imports and exports ⇨ , developments in energy mix and deployment of new sustainable fuels ⇦;

(iii~~d~~) development of all sources of renewable energies, nuclear energy, carbon capture and storage;

(iv) decarbonisation of energy intensive industries.

~~(e) early action.~~

↓ 2013/12/EU Art. 1 and Annex .b (adapted)

~~2. By 30 June 2014, the Commission shall assess progress achieved and whether the Union is likely to achieve energy consumption of no more than 1483 Mtoe of primary energy and/or no more than 1086 Mtoe of final energy in 2020.~~

↓ 2012/27/EU (adapted)

~~3. In carrying out the review referred to in paragraph 2, the Commission shall:~~

~~(a) sum the national indicative energy efficiency targets reported by Member States;~~

~~(b) assess whether the sum of those targets can be considered a reliable guide to whether the Union as a whole is on track, taking into account the evaluation of the first annual report in accordance with Article 24(1), and the evaluation of the National Energy Efficiency Action Plans in accordance with Article 24(2);~~

~~(c) take into account complementary analysis arising from:~~

~~(i) an assessment of progress in energy consumption, and in energy consumption in relation to economic activity, at Union level, including progress in the efficiency of energy supply in Member States that have based their national indicative targets on final energy consumption or final energy savings, including progress due to these Member States' compliance with Chapter III of this Directive;~~

~~(ii) results from modelling exercises in relation to future trends in energy consumption at Union level;~~

↓ 2013/12/EU Art. 1 and Annex .c (adapted)

~~(d) compare the results under points (a) to (c) with the quantity of energy consumption that would be needed to achieve energy consumption of no more than 1483 Mtoe of primary energy and/or no more than 1086 Mtoe of final energy in 2020.~~

↓ 2019/504 Art. 1

~~5. Each Member State shall set indicative national energy efficiency contributions towards the Union's 2030 targets as referred to in Article 1(1) of this Directive in accordance with Articles 4 and 6 of Regulation (EU) 2018/1999 of the European Parliament and of the~~

~~Council[107]. When setting those contributions, Member States shall take into account that the Union's 2030 energy consumption has to be no more than 1 128 Mtoe of primary energy and/or no more than 846 Mtoe of final energy. Member States shall notify those contributions to the Commission as part of their integrated national energy and climate plans as referred to in, and in accordance with, the procedure pursuant to Articles 3 and 7 to 12 of Regulation (EU) 2018/1999.~~

⇩ new

3. Where the Commission concludes, on the basis of its assessment pursuant to Article 29(1) and (3) of Regulation (EU) 2018/1999, that insufficient progress has been made towards meeting the energy efficiency contributions, Member States that are above their indicative trajectories referred to in paragraph 2 of this Article shall ensure that additional measures are implemented within one year following the date of reception of the Commission's assessment in order to ensure getting back on track to reach their energy efficiency contributions. Those additional measures shall include, but shall not be limited to, the following measures:

a. national measures delivering additional energy savings, including stronger project development assistance for the implementation of energy efficiency investment measures;

b. increasing the energy savings obligation set out in Article 8;

c. adjusting the obligation for public sector;

d. making a voluntary financial contribution to the National Energy Efficiency Fund referred to in Article 25 or another financing instrument dedicated to energy efficiency, where the annual financial contributions shall be equal to the investments required to reach the indicative trajectory.

Where a Member State is above its indicative trajectory referred to in paragraph 2 of this Article, it shall include in its integrated national energy and climate progress report pursuant to Article 17 of Regulation (EU) 2018/1999, an explanation of how it will cover the gap to ensure reaching its national energy efficiency contributions.

The Commission shall assess whether the national measures referred to in this paragraph are sufficient to achieve the Union's energy efficiency targets. Where national measures are deemed to be insufficient, the Commission shall, as appropriate, propose measures and exercise its power at Union level in addition to those recommendations in order to ensure, in particular, the achievement of the Union's 2030 targets for energy efficiency.

4. The Commission shall assess by 31 December 2026 any methodological changes in the data reported pursuant to Regulation (EC) No 1099/2008 on energy statistics, in the methodology for calculating energy balance and in energy models for European energy use

[107] ~~Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council (OJ L 328, 21.12.2018, p. 1).~~

and, if necessary, propose technical calculation adjustments to the Union's 2030 targets with a view to maintaining the level of ambition set out in paragraph 1 of this Article.

↓ 2018/2002 Art. 1.2

~~6. The Commission shall assess the Union's 2030 headline targets on energy efficiency set in Article 1(1) with a view to submitting a legislative proposal by 2023 to revise those targets upwards in the event of substantial cost reductions resulting from economic or technological developments, or where needed to meet the Union's international commitments for decarbonisation.~~

↓ 2012/27/EU (adapted)

CHAPTER II

~~*EFFICIENCY IN ENERGY USE*~~ ⌦ *EXEMPLARY ROLE OF PUBLIC SECTOR* ⌫

⇩ new

Article 5

Public sector leading on energy efficiency

1. Member States shall ensure that the total final energy consumption of all public bodies combined is reduced by at least 1,7% each year, when compared to the year X-2 (with X as the year when this Directive enters into force).

Member States may take into account climatic variations within the Member State when calculating their public bodies' final energy consumption.

2. Member States shall include, in their national energy and climate plans and updates thereof pursuant to Regulation (EU) 2018/1999, a list of public bodies which shall contribute to the fulfilment of the obligation set out in paragraph 1 of this Article, the amount of energy consumption reduction to be achieved by each of them and the measures they plan to achieve it. As part of their integrated national energy and climate reports pursuant to Article 17 of Regulation (EU) 2018/1999, Member States shall report to the Commission the final energy consumption reduction achieved annually.

3. Member States shall ensure that regional and local authorities, establish specific energy efficiency measures in their decarbonisation plans after consulting stakeholders and the public, including the particular groups at risk of energy poverty or more susceptible to its effects, such as women, persons with disabilities, older persons, children, and persons with a minority racial or ethnic background.

4. Member States shall support public bodies in the uptake of energy efficiency improvement measures, including at regional and local levels, by providing guidelines, promoting competence building and training opportunities and encouraging cooperation amongst public bodies.

5. Member States shall encourage public bodies to consider life cycle carbon emissions of their public bodies' investment and policy activities.

↓ 2012/27/EU (adapted)
⇨ new

Article 6~~5~~

Exemplary role of public bodies' buildings

1. Without prejudice to Article 7 of Directive 2010/31/EU of the European Parliament and of the Council[108], each Member State shall ensure that~~, as from 1 January 2014,~~ ⇨ at least ⇦ 3 % of the total floor area of heated and/or cooled buildings owned ~~and~~ by ~~its central government~~ ⇨ public bodies ⇦ is renovated each year to ⇨ at least ⇦ ~~meet at least the minimum energy performance requirements that it has set~~ ⇨ be transformed into nearly zero-energy buildings ⇦ in ~~application of~~ ⌦ accordance with ⌫ Article ~~4~~ ⇨ 9 ⇦ of Directive 2010/31/EU.

Where public bodies occupy a building that they do not own, they shall exercise their contractual rights to the extent possible and encourage the building owner to renovate the building to a nearly zero-energy building in accordance with Article 9 of Directive 2010/31/EU. When concluding a new contract for occupying a building they do not own, public bodies shall aim for that building to fall into the top two energy efficiency classes on the energy performance certificate.

~~The 3 % rate shall be calculated on the total floor area of buildings with a total useful floor area over 500 m² owned and occupied by the central government of the Member State concerned that, on 1 January of each year, do not meet the national minimum energy performance requirements set in application of Article 4 of Directive 2010/31/EU. That threshold shall be lowered to 250 m² as of 9 July 2015.~~

~~Where a Member State requires that the obligation to renovate each year 3 % of the total floor area extends to floor area owned and occupied by administrative departments at a level below central government, the 3 % rate~~ ⇨ The rate of at least 3% ⇦ shall be calculated on the total floor area of buildings ⌦ having ⌫~~with~~ a total useful floor area ~~over 500 m² and, as of 9 July 2015,~~ over 250 m^2 owned ~~and~~ by ~~central government and by these administrative departments~~ ⇨ public bodies ⇦ of the Member State concerned ⌦ and which ⌫ ~~that~~, on 1 January ~~of each year, do not meet the national minimum energy performance requirements set in application of Article 4 of Directive 2010/31/EU~~ ⇨ 2024, are not nearly zero-energy buildings ⇦.

~~When implementing measures for the comprehensive renovation of central government buildings in accordance with the first subparagraph, Member States may choose to consider the building as a whole, including the building envelope, equipment, operation and maintenance.~~

---

108 Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (OJ L 153, 18.6.2010, p. 13).

~~Member States shall require that central government buildings with the poorest energy performance be a priority for energy efficiency measures, where cost-effective and technically feasible.~~

~~2. Member States may decide not to set or apply the requirements referred to in paragraph 1 to the following categories of buildings:~~

~~(a) buildings officially protected as part of a designated environment, or because of their special architectural or historical merit, in so far as compliance with certain minimum energy performance requirements would unacceptably alter their character or appearance;~~

~~(b) buildings owned by the armed forces or central government and serving national defence purposes, apart from single living quarters or office buildings for the armed forces and other staff employed by national defence authorities;~~

~~(c) buildings used as places of worship and for religious activities.~~

~~3. If a Member State renovates more than 3 % of the total floor area of central government buildings in a given year, it may count the excess towards the annual renovation rate of any of the three previous or following years.~~

2~~4~~. In exceptional cases, Member States may count towards the annual renovation rate of ~~central government~~ buildings new buildings owned as replacements for specific ~~central government~~ ⇨ public bodies' ⇦ buildings demolished in any of the two previous years~~, or buildings that have been sold, demolished or taken out of use in any of the two previous years due to more intensive use of other buildings~~. Such exceptions shall only apply where they would be more cost effective and sustainable in terms of the energy and lifecycle CO_2 emissions achieved compared to the renovations of such buildings. The general criteria, methodologies and procedures to identify such exceptional cases shall be clearly set out and published by each Member State.

3~~5~~. For the purposes of ⇨ this Article ⇦ ~~paragraph 1~~, ~~by 31 December 2013,~~ Member States shall ~~establish~~ ~~and~~ make publicly available an inventory of heated and/or cooled ~~central government~~ ⇨ public bodies' ⇦ buildings with a total useful floor area ~~over 500 m²~~ ~~and, as of 9 July 2015,~~ ⌧ of more than ⌧ ~~over~~ 250 m^2~~, excluding buildings exempted on the basis of paragraph 2~~. ⇨ This inventory shall be updated at least once a year. ⇦ The inventory shall contain ⇨ at least ⇦ the following data:

(a) the floor area in m^2; ~~and~~

(b) the energy performance ⇨ certificate ⇦ of each building ~~or relevant energy data~~ ⇨ issued in accordance with Article 12 of Directive 2010/31/EU ⇦.

~~6. Without prejudice to Article 7 of Directive 2010/31/EU, Member States may opt for an alternative approach to paragraphs 1 to 5 of this Article, whereby they take other cost-effective measures, including deep renovations and measures for behavioural change of occupants, to achieve, by 2020, an amount of energy savings in eligible buildings owned and occupied by their central government that is at least equivalent to that required in paragraph 1, reported on an annual basis.~~

~~For the purpose of the alternative approach, Member States may estimate the energy savings that paragraphs 1 to 4 would generate by using appropriate standard values for the energy consumption of reference central government buildings before and after renovation and according to estimates of the surface of their stock. The categories of reference central government buildings shall be representative of the stock of such buildings.~~

~~Member States opting for the alternative approach shall notify to the Commission, by 31 December 2013, the alternative measures that they plan to adopt, showing how they would achieve an equivalent improvement in the energy performance of the buildings within the central government estate.~~

~~7. Member States shall encourage public bodies, including at regional and local level, and social housing bodies governed by public law, with due regard for their respective competences and administrative set-up, to:~~

~~(a) adopt an energy efficiency plan, freestanding or as part of a broader climate or environmental plan, containing specific energy saving and efficiency objectives and actions, with a view to following the exemplary role of central government buildings laid down in paragraphs 1, 5 and 6;~~

~~(b) put in place an energy management system, including energy audits, as part of the implementation of their plan;~~

~~(c) use, where appropriate, energy service companies, and energy performance contracting to finance renovations and implement plans to maintain or improve energy efficiency in the long term.~~

Article 7~~6~~

⌦ Public procurement ⌫ ~~Purchasing by public bodies~~

1. Member States shall ensure that ~~central governments~~ ⇨ contracting authorities and contracting entities, when concluding public contracts and concessions with a value equal to or greater than the thresholds laid down in Article 8 of Directive 2014/23/EU, Article 4 of Directive 2014/24/EU and Article 15 of Directive 2014/25/EU, ⇦ purchase only products, services, buildings and ⇨ works ⇦ ~~buildings~~ with high energy-efficiency performance~~, insofar as that is consistent with cost-effectiveness, economical feasibility, wider sustainability, technical suitability, as well as sufficient competition, as~~ ⌦ in accordance with the requirements ⌫ referred to in Annex IV ⌦ to this Directive ⌫.

~~The obligation set out in the first subparagraph shall apply to contracts for the purchase of products, services and buildings by public bodies in so far as such contracts have a value equal to or greater than the thresholds laid down in Article 4 of Directive 2004/18/EC.~~

⇩ new

Member States shall also ensure that in concluding the public contracts and concessions with a value equal to or greater than the thresholds referred to in the first subparagraph, contracting authorities and contracting entities, apply the energy efficiency first principle referred to in Article 3 of this Directive, including for those public contracts and concessions for which no specific requirements are provided in Annex IV.

🡻 2012/27/EU (adapted)
⇨ new

2. The obligation referred to in paragraph 1 shall apply to the contracts of the armed forces only to the extent that its application does not cause any conflict with the nature and primary aim of the activities of the armed forces. The obligation shall not apply to contracts for the supply of military equipment as defined by Directive 2009/81/EC of the European Parliament and of the Council ~~of 13 July 2009 on the coordination of procedures for the award of certain~~

~~works contracts, supply contracts and service contracts by contracting authorities or entities in the fields of defence and security~~[109].

3. ~~Member States shall encourage public bodies, including at regional and local levels, with due regard to their respective competences and administrative set-up, to follow the exemplary role of their central governments to purchase only products, services and buildings with high energy efficiency performance.~~ ⇨ Notwithstanding paragraph 4 of Article 24 of this Directive, ⇦ Member States shall ~~encourage public bodies~~ ⇨ ensure that contracting authorities and contracting entities ⇦ ~~, when tendering service contracts with significant energy content, to~~ assess the ~~possibility~~ ⇨ feasibility ⇦ of concluding long-term energy performance contracts that provide long-term energy savings ⇨ when procuring service contracts with significant energy content. ⇦

4. Without prejudice to paragraph 1, when purchasing a product package ⌦ fully ⌫ covered ~~as a whole~~ by a delegated act adopted under Regulation (EU) 2017/1369 of the European Parliament and of the Council[110] ~~Directive 2010/30/EU~~, Member States may require that the aggregate energy efficiency ~~shall~~ take priority over the energy efficiency of individual products within that package, by purchasing the product package that complies with the criterion of belonging to the highest energy efficiency class.

⇩ new

5. Member States may require that contracting authorities and contracting entities take into account, where appropriate, wider sustainability, social, environmental and circular economy aspects in procurement practices with a view to achieving the Union's decarbonisation and zero pollution objectives. Where appropriate, and in accordance with the requirements laid down in Annex IV, Member States shall require contracting authorities and contracting entities to take into account Union green public procurement criteria.

To ensure transparency in the application of energy efficiency requirements in the procurement process, Member States shall make publicly available information on the energy efficiency impact of contracts with a value equal to or greater than the thresholds referred to in paragraph 1. Contracting authorities may decide to require that tenderers disclose information on the life cycle global warming potential of a new building and may make that information publically available for the contracts, in particular for new buildings having a floor area larger than 2000 square meters.

Member States shall support contracting authorities and contracting entities in the uptake of energy efficiency requirements, including at regional and local level, by providing clear rules and guidelines including methodologies on the assessment of lifecycle costs and environment impacts and costs, set up competence support centres, encouraging cooperation amongst contracting authorities including across borders and using aggregated procurement and digital procurement where possible.

---

109 Directive 2009/81/EC of the European Parliament and of the Council of 13 July 2009 on the coordination of procedures for the award of certain works contracts, supply contracts and service contracts by contracting authorities or entities in the fields of defence and security (OJ L 216, 20.8.2009, p. 7).

110 Regulation (EU) 2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU (OJ L 198, 28.7.2017, p. 1).

6. Member States shall establish legal and regulatory provisions, and administrative practices, regarding public purchasing and annual budgeting and accounting, necessary to ensure that individual contracting authorities are not deterred from making investments in improving energy efficiency and from using energy performance contracting and third-party financing mechanisms on a long-term contractual basis.

🡻 2012/27/EU (adapted)
⇨ new

7.~~(b)~~ ⇨ Member States shall remove any regulatory or non-regulatory barriers to energy efficiency, in particular as regards ⇦ legal and regulatory provisions, and administrative practices, regarding public purchasing and annual budgeting and accounting, with a view to ensuring that individual public bodies are not deterred from making investments in improving energy efficiency ~~and minimising expected life-cycle costs~~ and from using energy performance contracting and ~~other~~ third-party financing mechanisms on a long-term contractual basis.

⇩ new

Member States shall report to the Commission on the measures taken to address the barriers to uptake of energy efficiency improvements as part of the integrated national energy and climate progress reports pursuant to Article 17 of Regulation (EU) 2018/1999.

🡻 2018/2002 Art. 1.3 (adapted)
⇨ new

CHAPTER III

⌦ *EFFICIENCY IN ENERGY USE* ⌫

Article 8~~7~~

Energy savings obligation

1. Member States shall achieve cumulative end-use energy savings at least equivalent to:

(a) new savings each year from 1 January 2014 to 31 December 2020 of 1,5 % of annual energy sales to final customers by volume, averaged over the most recent three-year period prior to 1 January 2013. Sales of energy, by volume, used in transport may be excluded, in whole or in part, from that calculation;

(b) new savings each year from 1 January 2021 to 31 December ~~2030~~ ⇨ 2023 ⇦ of 0,8 % of annual final energy consumption, averaged over the most recent three-year period prior to 1 January 2019. By way of derogation from that requirement, Cyprus and Malta shall achieve new savings each year from 1 January 2021 to 31 December ~~2030~~ ⇨ 2023 ⇦ equivalent to 0,24 % of annual final energy consumption, averaged over the most recent three-year period prior to 1 January 2019.

⇩ new

(c) new savings each year from 1 January 2024 to 31 December 2030 of 1,5 % of annual final energy consumption, averaged over the three-year period prior to 1 January 2020.

🡻 2018/2002 Art. 1.3 (adapted)
⇨ new

Member States shall decide how to phase the calculated quantity of new savings over each period referred to in points (a), (b) and ⇨ (c) ⇦ of the first subparagraph, provided that the required total cumulative end-use energy savings have been achieved by the end of each obligation period.

Member States shall continue to achieve new annual savings in accordance with ~~point (b)~~ ⇨ the savings rate provided in point (c) ⇦ of the first subparagraph for ten-year periods after 2030, ~~unless reviews by the Commission by 2028 and every 10 years thereafter conclude that this is not necessary to achieve the Union's long-term energy and climate targets for 2050.~~

(2) Member States shall achieve the amount of energy savings required under paragraph 1 of this Article either by establishing an energy efficiency obligation scheme referred to in Article 9~~7a~~ or by adopting alternative policy measures referred to in Article 10~~7b~~. Member States may combine an energy efficiency obligation scheme with alternative policy measures. Member States shall ensure that energy savings resulting from policy measures referred to in Articles 9~~7a~~ and 10~~7b~~ and Article 28(11)~~20(6)~~ are calculated in accordance with Annex V.

⇩ new

(3) Member States shall implement energy efficiency obligation schemes, alternative policy measures, or a combination of both, or programmes or measures financed under an Energy Efficiency National Fund, as a priority among people affected by energy poverty, vulnerable customers and, where applicable, people living in social housing. Member States shall ensure that policy measures implemented pursuant to this Article have no adverse effect on those persons. Where applicable, Member States shall make the best possible use of funding, including public funding, funding facilities established at Union level, and revenues from allowances pursuant to Article 22(3)(b) with the aim of removing adverse effects and ensuring a just and inclusive energy transition.

In designing such policy measures, Member States shall consider and promote the role of renewable energy communities and citizen energy communities in the contribution to the implementation towards these policy measures.

Member States shall achieve a share of the required amount of cumulative end-use energy savings among people affected by energy poverty vulnerable customers and, where applicable, people living in social housing. This share shall at least equal the proportion of households in energy poverty as assessed in their National Energy and Climate Plan established in accordance with Article 3(3)(d) of the Governance Regulation 2018/1999. If a Member State had not notified the share of households in energy poverty as assessed in their National Energy and Climate Plan, the share of the required amount of cumulative end-use energy savings among people affected by energy poverty vulnerable customers and, where applicable, people living in social housing, shall at least equal the arithmetic average share of

the following indicators for the year 2019 or, if not available for 2019, for the linear extrapolation of their values for the last three years that are available:

a) Inability to keep home adequately warm (Eurostat, SILC [ilc_mdes01]);

b) Arrears on utility bills (Eurostat, SILC, [ilc_mdes07]); and

c) Structure of consumption expenditure by income quintile and COICOP consumption purpose (Eurostat, HBS, [hbs_str_t223], data for [CP045] Electricity, gas and other fuels).

(4) Member States shall include information about the indicators applied, the arithmetic average share and the outcome of policy measures established in accordance with paragraph 3 of this Article in the updates of their integrated national energy and climate plans in accordance with Article 14 of Regulation (EU) 2018/1999, in their subsequent integrated national energy and climate plans pursuant to Articles 3 and 7 to 12 of Regulation (EU) 2018/1999, and respective progress reports in accordance with Article 17 of that Regulation.

🡻 2018/2002 Art. 1.3 (adapted)
⇨ new

5. Member States may count energy savings that stem from policy measures, whether introduced by 31 December 2020 or after that date, provided that those measures result in new individual actions that are carried out after 31 December 2020. ⇨ Energy savings achieved in any obligation period shall not count towards the amount of required energy savings for the previous obligation periods set out in paragraph 1. ⇦

6~~2~~. Provided that Member States achieve at least their cumulative end-use energy savings obligation referred to in point (b) of the first subparagraph of paragraph 1, they may calculate the required amount of energy savings ⇨ referred to in point (b) of the first subparagraph of paragraph 1 ⇦ by one or more of the following means:

(a) applying an annual savings rate on energy sales to final customers or on final energy consumption, averaged over the most recent three-year period prior to 1 January 2019;

(b) excluding, in whole or in part, energy used in transport from the calculation baseline;

(c) making use of any of the options set out in paragraph 4.

7~~3~~. Where Member States make use ⌦ of any ⌫ of the possibilities provided for in ~~point (a), (b) or (c) of~~ paragraph 6 ⇨ regarding the required energy savings referred to in point (b) of the first subparagraph of paragraph 1 ⇦, they shall establish:

(a) their own annual savings rate that will be applied in the calculation of their cumulative end-use energy savings, which shall ensure that the final amount of their net energy savings is no lower than those required under point (b) of the first subparagraph of paragraph 1; ~~and~~

(b) their own calculation baseline, which may exclude, in whole or in part, energy used in transport.

8~~4~~. Subject to paragraph 9, each Member State may:

(a) carry out the calculation required under point (a) of the first subparagraph of paragraph 1 using values of 1 % in 2014 and 2015; 1,25 % in 2016 and 2017; and 1,5 % in 2018, 2019 and 2020;

(b) exclude from the calculation all or part of the sales of energy used, by volume, with respect to the obligation period referred to in point (a) of the first subparagraph of paragraph 1, or final energy consumed, with respect to the obligation period referred to in point (b) of that subparagraph, by industrial activities listed in Annex I to Directive 2003/87/EC;

(c) count towards the amount of required energy savings ⇨ in point (a) and (b) of the first subparagraph of paragraph 1 ⇦, energy savings achieved in the energy transformation, distribution and transmission sectors, including efficient district heating and cooling infrastructure, as a result of implementing the requirements set out in Articles 23(4), point (b) of Article 24~~14~~(4), and Article 25~~1~~(1) to (10). Member States shall inform the Commission about their intended policy measures under this point for the period from 1 January 2021 to 31 December 2030 as part of their integrated national energy and climate plans. The impact of those measures shall be calculated in accordance with Annex V and included in those plans;

(d) count towards the amount of required energy savings, energy savings resulting from individual actions newly implemented since 31 December 2008 that continue to have an impact in 2020 with respect to the obligation period referred to in point (a) of the first subparagraph of paragraph 1 and beyond 2020 with respect to the period referred to in point (b) of the first subparagraph of paragraph 1, and which can be measured and verified;

(e) count towards the amount of required energy savings, energy savings that stem from policy measures, provided that it can be demonstrated that those measures result in individual actions carried out from 1 January 2018 to 31 December 2020 which deliver savings after 31 December 2020;

(f) exclude from the calculation of the amount of required energy savings ⇨ pursuant to point (a) and (b) of the first subparagraph of paragraph 1 ⇦, 30 % of the verifiable amount of energy generated on or in buildings for own use as a result of policy measures promoting new installation of renewable energy technologies;

(g) count towards the amount of required energy savings ⇨ pursuant to point (a) and (b) of the first subparagraph of paragraph 1 ⇦, energy savings that exceed the energy savings required for the obligation period from 1 January 2014 to 31 December 2020, provided that those savings result from individual actions carried out under policy measures referred to in Articles 9~~a~~ and 10~~7b~~, notified by Member States in their National Energy Efficiency Action Plans and reported in their progress reports in accordance with Article 24.

9~~5~~. Member States shall apply and calculate the effect of the options chosen under paragraph 8~~4~~ for the period~~s~~ referred to in points (a) and (b) of the first subparagraph of paragraph 1 separately:

(a) for the calculation of the amount of energy savings required for the obligation period referred to in point (a) of the first subparagraph of paragraph 1, Member States may make use of points (a) to (d) of paragraph 8~~4~~. All the options chosen under paragraph 4 taken together shall amount to no more than 25 % of the amount of energy savings referred to in point (a) of the first subparagraph of paragraph 1;

(b) for the calculation of the amount of energy savings required for the obligation period referred to in point (b) ~~of~~ the first subparagraph of paragraph 1, Member States may make use of points (b) to (g) of paragraph 8~~4~~, provided individual actions referred to in point (d) of paragraph 4 continue to have a verifiable and measurable impact after

31 December 2020. All the options chosen under paragraph 8~~4~~ taken together shall not lead to a reduction of more than 35 % of the amount of energy savings calculated in accordance with paragraphs 6~~2~~ and 7~~3~~.

Regardless of whether Member States exclude, in whole or in part, energy used in transport from their calculation baseline or make use of any of the options listed in paragraph 8~~4~~, they shall ensure that the calculated net amount of new savings to be achieved in final energy consumption during the obligation period ⇨ referred to in point (b) of the first subparagraph of paragraph 1 ⇦ from 1 January 2021 to 31 December ~~2030~~ ⇨ 2023 ⇦ is not lower than the amount resulting from applying the annual savings rate referred to in point (b) of the first subparagraph of paragraph 1.

10~~6~~. Member States shall describe in ⇨ the updates of ⇦ their integrated national energy and climate plans ⇨ in accordance with Article 14 of Regulation (EU) 2018/1999, in their subsequent integrated national energy and climate plans pursuant to Articles 3 and 7 to 12 of and ⇦ in accordance with Annex III to Regulation (EU) 2018/1999, ⇨ and respective progress reports ⇦ the calculation of the amount of energy savings to be achieved over the period from 1 January 2021 to 31 December 2030 referred to in point (b) of the first subparagraph of paragraph 1 of this Article and shall, if relevant, explain how the annual savings rate and the calculation baseline were established, and how and to what extent the options referred to in paragraph 8~~4~~ of this Article were applied.

⇩ new

(11) Member States shall notify the Commission with the amount of the required energy savings referred to in point (c) of the first subparagraph of paragraph 1 of this Article and paragraph of 3, a description of the policy measures to be implemented to achieve the required total amount of the cumulative end-use energy savings and their calculation methodologies pursuant to Annex V of this Directive, as part of the updates of their integrated national energy and climate plans in accordance with Article 14 of Regulation (EU) 2018/1999, and as part of their integrated national energy and climate plans as referred to in, and in accordance with, the procedure pursuant to Articles 3 and 7 to 12 of Regulation (EU) 2018/1999. Member States shall use the reporting template provided to the Member States by the Commission.

(12) Where on the basis of the assessment of the integrated national energy and climate progress reports pursuant to Article 29 of Regulation (EU) 2018/1999, or of the draft or final update of the latest notified integrated national energy and climate plan pursuant to Article 14 of Regulation (EU) 2018/1999, or the assessment of the subsequent draft and final integrated national energy and climate plans pursuant to Article 3 of Regulation (EU) 2018/1999, the Commission concludes that policy measures do not ensure the achievement of the required amount of cumulative end-use energy savings by the end of the obligation period, the Commission may issue recommendations in accordance with Article 34 of Regulation (EU) 2018/1999 to the Member States whose policy measures it deems insufficient to ensure the fulfilment of their energy savings obligations.

🡻 2018/2002 Art. 1.3

~~7. Energy savings achieved after 31 December 2020 shall not count towards the amount of required energy savings for the period from 1 January 2014 to 31 December 2020.~~

⇩ new

13. Where a Member State has not achieved the required cumulative end-use energy savings by the end of each obligation period set out in paragraph 1 of this Article, it shall achieve the outstanding energy savings in addition to the cumulative end-use energy savings required by the end of the following obligation period.

🡻 2018/2002 Art. 1.3
⇨ new

~~8. By way of derogation from paragraph 1 of this Article, Member States that allow obligated parties to use the option referred to in point (b) of Article 7a(6) may, for the purpose of point (a) of the first subparagraph of paragraph 1 of this Article, count energy savings obtained in any given year after 2010 and before the obligation period referred to in point (a) of the first subparagraph of paragraph 1 of this Article as if those energy savings had instead been obtained after 31 December 2013 and before 1 January 2021, provided that all of the following circumstances apply:~~

~~(a) the energy efficiency obligation scheme was in force at any point between 31 December 2009 and 31 December 2014 and was included in the Member State's first National Energy Efficiency Action Plan submitted under Article 24(2);~~

~~(b) the savings were generated under the obligation scheme;~~

~~(c) the savings are calculated in accordance with Annex V;~~

~~(d) the years for which the savings are counted as having been obtained have been reported in the National Energy Efficiency Action Plans in accordance with Article 24(2).~~

~~9. Member States shall ensure that savings resulting from policy measures referred to in Articles 7a and 87b and Article 20(6) are calculated in accordance with Annex V.~~

~~10. Member States shall achieve the amount of energy savings required under paragraph 1 of this Article either by establishing an energy efficiency obligation scheme referred to in Article 7a or by adopting alternative policy measures referred to in Article 87b. Member States may combine an energy efficiency obligation scheme with alternative policy measures.~~

~~11. In designing policy measures to fulfil their obligations to achieve energy savings, Member States shall take into account the need to alleviate energy poverty in accordance with criteria established by them, taking into consideration their available practices in the field, by requiring, to the extent appropriate, a share of energy efficiency measures under their national energy efficiency obligation schemes, alternative policy measures, or programmes or measures financed under an Energy Efficiency National Fund, to be implemented as a priority among vulnerable households, including those affected by energy poverty and, where appropriate, in social housing.~~

~~Member States shall include information about the outcome of measures to alleviate energy poverty in the context of this Directive in the integrated national energy and climate progress reports in accordance with Regulation (EU) 2018/1999.~~

14~~12~~. ⇨ As part of their updates of national energy and climate plans and respective progress reports, and their subsequent integrated national energy and climate plans and notified pursuant to Regulation (EU) 2018/1999 ⇦ Member States shall demonstrate ⇨ including, where appropriate, evidence and calculations: ⇦

(a) that where there is an overlap in the impact of policy measures or individual actions, there is no double counting of energy savings;.

⇩ new

(b) how energy savings achieved pursuant to points (b) and (c) of the first subparagraph of paragraph 1 contribute to the achievement of their national contribution pursuant to Article 4.

(c) that policy measures are established for fulfilling their energy savings obligation, designed in compliance with the requirements of this Article and that those policy measures are eligible and appropriate to ensure the achievement of the required amount of cumulative end-use energy savings by the end of each obligation period.

🡻 2018/2002 Art. 1.4
⇨ new

Article 97a

Energy efficiency obligation schemes

1. Where Member States decide to fulfil their obligations to achieve the amount of savings required under Article 87(1) by way of an energy efficiency obligation scheme, they shall ensure that obligated parties as referred to in paragraph 2 of this Article operating in each Member State's territory achieve, without prejudice to Article 87(94) and (105), their cumulative end-use energy savings requirement as set out in Article 87(1).

Where applicable, Member States may decide that obligated parties fulfil those savings, in whole or in part, as a contribution to the Energy Efficiency National Fund in accordance with Article 28(11)20(6).

2. Member States shall designate, on the basis of objective and non-discriminatory criteria, obligated parties among ⇨ transmission system operators, ⇦ energy distributors, retail energy sales companies and transport fuel distributors or transport fuel retailers operating in their territory. The amount of energy savings needed to fulfil the obligation shall be achieved by the obligated parties among final customers, designated by the Member State, independently of the calculation made pursuant to Article 87(1) or, if Member States so decide, through certified savings stemming from other parties as described in point (a) of paragraph 106 of this Article.

3. Where retail energy sales companies are designated as obligated parties under paragraph 2, Member States shall ensure that, in fulfilling their obligation, retail energy sales companies do not create any barriers that impede consumers from switching from one supplier to another.

⇩ new

(4) Member States may require obligated parties to achieve a share of their energy savings obligation among people affected by energy poverty, vulnerable customers and, where applicable, people living in social housing. Member States may also require obligated parties to achieve energy cost reduction targets and to achieve energy savings by promoting energy efficiency improvement measures, including financial support measures mitigating carbon price effects on SMEs and micro-SMEs.

(5) Member States may require obligated parties to work with local authorities or municipalities to promote energy efficiency improvement measures among people affected by energy poverty, vulnerable customers and, where applicable, people living in social housing. This includes identifying and addressing the specific needs of particular groups at risk of energy poverty or more susceptible to its effects. To protect people affected by energy poverty vulnerable customers and, where applicable, people living in social housing, Member States shall encourage obligated parties to carry out actions such as renovation of buildings, including social housing, replacement of appliances, financial support and incentives for energy efficiency improvement measures in conformity with national financing and support schemes, or energy audits.

(6) Member States shall require obligated parties to report on an annual basis on the energy savings achieved by the obligated parties from actions promoted among people affected by energy poverty, vulnerable customers and, where applicable, people living in social housing, and shall require aggregated statistical information on its final customers (identifying changes in energy savings to previously submitted information) and regarding technical and financial support provided.

🡻 2018/2002 Art. 1.4 (adapted)
⇨ new

7~~4~~. Member States shall express the amount of energy savings required of each obligated party in terms of either final or primary energy consumption. The method chosen to express the amount of energy savings required shall also be used to calculate the savings claimed by obligated parties. ⇨ When converting the amount of energy savings, ⇦ ~~T~~the ⇨ net calorific values ⇦ ~~conversion factors~~ set out ⇨ in Annex VI of Commission Implementing Regulation (EU) 2018/2066[111] and the primary energy factor pursuant to Article 29 ⇦ ~~in Annex IV~~ shall apply ⇨ unless the use of other conversion factors can be justified ⇦.

8~~5~~. Member States shall ⌦ establish ⌫ ~~put in place~~ measurement, control and verification systems ⌦ for carrying out ⌫ ~~under which~~ documented verification ~~is carried out~~ on at least a statistically significant proportion and representative sample of the energy efficiency improvement measures put in place by the obligated parties. The measurement, control and verification shall be carried out independently of the obligated parties. ⇨ Where an entity is an obligated party under a national energy efficiency obligation scheme under Article 9 and under the EU Emissions Trading System to buildings and road transport [Reference to proposal], the monitoring and verification system shall ensure that the carbon price passed through when releasing fuel for consumption [according to Article XX of Directive XX] shall be taken into account in the calculation and reporting of energy savings of the entity´s energy saving measures. ⇦

---

[111] Commission Implementing Regulation (EU) 2018/2066 of 19 December 2018 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council and amending Commission Regulation (EU) No 601/2012, OJ L 334, 31.12.2018, p. 1–93.

⇩ new

(9) Member States shall inform the Commission, as part of the integrated national energy and climate progress reports pursuant to Article 17 of Regulation (EU) 2018/1999, on the measurement, control and verification systems put in place, including but not limited to methods used, issues identified and how they were addressed.

🡻 2018/2002 Art. 1.4 (adapted)
⇨ new

10~~6~~. Within the energy efficiency obligation scheme, Member States may ⌦ authorise obligated parties to carry out ⌫ ~~do one or both of~~ the following:

(a) ~~permit obligated parties~~ to count towards their obligation certified energy savings achieved by energy service providers or other third parties, including when obligated parties promote measures through other State-approved bodies or through public authorities that may involve formal partnerships and may be in combination with other sources of finance. Where Member States so permit, they shall ensure that the certification of energy savings follows an approval process that is put in place in the Member States, that is clear, transparent, and open to all market participants, and that aims to minimise the costs of certification;

(b) ~~allow obligated parties~~ to count savings obtained in a given year as if they had instead been obtained in any of the four previous or three following years as long as this is not beyond the end of the obligation periods set out in Article 8~~7~~(1).

Member States shall assess and, if appropriate, take measures to minimise the impact of the direct and indirect costs of energy efficiency obligation schemes on the competitiveness of energy-intensive industries exposed to international competition.

11~~7~~. Member States shall, on an annual basis, publish the energy savings achieved by each obligated party, or each sub-category of obligated party, and in total under the scheme.

Article 10~~7b~~

Alternative policy measures

1. Where Member States decide to fulfil their obligations to achieve the savings required under Article 8~~7~~(1) by way of alternative policy measures, they shall ensure, without prejudice to Article 8~~7~~(9~~4~~) and (10~~5~~), that the energy savings required under Article 8~~7~~(1) are achieved among final customers.

2. For all measures other than those relating to taxation, Member States shall put in place measurement, control and verification systems under which documented verification is carried out on at least a statistically significant proportion and representative sample of the energy efficiency improvement measures put in place by the participating or entrusted parties. The measurement, control and verification shall be carried out independently of the participating or entrusted parties.

⇩ new

3. Member States shall inform the Commission, as part of the integrated national energy and climate progress reports pursuant to Article 17 of Regulation (EU) 2018/1999, on the

measurement, control and verification systems put in place, including but not limited to methods used, issues identified and how they were addressed.

4. When reporting a taxation measure, Member States shall demonstrate how the effectiveness of the price signal, such as tax rate and visibility over time, has been ensured in the design of the taxation measure. Where there is a decrease in the tax rate, Member States shall justify how the taxation measures still result in new energy savings.

↓ 2012/27/EU (adapted)

Article 11~~8~~

Energy ~~audits and energy~~ management systems ⌦ and energy audits ⌫

⇩ new

1. Member States shall ensure that enterprises with an average annual consumption higher than 100TJ of energy over the previous three years and taking all energy carriers together, implement an energy management system. The energy management system shall be certified by an independent body according to the relevant European or International Standards.

2. Member States shall ensure that enterprises with an average annual consumption higher than 10TJ of energy over the previous three years and taking all energy carriers together that do not implement an energy management system are subject to an energy audit. Energy audits shall be carried out in an independent and cost-effective manner by qualified or accredited experts in accordance with requirements provided in Article 26 or implemented and supervised by independent authorities under national legislation. Energy audits shall be carried out at least every four years from the date of the previous energy audit.

The results of the energy audits including the recommendations from these audits must be transmitted to the management of the enterprise. Member States shall ensure that the results and the implemented recommendations are published in the enterprise's annual report, where applicable.

↓ 2012/27/EU
⇨ new

3~~1~~. Member States shall promote the availability to all final customers of high quality energy audits which are cost-effective and:

(a) carried out in an independent manner by qualified and/or accredited experts according to qualification criteria; or

(b) implemented and supervised by independent authorities under national legislation.

The energy audits referred to in the first subparagraph may be carried out by in-house experts or energy auditors provided that the Member State concerned has put in place a scheme to assure and check their quality, including, if appropriate, an annual random selection of at least a statistically significant percentage of all the energy audits they carry out.

For the purpose of guaranteeing the high quality of the energy audits and energy management systems, Member States shall establish transparent and non-discriminatory minimum criteria for energy audits based on Annex VI. ⇨ Member States shall ensure that quality checks are carried out to ensure the validity and accuracy of energy audits. ⇦

Energy audits shall not include clauses preventing the findings of the audit from being transferred to any qualified/accredited energy service provider, on condition that the customer does not object.

4~~2~~. Member States shall develop programmes to encourage SMEs ⇨ that are not subject to paragraph 1 or 2 ⇦ to undergo energy audits and the subsequent implementation of the recommendations from these audits.

On the basis of transparent and non-discriminatory criteria and without prejudice to Union State aid law, Member States may set up support schemes for SMEs, including if they have concluded voluntary agreements, to cover costs of an energy audit and of the implementation of highly cost-effective recommendations from the energy audits, if the proposed measures are implemented.

Member States shall bring to the attention of SMEs, including through their respective representative intermediary organisations, concrete examples of how energy management systems could help their businesses. The Commission shall assist Member States by supporting the exchange of best practices in this domain.

~~3. Member States shall also develop programmes to raise awareness among households about the benefits of such audits through appropriate advice services.~~

~~Member States shall encourage training programmes for the qualification of energy auditors in order to facilitate sufficient availability of experts.~~

~~4. Member States shall ensure that enterprises that are not SMEs are subject to an energy audit carried out in an independent and cost-effective manner by qualified and/or accredited experts or implemented and supervised by independent authorities under national legislation by 5 December 2015 and at least every four years from the date of the previous energy audit.~~

⇩ new

5. Member States shall develop programmes to encourage non-SMEs that are not subject to paragraph 1 or 2 to undergo energy audits and the subsequent implementation of the recommendations from these audits.

🡻 2012/27/EU
⇨ new

6~~5~~. Energy audits shall be considered as fulfilling the requirements of paragraph ~~4~~ ⇨ 2 ⇦ when they are carried out in an independent manner, on the basis of minimum criteria based on Annex VI, and implemented under voluntary agreements concluded between organisations of stakeholders and an appointed body and supervised by the Member State concerned, or other bodies to which the competent authorities have delegated the responsibility concerned, or by the Commission.

Access of market participants offering energy services shall be based on transparent and non-discriminatory criteria.

⇩ new

7. Enterprises that implement an energy performance contract shall be exempted from the requirements of paragraphs 1 and 2 provided that the energy performance contract complies with the requirements set out in Annex XIV.

↓ 2012/27/EU (adapted)
⇨ new

8~~6~~. Enterprises ~~that are not SMEs and~~ that ~~are~~ implement~~ing~~ an ~~energy or~~ environmental management system - certified by an independent body according to the relevant European or i~~I~~nternational s~~S~~tandards - shall be exempted from the requirements of ~~paragraph 4~~ ⇨ paragraphs 1 and 2 ⇦, provided that the ⌦ environmental ⌫ management system concerned includes an energy audit on the basis of the minimum criteria based on Annex VI.

9~~7~~. Energy audits may stand alone or be part of a broader environmental audit. Member States may require that an assessment of the technical and economic feasibility of connection to an existing or planned district heating or cooling network shall be part of the energy audit.

Without prejudice to Union State aid law, Member States may implement incentive and support schemes for the implementation of recommendations from energy audits and similar measures.

⇩ new

10. Without prejudice to paragraphs 1 to 9, Member States shall require, by 15 March 2024 and every year thereafter, owners and operators of every data centre in their territory with a significant energy consumption to make publicly available the information set out in point 2 of Annex VI, which Member States shall subsequently report to the Commission.

↓ 2012/27/EU

Article 12~~9~~

↓ 2019/944 Art. 70.1(a)

Metering for natural gas

↓ 2019/944 Art. 70.1(b)

1. Member States shall ensure that, in so far as it is technically possible, financially reasonable, and proportionate to the potential energy savings, for natural gas final customers are provided with competitively priced individual meters that accurately reflect the final customer's actual energy consumption and that provide information on actual time of use.

↓ 2012/27/EU

Such a competitively priced individual meter shall always be provided when:

(a) an existing meter is replaced, unless this is technically impossible or not cost-effective in relation to the estimated potential savings in the long term;

(b) a new connection is made in a new building or a building undergoes major renovations, as set out in Directive 2010/31/EU.

↓ 2019/944 Art. 70.1(c)

2.Where, and to the extent that, Member States implement intelligent metering systems and roll out smart meters for natural gas in accordance with Directive 2009/73/EC:

↓ 2012/27/EU

(a) they shall ensure that the metering systems provide to final customers information on actual time of use and that the objectives of energy efficiency and benefits for final customers are fully taken into account when establishing the minimum functionalities of the meters and the obligations imposed on market participants;

(b) they shall ensure the security of the smart meters and data communication, and the privacy of final customers, in compliance with relevant Union data protection and privacy legislation;

(c~~e~~) they shall require that appropriate advice and information be given to customers at the time of installation of smart meters, in particular about their full potential with regard to meter reading management and the monitoring of energy consumption.

↓ 2018/2002 Art. 1.6 (adapted)

Article 13~~9a~~

Metering for heating, cooling and domestic hot water

1. Member States shall ensure that, for district heating, district cooling and domestic hot water, final customers are provided with competitively priced meters that accurately reflect their actual energy consumption.

2. Where heating, cooling or domestic hot water is supplied to a building from a central source that services multiple buildings or from a district heating or district cooling system, a meter shall be installed at the heat exchanger or point of delivery.

Article 14~~9b~~

Sub-metering and cost allocation for heating, cooling and domestic hot water

1. In multi-apartment and multi-purpose buildings with a central heating or central cooling source or supplied from a district heating or district cooling system, individual meters shall be installed to measure the consumption of heating, cooling or domestic hot water for each building unit, where technically feasible and cost effective in terms of being proportionate in relation to the potential energy savings.

Where the use of individual meters is not technically feasible or where it is not cost-efficient to measure heat consumption in each building unit, individual heat cost allocators shall be used to measure heat consumption at each radiator unless it is shown by the Member State in question that the installation of such heat cost allocators would not be cost-efficient. In those cases, alternative cost-efficient methods of heat consumption measurement may be considered. The general criteria, methodologies and/or procedures to determine technical non-feasibility and non-cost effectiveness shall be clearly set out and published by each Member State.

2. In new multi-apartment buildings and in residential parts of new multi-purpose buildings that are equipped with a central heating source for domestic hot water or are supplied from district heating systems, individual meters shall, notwithstanding the first subparagraph of paragraph 1, be provided for domestic hot water.

3. Where multi-apartment or multi-purpose buildings are supplied from district heating or district cooling, or where own common heating or cooling systems for such buildings are prevalent, Member States shall ensure they have in place transparent, publicly available national rules on the allocation of the cost of heating, cooling and domestic hot water consumption in such buildings to ensure transparency and accuracy of accounting for individual consumption. Where appropriate, such rules shall include guidelines on the manner in which to allocate cost for energy that is used as follows:

(a) domestic hot water;

(b) heat radiated from the building installation and for the purpose of heating the common areas, where staircases and corridors are equipped with radiators;

(c) for the purpose of heating or cooling apartments.

Article 15~~9c~~

Remote reading requirement

1. For the purposes of Articles 13~~9a~~ and 14~~9b~~, ⌦ newly installed ⌫ meters and heat cost allocators ~~installed after 25 October 2020~~ shall be remotely readable devices. The conditions of technical feasibility and cost effectiveness set out in Article 14~~9b~~(1) shall ~~continue to~~ apply.

2. Meters and heat cost allocators which are not remotely readable but which have already been installed shall be rendered remotely readable or replaced with remotely readable devices by 1 January 2027, save where the Member State in question shows that this is not cost-efficient.

↓ 2012/27/EU

Article 16~~10~~

↓ 2019/944 Art. 70.2(a)

Billing information for natural gas

↓ 2019/944 Art. 70.2(b) (adapted)

1. Where final customers do not have smart meters as referred to in Directive 2009/73/EC, Member States shall ensure~~, by 31 December 2014,~~ that billing information for natural gas is reliable, accurate and based on actual consumption, in accordance with point 1.1 of Annex VII, where that is technically possible and economically justified.

↓ 2012/27/EU

This obligation may be fulfilled by a system of regular self-reading by the final customers whereby they communicate readings from their meter to the energy supplier. Only when the

final customer has not provided a meter reading for a given billing interval shall billing be based on estimated consumption or a flat rate.

↓ 2019/944 Art. 70.2(c)

2. Meters installed in accordance with Directive 2009/73/EC shall enable the provision of accurate billing information based on actual consumption. Member States shall ensure that final customers have the possibility of easy access to complementary information on historical consumption allowing detailed self-checks.

↓ 2012/27/EU (adapted)

Complementary information on historical consumption shall include:

(a) cumulative data for at least the three previous years or the period since the start of the supply contract if this is shorter. The data shall correspond to the intervals for which frequent billing information has been produced; ~~and~~

(b) detailed data according to the time of use for any day, week, month and year. These data shall be made available to the final customer via the internet or the meter interface for the period of at least the previous 24 months or the period since the start of the supply contract if this is shorter.

3. Independently of whether smart meters have been installed or not, Member States:

(a) shall require that, to the extent that information on the energy billing and historical consumption of final customers is available, it be made available, at the request of the final customer, to an energy service provider designated by the final customer;

(b) shall ensure that final customers are offered the option of electronic billing information and bills and that they receive, on request, a clear and understandable explanation of how their bill was derived, especially where bills are not based on actual consumption;

(c) shall ensure that appropriate information is made available with the bill to provide final customers with a comprehensive account of current energy costs, in accordance with Annex VII;

(d) may lay down that, at the request of the final customer, the information contained in these bills shall not be considered to constitute a request for payment. In such cases, Member States shall ensure that suppliers of energy sources offer flexible arrangements for actual payments;

(e) shall require that information and estimates for energy costs are provided to consumers on demand in a timely manner and in an easily understandable format enabling consumers to compare deals on a like-for-like basis.

↓ 2018/2002 Art. 1.8 (adapted)

Article 17~~10a~~

Billing and consumption information for heating, cooling and domestic hot water

1. Where meters or heat cost allocators are installed, Member States shall ensure that billing and consumption information is reliable, accurate and based on actual consumption or heat

cost allocator readings, in accordance with points 1 and 2 of Annex VIII~~VIIa~~ for all final users~~;~~ ~~namely for natural or legal persons purchasing heating, cooling or domestic hot water for their own end-use, or natural or legal persons occupying an individual building or a unit in a multi-apartment or multi-purpose building supplied with heating, cooling or domestic hot water from a central source who has no direct or individual contract with the energy supplier~~.

This obligation may, where a Member State so provides, save in the case of sub-metered consumption based on heat cost allocators under Article 14~~9b~~, be fulfilled by a system of regular self-reading by the final customer or final user whereby they communicate readings from their meter. Only where the final customer or final user has not provided a meter reading for a given billing interval shall billing be based on estimated consumption or a flat rate.

2. Member States shall:

(a) require that, if information on the energy billing and historical consumption or heat cost allocator readings of final users is available, it be made available upon request by the final user, to an energy service provider designated by the final user;

(b) ensure that final customers are offered the option of electronic billing information and bills;

(c) ensure that clear and comprehensible information is provided with the bill to all final users in accordance with point 3 of Annex VIII~~VIIa~~; ~~and~~

(d) promote cybersecurity and ensure the privacy and data protection of final users in accordance with applicable Union law.

Member States may provide that, at the request of the final customer, the provision of billing information shall not be considered to constitute a request for payment. In such cases, Member States shall ensure that flexible arrangements for actual payment are offered.

3. Member States shall decide who is to be responsible for providing the information referred to in paragraphs 1 and 2 to final users without a direct or individual contract with an energy supplier.

↓ 2018/2002 Art. 1.9

Article 18~~11~~

↓ 2019/944 Art. 70.3

Cost of access to metering and billing information for natural gas

---

↓ 2018/2002 Art. 1.9

Member States shall ensure that final customers receive all their bills and billing information for energy consumption free of charge and that final customers have access to their consumption data in an appropriate way and free of charge.

↓ 2018/2002 Art. 1.10

Article 19~~11a~~

Cost of access to metering and billing and consumption information for heating, cooling and domestic hot water

1. Member States shall ensure that final users receive all their bills and billing information for energy consumption free of charge and that final users have access to their consumption data in an appropriate way and free of charge.

2. Notwithstanding paragraph 1 of this Article, the distribution of costs of billing information for the individual consumption of heating, cooling and domestic hot water in multi-apartment and multi-purpose buildings pursuant to Article 14~~9b~~ shall be carried out on a non-profit basis. Costs resulting from the assignment of that task to a third party, such as a service provider or the local energy supplier, covering the measuring, allocation and accounting for actual individual consumption in such buildings, may be passed onto the final users to the extent that such costs are reasonable.

3. In order to ensure reasonable costs for sub-metering services as referred to in paragraph 2, Member States may stimulate competition in that service sector by taking appropriate measures, such as recommending or otherwise promoting the use of tendering and/or the use of interoperable devices and systems facilitating switching between service providers.

⇩ new

CHAPTER IV

CONSUMER INFORMATION AND EMPOWERMENT

Article 20

Basic contractual rights for heating, cooling and domestic hot water

1. Without prejudice to Union rules on consumer protection, in particular Directive 2011/83/EU of the European Parliament and of the Council[112] and Council Directive 93/13/EEC of the European Parliament and of the Council[113], Member States shall ensure that final customers and, where explicitly referred to, final users are granted the rights provided for in paragraphs 2 to 8 of this Article.

2. Final customers shall have the right to a contract with their supplier that specifies:

(a) the identity and address of the supplier;

[112] Directive 2011/83/EU of the European Parliament and of the Council of 25 October 2011 on consumer rights, amending Council Directive 93/13/EEC and Directive 1999/44/EC of the European Parliament and of the Council and repealing Council Directive 85/577/EEC and Directive 97/7/EC of the European Parliament and of the Council (OJ L 304, 22.11.2011, p. 64).

[113] Council Directive 93/13/EEC of 5 April 1993 on unfair terms in consumer contracts (OJ L 95, 21.4.1993, p. 29).

(b) the services provided and the service quality levels offered;

(c) the types of maintenance service offered;

(d) the means by which up-to-date information on all applicable tariffs, maintenance charges and bundled products or services may be obtained;

(e) the duration of the contract, the conditions for renewal and termination of the contract and services, including products or services that are bundled with those services, and whether terminating the contract without charge is permitted;

(f) any compensation and the refund arrangements which apply if contracted service quality levels are not met, including inaccurate or delayed billing;

(g) the method of initiating an out-of-court dispute settlement procedure in accordance with Article 21;

(h) information relating to consumer rights, including information on complaint handling and all of the information referred to in this paragraph, which is clearly communicated on the bill or the undertaking's web site.

Conditions shall be fair and known in advance. In any case, this information shall be provided prior to the conclusion or confirmation of the contract. Where contracts are concluded through intermediaries, the information relating to the matters set out in this paragraph shall also be provided prior to the conclusion of the contract.

Final customers and final users shall be provided with a summary of the key contractual conditions in a comprehensible manner and in concise and simple language.

3. Final customers shall be given adequate notice of any intention to modify contractual conditions. Suppliers shall notify their final customers, in a transparent and comprehensible manner, directly of any adjustment in the supply price and of the reasons and preconditions for the adjustment and its scope, at an appropriate time no later than two weeks, or no later than one month in the case of household customers, before the adjustment comes into effect.

4. Suppliers shall offer final customers a wide choice of payment methods. Such payment methods shall not unduly discriminate between customers. Any difference in charges related to payment methods or prepayment systems shall be objective, non-discriminatory and proportionate and shall not exceed the direct costs borne by the payee for the use of a specific payment method or a prepayment system, in line with Article 62 of Directive (EU) 2015/2366 of the European Parliament and of the Council[114].

5. Pursuant to paragraph 6, household customers who have access to prepayment systems shall not be placed at a disadvantage by the prepayment systems.

6. Suppliers shall offer final customers and final users fair and transparent general terms and conditions, which shall be provided in plain and unambiguous language and shall not include non-contractual barriers to the exercise of customers' rights, such as excessive contractual documentation. Customers shall be protected against unfair or misleading selling methods. Final users shall be provided access to these general terms and conditions upon request. Final

[114] Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No 1093/2010, and repealing Directive 2007/64/EC, OJ L 337, 23.12.2015, p. 35–127.

customers and final users shall be protected against unfair or misleading selling methods. Final customers with disabilities should be provided all relevant information on their contract with their supplier in accessible formats.

7. Final customers and final users shall have the right to a good standard of service and complaint handling by their suppliers. Suppliers shall handle complaints in a simple, fair and prompt manner.

↓ 2012/27/EU (adapted)

Article 21~~12~~

~~Consumer~~ I~~i~~nformation and ~~empowering programme~~ ⌦ awareness raising ⌫

⇩ new

1. Member States shall ensure that information on available energy efficiency improvement measures, individual actions and financial and legal frameworks is transparent and widely disseminated to all relevant market actors, such as final customers, final users,, consumer organisations, civil society representatives, renewable energy communities, citizen energy communities, local and regional authorities, energy agencies, social service providers, builders, architects, engineers, environmental and energy auditors, and installers of building elements as defined in by Article 2(9) of Directive 2010/31/EU.

↓ 2012/27/EU (adapted)
⇨ new

2~~1~~. Member States shall take appropriate measures to promote and facilitate an efficient use of energy by final customers~~,~~ ~~including domestic customers~~ ⇨ and final users ⇦. These measures ~~may~~ ⇨ shall ⇦ be part of a national strategy ⇨ such as the integrated national energy and climate plan in accordance with Regulation (EU) 2018/1999, or the long term renovation strategy as defined in Directive 2010/31/EU ⇦.

~~2.~~ For the purposes of ~~paragraph 1~~ ⇨ this Article ⇦, these measures shall include ~~one or more of the elements listed under point (a) or (b):~~

~~(a)~~ a range of instruments and policies to promote behavioural change ~~which may include~~ ⌦ such as ⌫:

(i) fiscal incentives;

(ii) access to finance, ⇨ vouchers, ⇦ grants or subsidies;

(iii) information provision ⇨ in accessible form to people with disabilities ⇦;

(iv) exemplary projects;

(v) workplace activities;

⇩ new

(vi) training activities;

(vii) digital tools.

↓ 2012/27/EU
⇨ new

⇨ For the purposes of this article, these measures shall also include but not be limited to the following ⇦ ways and means to engage ~~consumers and consumer organisations during the possible roll-out of smart meters through~~ ⇨ market actors such as those referred in paragraph 1 ⇦:

⇩ new

(i) creation of one-stop shops or similar mechanisms for the provision of technical, administrative and financial advice and assistance on energy efficiency, including energy renovations of buildings and the take-up of renewable energy for buildings to final customers and final users, especially household and small non-household ones.

↓ 2012/27/EU
⇨ new

(ii) communication of~~:~~

~~(i)~~ cost-effective and easy-to-achieve changes in energy use;

(iii~~ii~~) ⇨ dissemination of ⇦ information on energy efficiency measures ⇨ and financing instruments ⇦;~~.~~

⇩ new

(iv) provision of single points of contact, to provide final customers and final users with all necessary information concerning their rights, the applicable law and dispute settlement mechanisms available to them in the event of a dispute. Such single points of contact may be part of general consumer information points.

↓ 2012/27/EU (adapted)
⇨ new

3~~2~~. Member States shall establish appropriate conditions for market ~~operators~~ ⌦ actors ⌫ to provide adequate and targeted information and advice to ⌦ final ⌫ ~~energy~~ consumers ⇨ , including vulnerable customers, people affected by energy poverty and, where applicable, people living in social housing ⇦ on energy efficiency.

⇩ new

4. Member States shall ensure that final customers, final users, vulnerable customers, people affected by energy poverty and, where applicable, people living in social housing, have access to simple, fair, transparent, independent, effective and efficient out-of-court mechanisms for the settlement of disputes concerning rights and obligations established under this Directive, through an independent mechanism such as an energy ombudsperson or a consumer body, or through a regulatory authority. Where the final customer as defined in Article 4(1)(a) of

Directive 2013/11/EU of the European Parliament and of the Council[115], such out-of-court dispute settlement mechanisms shall comply with the requirements set out therein.

Where necessary, Member States shall ensure that alternative dispute resolution entities cooperate to provide simple, fair, transparent, independent, effective and efficient out-of-court dispute settlement mechanisms for any dispute that arises from products or services that are tied to, or bundled with, any product or service falling under the scope of this Directive.

The participation of undertakings in out-of-court dispute settlement mechanisms for household customers shall be mandatory unless the Member State demonstrates to the Commission that other mechanisms are equally effective.

🡻 2012/27/EU (adapted)
⇨ new

~~Article 19~~

~~Other measures to promote energy efficiency~~

5~~1~~. ⇨ Without prejudice to the basic principles of their property and tenancy law, ⇦ Member States shall ~~evaluate and if necessary~~ take ~~appropriate~~ ⇨ necessary ⇦ measures to remove regulatory and non-regulatory barriers to energy efficiency, ~~without prejudice to the basic principles of the property and tenancy law of the Member States, in particular~~ as regards~~:~~

~~(a)~~the split of incentives between the ~~owner~~ ⌦ owners ⌫ and ~~the tenant~~ ⌦ tenants ⌫ ~~of a building~~ or among owners ⌦ of a building or building unit ⌫, with a view to ensuring that these parties are not deterred from making efficiency-improving investments that they would otherwise have made by the fact that they will not individually obtain the full benefits or by the absence of rules for dividing the costs and benefits between them~~, including national rules and measures regulating decision- making processes in multi-owner properties~~;

~~Such~~ M~~m~~easures to remove ⌦ such ⌫ barriers may include providing incentives, repealing or amending legal or regulatory provisions, or adopting guidelines and interpretative communications, or simplifying administrative procedures ⇨ , including national rules and measures regulating decision-making processes in multi-owner properties ⇦. The measures may be combined with the provision of education, training and specific information and technical assistance on energy efficiency ⌦ to market actors such as those referred in paragraph 1 ⌫.

~~2. The evaluation of barriers and measures referred to in paragraph 1 shall be notified to the Commission in the first National Energy Efficiency Action Plan referred to in Article 24(2). The Commission shall encourage the sharing of national best practices in this regard.~~

⇩ new

Member States shall take appropriate measures to support a multilateral dialogue with the participation of relevant public and social partners such as owners and tenants organisations,

---

[115] Directive 2013/11/EU of the European Parliament and of the Council of 21 May 2013 on alternative dispute resolution for consumer disputes and amending Regulation (EC) No 2006/2004 and Directive 2009/22/EC (Directive on consumer ADR) (OJ L 165, 18.6.2013, p. 63).

consumer organisations, renewable energy communities, citizen energy communities local and regional authorities, relevant public authorities and agencies and the aim to set out proposals on jointly accepted measures, incentives and guidelines pertinent to the split of incentives between the owners and tenants or among owners of a building or building unit.

Each Member State shall report such barriers and the measures taken in its long-term renovation strategy pursuant to Article 2a of Directive 2010/31/EU and Regulation (EU) 2018/1999.

🡻 2012/27/EU
⇨ new

6~~5~~. The Commission shall encourage the exchange and wide dissemination of information on ~~best~~ ⇨ good ⇦ energy efficiency practices ⇨ and methodologies to mitigate the split of incentives ⇦ in Member States.

⇩ new

Article 22

Empowering and protecting vulnerable customers and alleviating energy poverty

1. Member States shall take appropriate measures to empower and protect people affected by energy poverty, vulnerable customers and, where applicable, people living in social housing.

In defining the concept of vulnerable customers pursuant to Articles 28(1) and 29 of Directive (EU) 2019/944 and Article 3(3) of Directive 2009/73/EC, Member States shall take into account final users.

2. Member States shall implement energy efficiency improvement measures and related consumer protection or information measures, in particular those set out in Article 21 and Article 8(3), as a priority among people affected by energy poverty, vulnerable customers and, where applicable, people living in social housing to alleviate energy poverty.

3. To support vulnerable customers, people affected by energy poverty and, where applicable, people living in social housing, Member States shall:

a) implement energy efficiency improvement measures to mitigate distributional effects from other policies and measures, such as taxation measures implemented according to Article 9 of this Directive, or the application of emission trading in the buildings and transport sector according to the ETS Directive [Reference to proposal];

b) make the best possible use of public funding available at national and Union level, including, where applicable, the financial contribution Member State received from the Social Climate Fund pursuant to [Article 9 and Article 14 of the Social Climate Fund Regulation], and revenues from allowance auctions from emission trading pursuant to the EU ETS, for investments into energy efficiency improvement measures as priority actions,

c) where applicable, carry out early, forward-looking investments into energy efficiency improvement measures before distributional impacts from other policies and measures show effect

d) foster technical assistance and the roll-out of enabling funding and financial tools, such as on-bill schemes, local loan-loss reserve, guarantee funds, funds targeting deep renovations and renovations with minimum energy gains;

e) foster technical assistance for social actors to promote vulnerable consumers' active engagement in the energy market, and positive changes in their energy consumption behaviour.

f) ensure access to finance, grants or subsidies bound to minimum energy gains;

4. Member States shall establish a network of experts from various sectors such as health sector, building sector and social sectors to develop strategies to support local and national decision makers in implementing energy efficiency improvement measures alleviating energy poverty, measures to generate robust long term solutions to mitigate energy poverty and to develop appropriate technical assistance and financial tools. Member States shall strive to ensure a network of experts' composition that ensures gender balance and reflects the perspectives of people in all their diversity.

Member States may entrust the same network of experts:

a) to establish national definitions, indicators and criteria of energy poverty, energy poor and concepts of vulnerable customers, including final users;

b) to develop or improve relevant indicators and data sets, pertinent to the issue of energy poverty, that should be used and reported upon, and

c) to set up methods and measures to ensure affordability, the promotion of housing cost neutrality, or ways to ensure that public funding invested in energy efficiency improvement measures benefit both, owners and tenants, of buildings and building units, in particular regarding vulnerable customers, people affected by energy poverty, and, where applicable, people living in social housing.

d) to assess, and where applicable, propose measures to prevent or remedy situations in which particular groups are more affected or more at risk of being affected by energy poverty or more susceptible to the adverse impacts of energy poverty, such as women, persons with disabilities, older persons, children, and persons with a minority racial or ethnic background.

↓ 2012/27/EU (adapted)

~~3. The Commission shall review the impact of its measures to support the development of platforms, involving, inter alia, the European social dialogue bodies in fostering training programmes for energy efficiency, and shall bring forward further measures if appropriate. The Commission shall encourage European social partners in their discussions on energy efficiency.~~

CHAPTER V~~III~~

EFFICIENCY IN ENERGY SUPPLY

Article 23~~14~~

~~Promotion of efficiency in~~ H~~h~~eating and cooling ⌦ assessment and planning ⌫

⇩ new

1. As part of its integrated national energy and climate plan, its subsequent integrated national energy and climate plan and respective progress reports notified in accordance with Regulation (EU) 2018/1999, each Member State shall notify to the Commission a comprehensive heating and cooling assessment. That comprehensive assessment shall contain the information set out in Annex IX and shall be accompanied with the assessment carried out pursuant to Article 15(7) of Directive (EU) 2018/2001.

🡻 2012/27/EU (adapted)

~~1. By 31 December 2015, Member States shall carry out and notify to the Commission a comprehensive assessment of the potential for the application of high-efficiency cogeneration and efficient district heating and cooling, containing the information set out in Annex VIII. If they have already carried out an equivalent assessment, they shall notify it to the Commission.~~

~~The comprehensive assessment shall take full account of the analysis of the national potentials for high-efficiency cogeneration carried out under Directive 2004/8/EC.~~

~~At the request of the Commission, the assessment shall be updated and notified to the Commission every five years. The Commission shall make any such request at least one year before the due date.~~

~~2. Member States shall adopt policies which encourage the due taking into account at local and regional levels of the potential of using efficient heating and cooling systems, in particular those using high-efficiency cogeneration. Account shall be taken of the potential for developing local and regional heat markets.~~

⇩ new

2. Member States shall ensure that the public is given the opportunity to participate in the preparation of heating and cooling plans, the comprehensive assessment and the policies and measures.

🡻 2012/27/EU (adapted)
⇨ new

3. For the purpose of the assessment referred to in paragraph 1, Member States shall carry out a cost-benefit analysis covering their territory ⌦ and ⌫ based on climate conditions, economic feasibility and technical suitability ~~in accordance with Part 1 of Annex IX~~. The cost-benefit analysis shall be capable of facilitating the identification of the most resource- and cost-efficient solutions to meeting heating and cooling needs. That cost-benefit analysis may be part of an environmental assessment under Directive 2001/42/EC of the European

Parliament and of the Council ~~of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment~~[116].

⌦ Member States shall designate the competent authorities responsible for carrying out the cost-benefit analyses, provide the detailed methodologies and assumptions in accordance with Annex X and establish and make public the procedures for the economic analysis. ⌫

4. Where the assessment referred to in paragraph 1 and the analysis referred to in paragraph 3 identify a potential for the application of high-efficiency cogeneration and/or efficient district heating and cooling whose benefits exceed the costs, Member States shall take adequate measures for efficient district heating and cooling infrastructure to be developed and/or to accommodate the development of high-efficiency cogeneration and the use of heating and cooling from waste heat and renewable energy sources in accordance with ~~paragraphs 1, 5, and 7~~ ⇨ paragraph 1 and Article 24(4) and (6) ⇦.

Where the assessment referred to in paragraph 1 and the analysis referred to in paragraph 3 do not identify a potential whose benefits exceed the costs, including the administrative costs of carrying out the cost-benefit analysis referred to in Article 24(4)~~paragraph 5~~, the Member State concerned may exempt installations from the requirements laid down in that paragraph.

⇩ new

5. Member States shall adopt policies and measures, which ensure that the potential identified in the comprehensive assessments carried out pursuant to paragraph 1. These policies and measures shall include at least the elements set out in Annex IX. Each Member State shall notify those policies and measures as part of the update of its integrated national energy and climate plans, its subsequent integrated national energy and climate plan, and respective progress reports notified in accordance with Regulation (EU) 2018/1999.

6. Member States shall encourage regional and local authorities to prepare local heating and cooling plans at least in municipalities having a total population higher than 50.000. Those plans should at least:

(a) be based on the information and data provided in the comprehensive assessments carried out pursuant to paragraph 1 provide estimate and mapping of the potential for increasing energy efficiency, including via waste heat recovery, and renewable energy in heating and cooling in that particular area;

(b) include a strategy for the use of the identified potential pursuant to paragraph 6(a);

(c) be prepared with the involvement of all relevant regional or local stakeholders and ensure participation of general public;

(d) consider the common needs of local communities and multiple local or regional administrative units or regions;

(e) include the monitoring of the progress of implementation of policies and measures identified.

---

116 Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment (OJ L 197, 21.7.2001, p. 30).

Member States shall ensure that the public is given the opportunity to participate the preparation of heating and cooling plans, the comprehensive assessment and the policies and measures.

For this purpose, Member States shall develop recommendations supporting the regional and local authorities to implement policies and measures in energy efficient and renewable energy based heating and cooling at regional and local level utilising the potential identified. Member States shall support regional and local authorities to the utmost extent possible by any means including financial support and technical support schemes.

Article 24

Heating and cooling supply

1. In order to increase primary energy efficiency and the share of renewable energy in heating and cooling supply, an efficient district heating and cooling system is a system which meets the following criteria:

a. until 31 December 2025, a system using at least 50% renewable energy, 50% waste heat, 75% cogenerated heat or 50% of a combination of such energy and heat;

b. from 1 January 2026, a system using at least 50% renewable energy, 50% waste heat, 80% of high-efficiency cogenerated heat or at least a combination of such thermal energy going into the network where the share of renewable energy is at least 5% and the total share of renewable energy, waste heat or high-efficiency cogenerated heat is at least 50%;

c, from 1 January 2035, a system using at least 50% renewable energy and waste heat, where the share of renewable energy is at least 20%;

d. from 1 January 2045, a system using at least 75 % renewable energy and waste heat, where the share of renewable energy is at least 40%;

e. from 1 January 2050, a system using only renewable energy and waste heat, where the share of renewable energy is at least 60%.

2. Member States shall ensure that where a district heating and cooling system is built or substantially refurbished it meets the criteria set out in paragraph 1 applicable at such time when it starts or continues its operation after the refurbishment. In addition, Member States shall ensure that when a district heating and cooling system is built or substantially refurbished, there is no increase in the use of fossil fuels other than natural gas in existing heat sources compared to the annual consumption averaged over the previous three calendar years of full operation before refurbishment, and that any new heat sources in that system do not use fossil fuels other than natural gas.

3. Member States shall ensure that as from 1 January 2025, and every five years thereafter, operators of all existing district heating and cooling systems with a total energy output exceeding 5 MW and which do not meet the criteria set out in paragraph 1(b) to (e), prepare a plan to increase primary energy efficiency and renewable energy. The plan shall include measures to meet the criteria set out in paragraph 1(b) to (e) and shall be approved by the competent authority.

↓ 2012/27/EU (adapted)
⇨ new

4~~5~~. ⇨ In order to assess the economic feasibility of increasing energy efficiency of heat and cooling supply, ⇦ Member States shall ensure that ~~a~~ ⇨ an installation level ⇦ cost-benefit analysis in accordance with ~~Part 2 of~~ Annex X~~IX~~ is carried out where~~, after 5 June 2014~~ ⇨ the following installations are newly planned or substantially refurbished ⇦:

(a) a ~~new~~ thermal electricity generation installation with ~~a~~ ⇨ an average annual ⇦ total ~~thermal~~ ⇨ energy ⇦ input exceeding ~~20~~ ⇨ 5 ⇦ MW ~~is planned~~, in order to assess the cost and benefits of providing for the operation of the installation as a high-efficiency cogeneration installation;

~~(b) an existing thermal electricity generation installation with a total thermal input exceeding 20 MW is substantially refurbished, in order to assess the cost and benefits of converting it to high-efficiency cogeneration;~~

~~(c) an industrial installation with a total thermal input exceeding 20 MW generating waste heat at a useful temperature level is planned or substantially refurbished, in order to assess the cost and benefits of utilising the waste heat to satisfy economically justified demand, including through cogeneration, and of the connection of that installation to a district heating and cooling network;~~

~~(d) a new district heating and cooling network is planned or in an existing district heating or cooling network a new energy production installation with a total thermal input exceeding 20 MW is planned or an existing such installation is to be substantially refurbished, in order to assess the cost and benefits of utilising the waste heat from nearby industrial installations.~~

⇩ new

(b) an industrial installation with an average annual total energy input exceeding 5 MW in order to assess utilisation of the waste heat on-site and off-site;

(c) service facility with an annual average total energy input exceeding 5 MW, such as wastewater treatment facilities and LNG facilities in order to assess utilisation of waste heat on-site and off-site,

(d) a data centre with a total rated energy input exceeding 1 MW level, to assess the cost and benefits of utilising the waste heat to satisfy economically justified demand, and of the connection of that installation to a district heating network or an efficient/RES-based district cooling system. The analysis shall consider cooling system solutions that allow removing or capturing the waste heat at useful temperature level with minimal ancillary energy inputs.

For the purposes of assessing on-site waste heat for the purpose of points (b) to (d), energy audits in line with Annex VI may be carried out instead of the cost benefit analysis set out in this paragraph.

↓ 2012/27/EU
⇨ new

The fitting of equipment to capture carbon dioxide produced by a combustion installation with a view to its being geologically stored as provided for in Directive 2009/31/EC shall not be considered as refurbishment for the purpose of points ~~(b), (c) and (d)~~ ⇨ (b) and (c) ⇦ of this paragraph.

Member States ~~may~~ ⇨ shall ⇦ require the cost-benefit analysis ~~referred to in points (c) and (d)~~ to be carried out in cooperation with the companies responsible for the operation of the ~~district heating and cooling networks~~ ⇨ facility ⇦.

5~~6~~. Member States may exempt from paragraph 4~~5~~:

(a) those peak load and back-up electricity generating installations which are planned to operate under 1500 operating hours per year as a rolling average over a period of five years, based on a verification procedure established by the Member States ensuring that this exemption criterion is met;

~~(b) nuclear power installations;~~

(b~~c~~) installations that need to be located close to a geological storage site approved under Directive 2009/31/EC;~~.~~

⇩ new

(c) data centres whose waste heat is or will be used in a district heating network or directly for space heating, domestic hot water preparation or other uses in the building or group of buildings where it is located.

↓ 2012/27/EU (adapted)
⇨ new

Member States may also lay down thresholds, expressed in terms of the amount of available useful waste heat, the demand for heat or the distances between industrial installations and district heating networks, for exempting individual installations from the provisions of points ~~(c) and (d)~~ ⇨ (c) and (d) ⇦ of paragraph 5.

Member States shall notify exemptions adopted under this paragraph to the Commission ~~by 31 December 2013~~ ~~and any subsequent changes to them thereafter~~.

6~~7~~. Member States shall adopt authorisation criteria as referred to in Article 8~~7~~ of Directive (EU) 2019/944~~2009/72/EC~~, or equivalent permit criteria, to:

(a) take into account the outcome of the comprehensive assessment referred to in paragraph 13;

(b) ensure that the requirements of paragraph 4~~5~~ are fulfilled; ~~and~~

(c) take into account the outcome of cost-benefit analysis referred to in paragraph 4~~5~~.

7~~8~~. Member States may exempt individual installations from being required, by the authorisation and permit criteria referred to in paragraph 6~~7~~, to implement options whose benefits exceed their costs, if there are imperative reasons of law, ownership or finance for ~~so~~ doing ⌦ so ⌫. In these cases the Member State concerned shall submit a reasoned notification of its decision to the Commission within three months of the date of taking it.

⇨ The Commission may issue an opinion on the notification within three months upon its receipt. ⇦

8~~9~~. Paragraphs 4~~5~~, 5~~6~~, 6~~7~~ and 7~~8~~ of this Article shall apply to installations covered by Directive 2010/75/EU without prejudice to the requirements of that Directive.

⇩ new

9. Member States shall collect information on cost-benefit analyses carried out in accordance with paragraph 4 points (a), (b), (c) and (d) of this Article. That information should contain at least the data on available heat supply amounts and heat parameters, number of planned operating hours annually and geographical location of the sites. That data shall be published with the due respect of its potential sensitivity.

🡻 2012/27/EU (adapted)
⇨ new

10. On the basis of the harmonised efficiency reference values referred to in point (f) of Annex III~~II~~, Member States shall ensure that the origin of electricity produced from high-efficiency cogeneration can be guaranteed according to objective, transparent and non-discriminatory criteria laid down by each Member State. They shall ensure that this guarantee of origin complies with the requirements and contains at least the information specified in Annex XI~~X~~. Member States shall mutually recognise their guarantees of origin, exclusively as proof of the information referred to in this paragraph. Any refusal to recognise a guarantee of origin as such proof, in particular for reasons relating to the prevention of fraud, must be based on objective, transparent and non-discriminatory criteria. Member States shall notify the Commission of such refusal and its justification. In the event of refusal to recognise a guarantee of origin, the Commission may adopt a decision to compel the refusing party to recognise it, in particular with regard to objective, transparent and non-discriminatory criteria on which such recognition is based.

The Commission shall be empowered to review, by means of delegated acts in accordance with Article 29~~23~~ of this Directive, the harmonised efficiency reference values laid down in ~~Commission Implementing Decision 2011/877/EU[117]~~ Commission Delegated Regulation (EU) 2015/2402[118] ~~on the basis of Directive 2004/8/EC by 31 December 2014~~.

11. Member States shall ensure that any available support for cogeneration is subject to the electricity produced originating from high-efficiency cogeneration and the waste heat being effectively used to achieve primary energy savings. Public support to cogeneration and district heating generation and networks shall be subject to State aid rules, where applicable.

---

117 ~~OJ L 343, 23.12.2011, p. 91.~~

118 Commission Delegated Regulation (EU) 2015/2402 of 12 October 2015 reviewing harmonised efficiency reference values for separate production of electricity and heat in application of Directive 2012/27/EU of the European Parliament and of the Council and repealing Commission Implementing Decision 2011/877/EU (OJ L 333, 19.12.2015, p. 54).

Article 25~~15~~

Energy transformation, transmission and distribution

1. ~~Member States shall ensure that~~ N~~n~~ational energy regulatory authorities ~~pay due regard to~~ ⇨ shall apply the ⇦ energy efficiency ⇨ irst principle in accordance with Article 3 of this Directive ⇦ in carrying out the regulatory tasks specified in Directives (EU) 2019/944~~2009/72/EC~~ and 2009/73/EC regarding their decisions on the operation of the gas and electricity infrastructure ⇨ , include their decisions on network tariffs ⇦.

~~Member States shall in particular ensure that national energy regulatory authorities, through the development of network tariffs and regulations, within the framework of Directive (EU) 2019/9442009/72/EC and taking into account the costs and benefits of each measure, provide incentives for grid operators to make available system services to network users permitting them to implement energy efficiency improvement measures in the context of the continuing deployment of smart grids.~~

~~Such systems services may be determined by the system operator and shall not adversely impact the security of the system.~~

⇩ new

2. Member States shall ensure that gas and electricity transmission and distribution network operators apply the energy efficiency first principle in accordance with Article 3 of this Directive in their network planning, network development and investment decisions. While taking security of supply and market integration into account, Member States shall ensure that transmission system operators and distribution system operators do not invest in stranded assets to contribute to climate change mitigation. National regulatory authorities should provide methodologies and guidance on how to assess alternatives in the cost-benefit analysis, taking into account wider benefits, and verify the implementation of the energy efficiency first principle by the transmission system operators or distribution system operators when approving, verifying or monitoring the projects submitted by the transmission system operators or distribution system operators.

3. Member States shall ensure that transmission and distribution network operators map network losses and take cost-effective measures to reduce network losses. Transmission and distribution network operators shall report those measures and expected energy savings through the reduction of network losses to the national energy regulatory authority. National energy regulatory authorities shall limit the possibility for transmission and distribution network operators to recover avoidable network losses from tariffs paid by consumers. Member States shall ensure that transmission and distribution operators assess energy efficiency improvement measures with regard to their existing gas or electricity transmission or distribution systems and improve energy efficiency in infrastructure design and operation. Member States shall encourage transmission and distribution network operators to develop innovative solutions to improve the energy efficiency of existing systems through incentive based regulations.

4. National energy regulatory authorities shall include a specific section on the progress achieved in energy efficiency improvements regarding the operation of the gas and electricity infrastructure in the annual report drawn up pursuant Article 59(l) of Directive (EU) 2019/944 and pursuant to Article 41 of Directive (EU) 2009/73/EC. In these reports, national energy regulatory authorities shall provide an assessment of network losses in the operation of the gas and electricity infrastructure, the measures carried out by transmission and distribution

network operators, and, where applicable, provide recommendations for energy efficiency improvements.

↓ 2012/27/EU (adapted)

5. For electricity, Member States shall ensure that network regulation and network tariffs fulfil the criteria in Annex XII~~XI~~, taking into account guidelines and codes developed pursuant to Regulation (EU) 2019/943~~(EC) No 714/2009~~.

~~2. Member States shall ensure, by 30 June 2015, that:~~

~~(a) an assessment is undertaken of the energy efficiency potentials of their gas and electricity infrastructure, in particular regarding transmission, distribution, load management and interoperability, and connection to energy generating installations, including access possibilities for micro energy generators;~~

~~(b) concrete measures and investments are identified for the introduction of cost-effective energy efficiency improvements in the network infrastructure, with a timetable for their introduction.~~

↓ 2018/2002 Art. 1.11

~~2a. By 31 December 2020, the Commission shall, after consulting relevant stakeholders, prepare a common methodology in order to encourage network operators to reduce losses, implement a cost-efficient and energy-efficient infrastructure investment programme and properly account for the energy efficiency and flexibility of the grid.~~

↓ 2012/27/EU
⇨ new

6~~3~~. Member States may permit components of schemes and tariff structures with a social aim for net-bound energy transmission and distribution, provided that any disruptive effects on the transmission and distribution system are kept to the minimum necessary and are not disproportionate to the social aim.

7~~4~~. ~~Member States~~ ⇨ National regulatory authorities ⇦ shall ensure the removal of those incentives in transmission and distribution tariffs that are detrimental to the ~~overall efficiency (including~~ energy efficiency~~)~~ of the generation, transmission, distribution and supply of electricity ⇨ and gas ⇦ ~~or those that might hamper participation of demand response, in balancing markets and ancillary services procurement. Member States shall ensure that network operators are incentivised to improve efficiency in infrastructure design and operation, and, within the framework of Directive (EU) 2019/9442009/72/EC, that tariffs allow suppliers to improve consumer participation in system efficiency, including demand response, depending on national circumstances~~.

↓ 2019/944 Art. 70.5(a)

8~~5~~. Transmission system operators and distribution system operators shall comply with the requirements set out in Annex XII~~XII~~.

~~Member States may particularly facilitate the connection to the grid system of electricity produced from high-efficiency cogeneration from small-scale and micro-cogeneration units. Member States shall, where appropriate, take steps to encourage network operators to adopt a simple notification 'install and inform' process for the installation of micro-cogeneration units to simplify and shorten authorisation procedures for individual citizens and installers.~~

~~6. Subject to the requirements relating to the maintenance of the reliability and safety of the grid, Member States shall take the appropriate steps to ensure that, where this is technically and economically feasible with the mode of operation of the high-efficiency cogeneration installation, high-efficiency cogeneration operators can offer balancing services and other operational services at the level of transmission system operators or distribution system operators. Transmission system operators and distribution system operators shall ensure that such services are part of a services bidding process which is transparent, non-discriminatory and open to scrutiny.~~

9. Where appropriate, ~~Member States~~ ⇨ national regulatory authorities ⇦ may require transmission system operators and distribution system operators to encourage high-efficiency cogeneration to be sited close to areas of ⇨ heat ⇦ demand by reducing the connection and use-of-system charges.

10~~7~~. Member States may allow producers of electricity from high-efficiency cogeneration wishing to be connected to the grid to issue a call for tender for the connection work.

11~~9~~. When reporting under Directive 2010/75/EU, and without prejudice to Article 9(2) of that Directive, Member States shall consider including information on energy efficiency levels of installations undertaking the combustion of fuels with total rated thermal input of 50 MW or more in the light of the relevant best available techniques developed in accordance with Directive 2010/75/EU ~~and Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control~~[119].

~~Member States may encourage operators of installations referred to in the first subparagraph to improve their annual average net operational rates.~~

CHAPTER VII~~IV~~

HORIZONTAL PROVISIONS

Article 26~~16~~

Availability of qualification, accreditation and certification schemes

~~1. Where a Member State considers that the national level of technical competence, objectivity and reliability is insufficient, it shall ensure that, by 31 December 2014, certification and/or accreditation schemes and/or equivalent qualification schemes, including, where necessary, suitable training programmes, become or are available for providers of~~

[119] ~~Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control (OJ L 24, 29.1.2008, p. 8).~~

~~energy services, energy audits, energy managers and installers of energy-related building elements as defined in Article 2(9) of Directive 2010/31/EU.~~

~~2. Member States shall ensure that the schemes referred to in paragraph 1 provide transparency to consumers, are reliable and contribute to national energy efficiency objectives.~~

⇩ new

1. Member States shall ensure the appropriate level of competences for energy efficiency professions that corresponds to the market needs. Member States in close cooperation with the social partners shall ensure that certification and/or equivalent qualification schemes, including, where necessary, suitable training programmes, are available for energy efficiency professions including providers of energy services, providers of energy audits, energy managers, independent experts and installers of building elements pursuant to Directive 2010/31/EU, and are reliable and contribute to national energy efficiency objectives and the overall EU decarbonisation objectives.

Providers of certification, and/or equivalent qualification schemes, including, where necessary, suitable training programmes shall be accredited according to Regulation (EC) No 765/2008[120].

2. Member States shall ensure that national certification, or equivalent qualification schemes, including, where necessary, training programmes, take into account existing European or international standards.

🡻 2012/27/EU (adapted)
⇨ new

3. Member States shall make publicly available the certification, ~~and/or accreditation schemes~~ or equivalent qualification schemes ⇨ , or suitable training programmes ⇦ referred to in paragraph 1 and shall cooperate among themselves and with the Commission on comparisons between, and recognition of, the schemes.

Member States shall take appropriate measures to make consumers aware of the availability of ~~qualification and/or certification~~ ⌦ the ⌫ schemes in accordance with Article 27~~18~~(1).

⇩ new

4. Member States shall assess by 31 December 2024 and every four years thereafter whether the schemes ensure the necessary level of competences for energy services providers, energy auditors, energy managers, independent experts and installers of building elements pursuant to Directive 2010/31/EU, and shall make the assessment and recommendations thereof publically available.

---

[120] Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products and repealing Regulation (EEC) No 339/93.

🡻 2012/27/EU (adapted)
⇨ new

~~*Article 17*~~

~~**Information and training**~~

~~1. Member States shall ensure that information on available energy efficiency mechanisms and financial and legal frameworks is transparent and widely disseminated to all relevant market actors, such as consumers, builders, architects, engineers, environmental and energy auditors, and installers of building elements as defined in Directive 2010/31/EU.~~

~~4. Member States shall, with the participation of stakeholders, including local and regional authorities, promote suitable information, awareness-raising and training initiatives to inform citizens of the benefits and practicalities of taking energy efficiency improvement measures.~~

Article 27~~18~~

Energy services

1. Member States shall promote the energy services market and access ⌦ to it ⌫ for SMEs ~~to this market~~ by~~:~~

~~(a)~~ disseminating clear and easily accessible information on:

(a~~i~~) available energy service contracts and clauses that should be included in such contracts to guarantee energy savings and final customers' rights;

(b~~ii~~) financial instruments, incentives, grants ⇨ , revolving funds, guarantees, insurance schemes, ⇦ and loans to support energy efficiency service projects;

⇩ new

(c) available energy services providers that are qualified and/or certified and their qualifications and/or certifications in accordance with Article 26.

(d) available monitoring and verification methodologies and quality control schemes.

🡻 2012/27/EU (adapted)
⇨ new

2.~~(b)~~ ~~encouraging~~ ⌦ Member States shall encourage ⌫ the development of quality labels, inter alia, by trade associations ⇨ , based on European or international standards where relevant ⇦;

3.~~(c)~~ ~~making~~ ⌦ Member States shall make ⌫ publicly available and regularly ~~updating~~ ⌦ update ⌫ a list of available energy service providers who are qualified and/or certified and their qualifications and/or certifications in accordance with Article 26~~16~~, or ~~providing~~ ⌦ provide ⌫ an interface where energy service providers can provide information.

⇩ new

4. Member States shall encourage public bodies to use energy performance contracting for renovations of large buildings. For renovations of large non-residential buildings with a useful floor area above 1000 m^2, Member States shall ensure that public bodies assess the feasibility of using energy performance contracting.

Member States may encourage public bodies to combine energy performance contracting with expanded energy services including demand response and storage.

🡻 2012/27/EU (adapted)
⇨ new

5.~~(d)~~ ~~supporting~~ ⌦ Member States shall support ⌫ the public sector in taking up energy service offers, in particular for building refurbishment, by:

(a~~i~~) providing model contracts for energy performance contracting which include at least the items listed in Annex XIII~~XIII~~ ⇨ and take into account the existing European or international standards, available tendering guidelines and Eurostat guide to the statistical treatment of energy performance contracts in government accounts ⇦;

(b~~ii~~) providing information on best practices for energy performance contracting, including, if available, cost-benefit analysis using a life-cycle approach;

⇩ new

(c) making publicly available a database of implemented and ongoing energy performance contracting projects that includes the projected and achieved energy savings.

🡻 2012/27/EU (adapted)
⇨ new

6~~2~~. Member States shall support the proper functioning of the energy services market~~,~~ ~~where appropriate,~~ by ⌦ taking the following measures ⌫:

(a) identifying and publicising point(s) of contact where final customers can obtain the information referred to in paragraph 1;

(b) ~~taking, if necessary, measures to remove~~ ⌦ removing ⌫ the regulatory and non-regulatory barriers that impede the uptake of energy performance contracting and other energy efficiency service models for the identification and/or implementation of energy saving measures;

~~(c) considering putting in place or assigning the role of an independent mechanism, such as an ombudsman, to ensure the efficient handling of complaints and out-of-court settlement of disputes arising from energy service contracts;~~

⇩ new

(c) setting up and promoting the role of advisory bodies and independent market intermediaries including one stop shops or similar support mechanisms to stimulate

market development on the demand and supply sides, and making information about those support mechanisms publically available and accessible to market actors.

7. For the purpose of supporting the proper functioning of the energy services market, Member States may establish an individual mechanism or designate an ombudsperson to ensure the efficient handling of complaints and out-of-court settlement of disputes arising from energy service and energy performance contracts.

🡻 2012/27/EU (adapted)
⇨ new

~~(d) enabling independent market intermediaries to play a role in stimulating market development on the demand and supply sides.~~

8~~3~~. Member States shall ensure that energy distributors, distribution system operators and retail energy sales companies refrain from any activities that may impede the demand for and delivery of energy services or ~~other~~ energy efficiency improvement measures, or hinder the development of markets for such services or measures, including foreclosing the market for competitors or abusing dominant positions.

Article 28~~20~~

Energy Efficiency National Fund, Financing and Technical Support

1. Without prejudice to Articles 107 and 108 ⌦ TFEU ⌫ ~~of the Treaty on the Functioning of the European Union~~, Member States shall facilitate the establishment of financing facilities, or use of existing ones, for energy efficiency improvement measures to maximise the benefits of multiple streams of financing ⇨ and the combination of grants, financial instruments and technical assistance ⇦.

2. The Commission shall, where appropriate, directly or via the European financial institutions, assist Member States in setting up financing facilities and ~~technical support schemes~~ ⇨ project development assistance facilities at national, regional or local level ⇦ with the aim of increasing ⇨ investments in ⇦ energy efficiency in different sectors ⇨ , and protecting and empowering vulnerable customers, people affected by energy poverty and, where applicable, people living in social housing including by integrating an equality perspective so that no one is left behind. ⇦

⇨ 3. Member States shall adopt measures that ensure that energy efficiency lending products, such as green mortgages and green loans, secured and unsecured, are offered widely and in a non-discriminatory manner by financial institutions and, are visible and accessible to consumers. Member States shall adopt measures to facilitate the implementation of on-bill and on-tax financing schemes. ⇦ Member States shall ~~encourage the provision of information to~~ ⇨ ensure that ⇦ banks and other financial institutions ⌦ receive information on opportunities to participate in the financing of energy efficiency improvement measures ⌫ ~~on possibilities of participating~~, including through the creation of public/private partnerships~~, in the financing of energy efficiency improvement measures~~.

4~~3~~. The Commission shall facilitate the exchange of best practice between the competent national or regional authorities or bodies, e.g. through annual meetings of the regulatory bodies, public databases with information on the implementation of measures by Member States, and country comparison.

↓ 2018/2002 Art. 1.12 (adapted)
⇨ new

5~~3a~~. In order to mobilise private financing for energy efficiency measures and energy renovation, in accordance with Directive 2010/31/EU, the Commission shall conduct a dialogue with both public and private financial institutions in order to map out possible actions it can take.

6~~3b~~. The actions referred to in paragraph 4~~3a~~ shall include the following ⌦ elements ⌫:

(a) mobilising capital investment into energy efficiency by considering the wider impacts of energy savings ~~for financial risk management~~;

(b) ensuring better energy and finance performance data by:

(i) examining further how energy efficiency investments improve underlying asset values;

(ii) supporting studies to assess the monetisation of the non-energy benefits of energy efficiency investments.

7~~3c~~. For the purpose of mobilising private financing of energy efficiency measures and energy renovation, Member States shall, when implementing this Directive:

(a) consider ways to make better use of energy audits under Article 11~~8~~ to influence decision-making;

(b) make optimal use of the possibilities and tools ⇨ available from the Union budget, and ⇦ proposed in the smart finance for smart buildings initiative ⇨ and in Commission Communication entitled 'Renovation Wave´. ⇦

8~~3d~~. By ~~1 January 2020~~ ⇨ 31 December 2024the ⇦ Commission shall provide guidance for Member States ⇨ and market actors ⇦ on how to unlock private investment.

⇩ new

The guidance shall have the purpose of helping Member States and market actors to develop and implement their energy efficiency investments in the various Union programmes, and will propose adequate financial mechanisms and solutions, with a combination of grants, financial instruments and project development assistance, to scale up existing initiatives and use the Union funding as a catalyst to leverage and trigger private financing.

↓ 2012/27/EU (adapted)
⇨ new

9~~4~~. Member States may set up an Energy Efficiency National Fund. The purpose of this fund shall be ⇨ to implement energy efficiency measures, including measures pursuant to Article 8(3) and Article 22 as a priority among vulnerable customers, people affected by energy poverty and, where applicable, people living in social housing, and ⇦ to ~~support~~ ⇨ implement ⇦ national energy efficiency ~~initiatives~~ ⇨ measures to support Member States in meeting their national energy efficiency contributions and their indicative trajectories referred to in Article 4(2). The Energy Efficiency National Fund may be financed with revenues from the allowance auctions pursuant to the EU Emission Trading System on buildings and transport sectors. ⇦

10~~5~~. Member States may allow ⇨ public bodies to fulfil the ⇦ ~~for the~~ obligations set out in Article 6~~5~~(1) ~~to be fulfilled~~ by ⌦ means of ⌫ annual contributions to the Energy Efficiency National Fund ~~of an amount~~ ⌦ equivalent ⌫ ~~equal~~ to the ⌦ amount of the ⌫ investments required to achieve those obligations.

11~~6~~. Member States may provide that obligated parties can fulfil their obligations set out in Article 9~~7~~(1) and 4 by contributing annually to the Energy Efficiency National Fund an amount equal to the investments required to achieve those obligations.

12~~7~~. Member States may use their revenues from annual emission allocations under Decision No 406/2009/EC for the development of innovative financing ~~mechanisms to give practical effect to the objective in Article 65 of improving the energy performance of buildings~~ ⇨ for energy efficiency improvements ⇦.

Article 29~~21~~

Conversion factors ⌦ and primary energy factors ⌫

1. For the purpose of comparison of energy savings and conversion to a comparable unit, the ⇨ net calorific values in Annex VI of Commission Implementing Regulation (EU) 2018/2066[121] and the primary energy factors ⇦ ~~conversion factors~~ set out in ⌦ paragraph 2 ⌫~~Annex IV~~ shall apply unless the use of other ~~conversion~~ ⇨ values or ⇦ factors can be justified.

⇩ new

2. A primary energy factor shall be applicable when energy savings are calculated in primary energy terms using a bottom-up approach based on final energy consumption.3. For savings in kWh electricity, Member States shall apply a coefficient in order to accurately calculate the resulting primary energy consumption savings. Member States shall apply a default coefficient of 2,1 unless they use their discretion to define a different coefficient based upon justified national circumstances.

4. For savings in kWh of other energy carriers, Member States shall apply a coefficient in order to accurately calculate the resulting primary energy consumption savings. 5. Where Member States establish their own coefficient to a default value provided pursuant to this Directive, Member States shall establish this through a transparent methodology on the basis of national circumstances affecting primary energy consumption. The circumstances shall be substantiated, verifiable and based on objective and non-discriminatory criteria.

6. Where establishing an own coefficient, Member States shall take into account the energy mix included in the update of their integrated national energy and climate plans and subsequent integrated National Energy and Climate Plan to be notified to the Commission in accordance with Regulation (EU) 2018/1999. If they deviate from the default value Member States shall notify the coefficient that they use to the Commission along with the calculation methodology and underlying data in the update of their integrated National Energy and

[121] Commission Implementing Regulation (EU) 2018/2066 of 19 December 2018 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council and amending Commission Regulation (EU) No 601/2012, OJ L 334, 31.12.2018, p. 1–93.

Climate Plans and subsequent integrated National Energy and Climate Plans in accordance with Regulation (EU) 2018/1999.

7. By 25 December 2022 and every four years thereafter, the Commission shall revise the default coefficient on the basis of observed data. That revision shall be carried out taking into account its effects on other Union law such as Directive 2009/125/EC and Regulation (EU) 2017/1369.

↓ 2012/27/EU (adapted)
⇨ new

CHAPTER VII~~V~~

FINAL PROVISIONS

Article 30~~13~~

Penalties

Member States shall lay down the rules on penalties applicable in case of non-compliance with the national provisions adopted pursuant to ~~Articles 7 to 11a~~ ~~and Article 18(3)~~ ⇨ this Directive ⇦ and shall take the necessary measures to ensure that they are implemented. The penalties provided for shall be effective, proportionate and dissuasive. Member States shall notify those provisions to the Commission ⇨ by [transposition date] ⇦ ~~by 5 June 2014~~ and shall notify it without delay of any subsequent amendment affecting them.

Article 31~~22~~

Delegated acts

1. The Commission ~~shall be~~ ⌦ is ⌫ empowered to adopt delegated acts in accordance with Article 32~~23~~ ~~to~~ ⌦ concerning the ⌫ review ⌦ of ⌫ the harmonised efficiency reference values referred to in the second subparagraph of Article 24~~14~~(10).

↓ 2018/2002 Art. 1.13 (adapted)

2. The Commission is empowered to adopt delegated acts in accordance with Article 32~~23~~ ~~to amend~~ ⌦ to amend or supplement of ⌫ this Directive by adapting to technical progress the values, calculation methods, default primary energy coefficient ⌦ s ⌫ and requirements ⌦ referred to ⌫ in ⌦ Article 29, ⌫ Annexes II, III, V, VII to XI, and XIII ~~I to V, VII to X, and XII~~.

⇩ new

3. The Commission is empowered to adopt delegated acts in accordance with Article 32 to supplement this Directive by establishing, after having consulted the relevant stakeholders, a common Union scheme for rating the sustainability of data centres located in its territory. The scheme shall establish the definition of data centre sustainability indicators, and, pursuant to paragraph 9 of Article 10 of this Directive, define the minimum thresholds for significant energy consumption and set out the key indicators and the methodology to measure them.

🡻 2012/27/EU

Article 32~~23~~

Exercise of the delegation

1. The power to adopt delegated acts is conferred on the Commission subject to the conditions laid down in this Article.

🡻 2018/2002 Art. 1.14(a)
⇨ new

2. The power to adopt delegated acts referred to in Article 31~~22~~ shall be conferred on the Commission for a period of five years from ~~24 December 2018~~ ⇨ [*date of publication in OJ*] ⇦. The Commission shall draw up a report in respect of the delegation of power not later than nine months before the end of the five-year period. The delegation of power shall be tacitly extended for periods of an identical duration, unless the European Parliament or the Council opposes such extension not later than three months before the end of each period.

🡻 2012/27/EU

3. The delegation of power referred to in Article 31~~22~~ may be revoked at any time by the European Parliament or by the Council. A decision to revoke shall put an end to the delegation of the power specified in that decision. It shall take effect the day following the publication of the decision in the *Official Journal of the European Union* or at a later date specified therein. It shall not affect the validity of any delegated acts already in force.

🡻 2018/2002 Art. 1.14(b)

4~~3a~~. Before adopting a delegated act, the Commission shall consult experts designated by each Member State in accordance with the principles laid down in the Interinstitutional Agreement of 13 April 2016 on Better Law-Making[~~122~~].

🡻 2012/27/EU

5~~4~~. As soon as it adopts a delegated act, the Commission shall notify it simultaneously to the European Parliament and to the Council.

6~~5~~. A delegated act adopted pursuant to Article 31~~22~~ shall enter into force only if no objection has been expressed either by the European Parliament or the Council within a period of two months of notification of that act to the European Parliament and the Council or if, before the expiry of that period, the European Parliament and the Council have both informed the Commission that they will not object. That period shall be extended by two months at the initiative of the European Parliament or of the Council.

[122] ~~OJ L 123, 12.5.2016, p. 1.~~

Article 33~~24~~

Review and monitoring of implementation

↓ 2018/2002 Art. 1.15(a)

1~~4a~~. In the context of the State of the Energy Union report, the Commission shall report on the functioning of the carbon market in accordance with Article 35(1) and point (c) of Article 35(2) of Regulation (EU) 2018/1999, taking into consideration the effects of the implementation of this Directive.

↓ 2012/27/EU (adapted)

~~5. The Commission shall review the continued need for the possibility of exemptions set out in Article 24(5)14(6) for the first time in the assessment of the first National Energy Efficiency Action Plan and every three years thereafter. Where the review shows that any of the criteria for these exemptions can no longer be justified taking into account the availability of heat load and the real operating conditions of the exempted installations, the Commission shall propose appropriate measures.~~

⇩ new

2. By 31 October 2025 and every four years thereafter, the Commission shall evaluate the existing measures to achieve energy efficiency increase and decarbonisation in heating and cooling. The evaluation shall take into account:

(a) Energy efficiency and greenhouse gases emissions trends in heating and cooling, including in district heating and cooling;

(b) Interlinkages between measures taken;

(c) Changes in energy efficiency and greenhouse gas emissions in the heating and cooling;

(d) Existing and planned energy efficiency policies and measures and greenhouse gas reduction policies and measures at national and EU level, and

(e) Measures Member States provided in their comprehensive assessments pursuant to Article 23(1) and notified in accordance with Article 17(b)(1) of Regulation (EU) 2018/1999.

The Commission may propose, if appropriate, by measures to ensure the achievement of the Union's climate energy targets.

↓ 2012/27/EU

3~~6~~. Member States shall submit to the Commission before 30 April each year statistics on national electricity and heat production from high and low efficiency cogeneration, in accordance with the methodology shown in Annex II~~I~~, in relation to total heat and electricity production. They shall also submit annual statistics on cogeneration heat and electricity capacities and fuels for cogeneration, and on district heating and cooling production and capacities, in relation to total heat and electricity production and capacities. Member States shall submit statistics on primary energy savings achieved by application of cogeneration in accordance with the methodology shown in Annex III~~II~~.

↓ 2012/27/EU (adapted)

~~7. By 30 June 2014 the Commission shall submit the assessment referred to in Article 3(2) to the European Parliament and to the Council, accompanied, if necessary, by proposals for further measures.~~

~~8. The Commission shall review the effectiveness of the implementation of Article 6 by 5 December 2015, taking into account the requirements laid down in Directive 2004/18/EC and shall submit a report to the European Parliament and the Council. That report shall be accompanied, if appropriate, by proposals for further measures.~~

~~9. By 30 June 2016, the Commission shall submit a report to the European Parliament and the Council on the implementation of Article 7. That report shall be accompanied, if appropriate, by a legislative proposal for one or more of the following purposes:~~

~~(a) to change the final date laid down in Article 67(1);~~

~~(b) to review the requirements laid down in Article 67(1), (2) and (3);~~

~~(c) to establish additional common requirements, in particular as regards the matters referred to in Article 67(7).~~

~~10. By 30 June 2018, the Commission shall assess the progress made by Member States in removing the regulatory and non-regulatory barriers referred to in Article 19(1). This assessment shall be followed, if appropriate, by proposals for further measures.~~

↓ 2018/2002 Art. 1.15(b) (adapted)
⇨ new

~~12. By 31 December 2019, the Commission shall assess the effectiveness of the implementation of the definition of small and medium-sized enterprises for the purposes of Article 8(4), and shall submit a report to the European Parliament and to the Council. As soon as possible after submission of that report, the Commission shall, if appropriate, adopt legislative proposals.~~

4~~13~~. By 1 January 2021, the Commission shall carry out an assessment of the potential for energy efficiency in conversion, transformation, transmission, transportation and storage of energy, and shall submit a report to the European Parliament and to the Council. That report shall, if appropriate, be accompanied by legislative proposals.

5~~14~~. ⌦ Subject to any changes to the retail market provisions of Directive 2009/73/EC, ⌫ ~~B~~by 31 December 2021, the Commission~~,~~ shall~~, unless changes to the retail market provisions of Directive 2009/73/EC on common rules for the internal market in gas have meanwhile been proposed,~~ carry out an assessment, and submit a report to the European Parliament and to the Council, on the provisions related to metering, billing and consumer information for natural gas, with the aim of aligning them, where appropriate, with the relevant provisions for electricity in Directive (EU) 2019/944~~2009/72/EC~~, in order to strengthen consumer protection and enable final customers to receive more frequent, clear and up-to-date information about their natural gas consumption and to regulate their energy use. As soon as possible after submission of that report, the Commission shall, ⌦ where ⌫ ~~if~~ appropriate, adopt legislative proposals.

🡻 2018/2002 Art. 1.2 (adapted)

6~~4~~. By 31 October 2022, the Commission shall assess whether the Union has achieved its 2020 headline target~~s~~ on energy efficiency.

🡻 2018/2002 Art. 1.15(b)
⇨ new

7~~15~~. By 28 February ~~2024~~ ⇨ 2027 ⇦, and every five years thereafter, the Commission shall evaluate this Directive and submit a report to the European Parliament and to the Council.

That evaluation shall include:

~~(a) an examination of whether to adapt, after 2030, the requirements and the alternative approach laid down in Article 5;~~

(a~~b~~) an assessment of the general effectiveness of this Directive and the need to adjust further the Union's energy efficiency policy in accordance with the objectives of the 2015 Paris Agreement ~~on climate change following the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change~~[123] and in the light of economic and innovation developments;

⇩ new

(b) the Union's 2030 headline targets on energy efficiency set out in Article 4(1) with a view to revising those that targets upwards in the event of substantial cost reductions resulting from economic or technological developments, or where needed to meet the Union's decarbonisation targets for 2040 or 2050, or its international commitments for decarbonisation;

(c) if Member States shall continue to achieve new annual savings in accordance with point (c) of the first subparagraph of Article 8 for the ten-year periods after 2030;

(d) if Member States shall continue to ensure that at least 3% of the total floor area of heated and/or cooled buildings owned by public bodies is renovated each year in accordance with paragraph 1 of Article 6 with a view to revising the renovation rate in that Article;

(e) if Member States shall continue to achieve a share of energy savings among vulnerable customers, people affected by energy poverty, and, where applicable, people living in social housing, in accordance with paragraph 3 of Article 8 for the ten-year periods after 2030;

(f) if Member States shall continue to achieve a reduction of final energy consumption in accordance with Article 5(1).

123 ~~OJ L 282, 19.10.2016, p. 4.~~

↓ 2018/2002 Art. 1.15(b)

That report shall be accompanied, where appropriate, by proposals for further measures.

↓ 2012/27/EU (adapted)
⇨ new

~~*Article 25*~~

~~**Online platform**~~

~~The Commission shall establish an online platform in order to foster the practical implementation of this Directive at national, regional and local levels. That platform shall support the exchange of experiences on practices, benchmarking, networking activities, as well as innovative practices.~~

Article 34~~26~~

Committee procedure

1. The Commission shall be assisted by a committee. That committee shall be a committee within the meaning of Regulation (EU) No 182/2011.

2. Where reference is made to this paragraph, Article 4 of Regulation (EU) No 182/2011 shall apply.

Article 35~~28~~

Transposition

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with ~~this Directive~~ ⌦ Articles […] and Annexes […] ⌫ [articles and annexes which have been amended in substance by comparison with the repealed Directive] by ⇨ […] ⇦ ~~5 June 2014~~.

~~Notwithstanding the first subparagraph, Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with Article 4, the first subparagraph of Article 5(1), Article 5(5), Article 5(6), the last subparagraph of Article 7(9), Article 14(6), Article 19(2), Article 24(1) and Article 24(2) and point (4) of Annex V by the dates specified therein.~~

They shall ~~forthwith~~ ⌦ immediately ⌫ communicate ~~to the Commission~~ the text of those ~~provisions~~ ⌦ measures to the Commission ⌫.

When Member States adopt those ⌦ measures ⌫ ~~provisions~~, they shall contain a reference to this Directive or be accompanied by such a reference on the occasion of their official publication. ⌦ They shall also include a statement that references in existing laws, regulations and administrative provisions to the Directive repealed by this Directive shall be construed as references to this Directive. ⌫ Member States shall determine how such reference is to be made ⌦ and how that statement is to be formulated ⌫.

2. Member States shall communicate to the Commission the text of the main provisions of national law which they adopt in the field covered by this Directive.

Article 36~~27~~

~~Amendments and~~ R~~r~~epeal~~s~~

~~1.~~Directive 2012/27/EU~~2006/32/EC~~ ⌦ , as amended by the acts listed in Annex XV, Part A, ⌫ is repealed ⌦ with effect ⌫ from ⇨ […] ⇦ [the day after the date in the first subparagraph of Article 35(1)] ~~5 June 2014, except for Article 4(1) to (4) thereof and Annexes I, III and IV thereto~~, without prejudice to the obligations of the Member States relating to the ~~time-limit~~ ⌦ time-limits ⌫ for ~~its~~ ⌦ the ⌫ transposition into national law ⌦ of the Directives set out in Annex XV, Part B ⌫ . ~~Article 4(1) to (4) of, and Annexes I, III and IV to Directive 2006/32/EC shall be repealed with effect from 1 January 2017.~~

~~Directive 2004/8/EC is repealed from 5 June 2014, without prejudice to the obligations of the Member States relating to the time-limit for its transposition into national law.~~

References to ⌦ the repealed ⌫ Directive~~s~~ ~~2006/32/EC and 2004/8/EC~~ shall be construed as references to this Directive and shall be read in accordance with the correlation table ~~set out~~ in Annex XVI~~XV~~.

~~2. Article 9(1) and (2) of Directive 2010/30/EU is deleted from 5 June 2014.~~

~~3. Directive 2009/125/EC is amended as follows:~~

~~(1) the following recital is inserted:~~

~~'(35a)Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings[124] requires Member States to set energy performance requirements for building elements that form part of the building envelope and system requirements in respect of the overall energy performance, the proper installation, and the appropriate dimensioning, adjustment and control of the technical building systems which are installed in existing buildings. It is consistent with the objectives of this Directive that these requirements may in certain circumstances limit the installation of energy-related products which comply with this Directive and its implementing measures, provided that such requirements do not constitute an unjustifiable market barrier.'~~

~~(2) the following sentence is added to the end of Article 6(1):~~

~~'This shall be without prejudice to the energy performance requirements and system requirements set by Member States in accordance with Article 4(1) and Article 8 of Directive 2010/31/EU.'.~~

Article 37~~29~~

Entry into force

This Directive shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

⌦ Articles […] and Annexes […] [articles and annexes which are unchanged by comparison with the repealed Directive] shall apply from […] [the day after the date in the first subparagraph of Article 35(1)]. ⌫

---

[124] ~~OJ L 153, 18.6.2010, p. 13.;~~

Article 38~~30~~

Addressees

This Directive is addressed to the Member States.

Done at Brussels,

For the European Parliament	*For the Council*
The President	*The President*

EUROPEAN
COMMISSION

Brussels, 14.7.2021
COM(2021) 558 final

ANNEXES 1 to 16

ANNEXES

to the

Proposal for a

DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on energy efficiency~~, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC~~ (recast)

{SEC(2021) 558 final} - {SWD(2021) 623 final} - {SWD(2021) 624 final} - {SWD(2021) 625 final} - {SWD(2021) 626 final} - {SWD(2021) 627 final}

⇩ new

ANNEX I

NATIONAL CONTRIBUTIONS TO THE UNION'S ENERGY EFFCIENCY TARGETS IN 2030 IN FINAL AND/OR PRIMARY ENERGY CONSUMPTION

1. The level of national contributions is calculated based on the indicative formula:

$$FEC_{C_{2030}} = C_{EU}(1 - Target)\, FEC_{B_{2030}}$$

$$PEC_{C_{2030}} = C_{EU}(1 - Target)\, PEC_{B_{2030}}$$

Where C_{EU} is a correction factor, *Target* is the level of national-specific ambition and FEC_{B2030} PEC_{B2030} is the 2020 Reference Scenario used as a baseline for 2030.

2. The following indicative formula represents the objective criteria reflecting the factors listed in points (d) (i) to (iv) of Article 4(3), each used for defining the level of national-specific ambition in % (*Target*) and having the same weight in the formula (0,25):

a) a flat rate contribution ("F_{flat}");

b) GDP-per-capita dependent contribution ("F_{wealth}");

c) energy intensity dependent contribution ("$F_{intensity}$");

d) cost-effective energy savings potential contribution ("$F_{potential}$").

3. F_{flat} represents the 2030 Union target that includes the additional efforts needed to reach the Union's energy efficiency targets in FEC and PEC compared to the 2020 Reference Scenario projections for 2030.

4. F_{wealth} shall be calculated for each Member State based on its three-year average Eurostat's real GDP per capita index to the Union's three-year average over the 2017-2019 period, expressed in Purchasing power parities (PPPs).

5. $F_{intensity}$ shall be calculated for each Member State based on its three-year average final energy intensity (FEC or PEC per real GDP in PPPs) index to the Union's three-year average over 2017-2019 period.

6. $F_{potential}$ shall be calculated for each Member State based on the final or primary energy savings under the PRIMES MIX 55% scenario for 2030. The savings are expressed in relation to 2020 Reference Scenario projections for 2030.

7. For each criteria provided in point 2(a) to (d), a lower and upper limit shall be applied. The level of ambition for each factor shall be capped at 50% and 150% of the Union average level of ambition under a given factor.

8. The source of the input data used to calculate the factors is Eurostat unless stated otherwise.

9. F_{total} shall be calculated as the weighted sum of all four factors (F_{flat}. F_{wealth} $F_{intensity}$ and $F_{potential}$). The target shall be then calculated as the product of the total factor F_{total} and the EU target.

10. A primary and final energy correction factor C_{EU} shall be applied to all Member States to calibrate the sum of all national contributions to the Union primary and

final energy consumption targets in 2030. The factor C_{EU} is identical for all Member States.

↓ 2012/27/EU (adapted)
⇨ new

ANNEX III~~I~~

GENERAL PRINCIPLES FOR THE CALCULATION OF ELECTRICITY FROM COGENERATION

Part I

General principles

Values used for calculation of electricity from cogeneration shall be determined on the basis of the expected or actual operation of the unit under normal conditions of use. For micro-cogeneration units the calculation may be based on certified values.

(a) Electricity production from cogeneration shall be considered equal to total annual electricity production of the unit measured at the outlet of the main generators ⌦ if following conditions are met ⌫ :

(i) in cogeneration units of types (b), (d), (e), (f), (g) and (h) referred to in Part II with an annual overall efficiency set by Member States at a level of at least 75 %; ~~and~~

(ii) in cogeneration units of types (a) and (c) referred to in Part II with an annual overall efficiency set by Member States at a level of at least 80 %.

(b) In cogeneration units with an annual overall efficiency below the value referred to in point (a)(i) ~~of point (a)~~ (cogeneration units of types (b), (d), (e), (f), (g), and (h) referred to in Part II) or with an annual overall efficiency below the value referred to in point (a)(ii) ~~of point (a)~~ (cogeneration units of types (a) and (c) referred to in Part II) ⌦ electricity from ⌫ cogeneration is calculated according to the following formula:

$E_{CHP}=H_{CHP}*C$

where:

E_{CHP} is the amount of electricity from cogeneration;

C is the power-to-heat ratio;

H_{CHP} is the amount of useful heat from cogeneration (calculated for this purpose as total heat production minus any heat produced in separate boilers or by live steam extraction from the steam generator before the turbine).

The calculation of electricity from cogeneration must be based on the actual power-to-heat ratio. If the actual power-to-heat ratio of a cogeneration unit is not known, the following default values may be used, in particular for statistical purposes, for units of types (a), (b), (c), (d) and (e) referred to in Part II provided that the calculated cogeneration electricity is less or equal to total electricity production of the unit:

Type of the unit	Default power to heat ratio, C
Combined cycle gas turbine with heat recovery	0,95
Steam back pressure turbine	0,45
Steam condensing extraction turbine	0,45
Gas turbine with heat recovery	0,55
Internal combustion engine	0,75

If Member States introduce default values for power-to-heat ratios for units of types (f), (g), (h), (i), (j) and (k) referred to in Part II, such default values shall be published and shall be notified to the Commission.

(c) If a share of the energy content of the fuel input to the cogeneration process is recovered in chemicals and recycled this share can be subtracted from the fuel input before calculating the overall efficiency used in points (a) and (b).

(d) Member States may determine the power-to-heat ratio as the ratio of electricity to useful heat when operating in cogeneration mode at a lower capacity using operational data of the specific unit.

(e) Member States may use other reporting periods than one year for the purpose of the calculations according to points (a) and (b).

Part II

Cogeneration technologies covered by this Directive

(a) Combined cycle gas turbine with heat recovery

(b) Steam back pressure turbine

(c) Steam condensing extraction turbine

(d) Gas turbine with heat recovery

(e) Internal combustion engine

(f) Microturbines

(g) Stirling engines

(h) Fuel cells

(i) Steam engines

(j) Organic Rankine cycles

(k) Any other type of technology or combination thereof falling under the definition laid down in point (30) of Article 2~~(30)~~.

When implementing and applying the general principles for the calculation of electricity from cogeneration, Member States shall use the detailed Guidelines established by Commission Decision 2008/952/EC ~~of 19 November 2008 establishing detailed guidelines for the~~

~~implementation and application of Annex II to Directive 2004/8/EC of the European Parliament and of the Council~~[1].

---

[1] Commission Decision 2008/952/EC of 19 November 2008 establishing detailed guidelines for the implementation and application of Annex II to Directive 2004/8/EC of the European Parliament and of the Council (OJ L 338, 17.12.2008, p. 55).

↓ 2012/27/EU

ANNEX III~~II~~

METHODOLOGY FOR DETERMINING THE EFFICIENCY OF THE COGENERATION PROCESS

Values used for calculation of efficiency of cogeneration and primary energy savings shall be determined on the basis of the expected or actual operation of the unit under normal conditions of use.

(a) High-efficiency cogeneration

For the purpose of this Directive high-efficiency cogeneration shall fulfil the following criteria:

– cogeneration production from cogeneration units shall provide primary energy savings calculated according to point (b) of at least 10 % compared with the references for separate production of heat and electricity;~~.~~

– production from small-scale and micro-cogeneration units providing primary energy savings may qualify as high-efficiency cogeneration;~~.~~

⇩ new

– direct emissions of the carbon dioxide from cogeneration production that is fuelled with fossil fuels, are less than 270 gCO_2 per 1 kWh of energy output from the combined generation (including heating/cooling, power and mechanical energy).

– When a cogeneration unit is built or substantially refurbished, Member States shall ensure that there is no increase in the use of fossil fuels other than natural gas in existing heat sources compared to the annual consumption averaged over the previous three calendar years of full operation before refurbishment, and that any new heat sources in that system do not use fossil fuels other than natural gas.

↓ 2012/27/EU

(b) Calculation of primary energy savings

The amount of primary energy savings provided by cogeneration production defined in accordance with Annex III~~I~~ shall be calculated on the basis of the following formula:

$$\mathrm{PES} = \left(1 - \frac{1}{\frac{\mathrm{CHPH}\eta}{\mathrm{RefH}\eta} + \frac{\mathrm{CHPE}\eta}{\mathrm{RefE}\eta}}\right) \times 100\,\%$$

Where:

PES is primary energy savings.

CHP Hη is the heat efficiency of the cogeneration production defined as annual useful heat output divided by the fuel input used to produce the sum of useful heat output and electricity from cogeneration.

Ref Hη is the efficiency reference value for separate heat production.

CHP Eη is the electrical efficiency of the cogeneration production defined as annual electricity from cogeneration divided by the fuel input used to produce the sum of useful heat output and electricity from cogeneration. Where a cogeneration unit generates mechanical energy, the annual electricity from cogeneration may be increased by an additional element representing the amount of electricity which is equivalent to that of mechanical energy. This additional element does not create a right to issue guarantees of origin in accordance with Article 24~~14~~(10).

Ref Eη is the efficiency reference value for separate electricity production.

(c) Calculations of energy savings using alternative calculation

Member States may calculate primary energy savings from a production of heat and electricity and mechanical energy as indicated below without applying Annex III~~I~~ to exclude the non-cogenerated heat and electricity parts of the same process. Such a production can be regarded as high-efficiency cogeneration provided it fulfils the efficiency criteria in point (a) of this Annex and, for cogeneration units with an electrical capacity larger than 25 MW, the overall efficiency is above 70 %. However, specification of the quantity of electricity from cogeneration produced in such a production, for issuing a guarantee of origin and for statistical purposes, shall be determined in accordance with Annex III~~I~~.

If primary energy savings for a process are calculated using alternative calculation as indicated above the primary energy savings shall be calculated using the formula in point (b) of this Annex replacing: 'CHP Hη' with 'Hη' and 'CHP Eη' with 'Eη', where:

Hη shall mean the heat efficiency of the process, defined as the annual heat output divided by the fuel input used to produce the sum of heat output and electricity output.

Eη shall mean the electricity efficiency of the process, defined as the annual electricity output divided by the fuel input used to produce the sum of heat output and electricity output. Where a cogeneration unit generates mechanical energy, the annual electricity from cogeneration may be increased by an additional element representing the amount of electricity which is equivalent to that of mechanical energy. This additional element will not create a right to issue guarantees of origin in accordance with Article 24~~14~~(10).

(d) Member States may use other reporting periods than one year for the purpose of the calculations according to points (b) and (c) of this Annex.

(e) For micro-cogeneration units the calculation of primary energy savings may be based on certified data.

(f) Efficiency reference values for separate production of heat and electricity

The harmonised efficiency reference values shall consist of a matrix of values differentiated by relevant factors, including year of construction and types of fuel, and must be based on a well-documented analysis taking, inter alia, into account data from operational use under realistic conditions, fuel mix and climate conditions as well as applied cogeneration technologies.

The efficiency reference values for separate production of heat and electricity in accordance with the formula set out in point (b) shall establish the operating efficiency of the separate heat and electricity production that cogeneration is intended to substitute.

The efficiency reference values shall be calculated according to the following principles:

(i)~~1.~~ f~~F~~or cogeneration units the comparison with separate electricity production shall be based on the principle that the same fuel categories are compared;~~.~~

(ii)~~2.~~ e~~E~~ach cogeneration unit shall be compared with the best available and economically justifiable technology for separate production of heat and electricity on the market in the year of construction of the cogeneration unit;~~.~~

(iii)~~3.~~ t~~T~~he efficiency reference values for cogeneration units older than 10 years of age shall be fixed on the reference values of units of 10 years of age;~~.~~

(iv)~~4.~~ t~~T~~he efficiency reference values for separate electricity production and heat production shall reflect the climatic differences between Member States.

↓ 2012/27/EU (adapted)
⇨ new

ANNEX IV~~III~~

ENERGY EFFICIENCY REQUIREMENTS FOR PUBLIC PROCUREMENT, ~~SERVICES AND BUILDINGS BY CENTRAL GOVERNMENT~~

~~Central governments~~ ⇨ In award procedures for public contracts and concessions, contracting authorities and contracting entities ⇦ that purchase products, services, ~~or~~ buildings ⇨ and works ⇦, insofar~~ as this is consistent with cost-effectiveness, economical feasibility, wider sustainability, technical suitability, as well as sufficient competition,~~ shall:

(a) where a product is covered by a delegated act adopted under Regulation (EU) 2017/1369~~Directive 2010/30/EU~~ or by a related Commission implementing directive, purchase only the products that comply with the criterion ~~of belonging to the highest energy efficiency class possible in the light of the need to ensure sufficient competition~~ ⌧ laid down in Article 7(2) of that Regulation ⌫;

(b) where a product not covered under point (a) is covered by an implementing measure under Directive 2009/125/EC adopted after the entry into force of this Directive, purchase only products that comply with energy efficiency benchmarks specified in that implementing measure;

~~(c) purchase office equipment products covered by Council Decision 2006/1005/EC of 18 December 2006 concerning conclusion of the Agreement between the Government of the United States of America and the European Community on the coordination of energy-efficiency labelling programmes for office equipment[2] that comply with energy efficiency requirements not less demanding than those listed in Annex C to the Agreement attached to that Decision;~~

⇩ new

(c) where a product or a service is covered by the Union green public procurement criteria, with relevance to energy efficiency of the product or service, make best efforts to purchase only products and services that respect at least the technical specifications set at 'core' level in the relevant Union green public procurement criteria including among others for data centres, server rooms and cloud services, Union green public procurement criteria for road lighting and traffic signals, Union green public procurement criteria for computers, monitors tablets and smartphones;

↓ 2012/27/EU
⇨ new

(d) purchase only tyres that comply with the criterion of having the highest fuel energy efficiency class, as defined by ~~Regulation (EC) No 1222/2009 of the European Parliament and of the Council of 25 November 2009 on the labelling of tyres with~~

[2] ~~Council Decision 2006/1005/EC of 18 December 2006 concerning conclusion of the Agreement between the Government of the United States of America and the European Community on the coordination of energy efficiency labelling programmes for office equipment (OJ L 381, 28.12.2006, p. 24).~~

~~respect to fuel efficiency and other essential parameters~~[3] Regulation (EU) 2020/740 of the European Parliament and of the Council[4]. This requirement shall not prevent public bodies from purchasing tyres with the highest wet grip class or external rolling noise class where justified by safety or public health reasons;

(e) require in their tenders for service contracts that service providers use, for the purposes of providing the services in question, only products that comply with the requirements referred to in points (a) to (d), when providing the services in question. This requirement shall apply only to new products purchased by service providers partially or wholly for the purpose of providing the service in question;

(f) purchase, or make new rental agreements for, only buildings that comply at least with the minimum energy performance requirements referred to in Article ~~5(1)~~ ⇨ 4(1) of Directive 2010/31/EU ⇦ unless the purpose of the purchase is:

(i) to undertake deep renovation or demolition;

(ii) in the case of public bodies, to re-sell the building without using it for public body's own purposes; or

(iii) to preserve it as a building officially protected as part of a designated environment, or because of its special architectural or historical merit.

Compliance with these requirements shall be verified by means of the energy performance certificates referred to in Article 11 of Directive 2010/31/EU.

---

3 ~~Regulation (EC) No 1222/2009 of 25 November 2009 on the labelling of tyres with respect to fuel efficiency and other essential parameters (OJ L 342, 22.12.2009, p. 46).~~

4 Regulation (EU) 2020/740 of the European Parliament and of the Council of 25 May 2020 on the labelling of tyres with respect to fuel efficiency and other parameters, amending Regulation (EU) 2017/1369 and repealing Regulation (EC) No 1222/2009 (OJ L 177, 5.6.2020, p. 1).

↓ 2018/2002 Art. 1.16 and Annex .2

ANNEX V

COMMON METHODS AND PRINCIPLES FOR CALCULATING THE IMPACT OF ENERGY EFFICIENCY OBLIGATION SCHEMES OR OTHER POLICY MEASURES UNDER ARTICLES 8~~7~~, 9~~7A~~ AND 10~~7B~~ AND ARTICLE 28(11)~~20(6)~~

1. Methods for calculating energy savings other than those arising from taxation measures for the purposes of Articles 8~~7~~, 9~~7a~~ and 10~~7b~~ and Article 28(11)~~20(6)~~.

   Obligated, participating or entrusted parties, or implementing public authorities, may use the following methods for calculating energy savings:

   (a) deemed savings, by reference to the results of previous independently monitored energy improvements in similar installations. The generic approach is termed '*ex ante*';

   (b) metered savings, whereby the savings from the installation of a measure, or package of measures, are determined by recording the actual reduction in energy use, taking due account of factors such as additionality, occupancy, production levels and the weather which may affect consumption. The generic approach is termed '*ex post*';

   (c) scaled savings, whereby engineering estimates of savings are used. This approach may be used only where establishing robust measured data for a specific installation is difficult or disproportionately expensive, e.g. replacing a compressor or electric motor with a different kWh rating from that for which independent information about savings has been measured, or where those estimates are carried out on the basis of nationally established methodologies and benchmarks by qualified or accredited experts that are independent of the obligated, participating or entrusted parties involved;

   (d) surveyed savings, where consumers' response to advice, information campaigns, labelling or certification schemes or smart metering is determined. This approach may be used only for savings resulting from changes in consumer behaviour. It shall not be used for savings resulting from the installation of physical measures.

2. In determining the energy savings for an energy efficiency measure for the purposes of Articles 8~~7~~, 9~~7a~~ and 10~~7b~~ and Article 28(11)~~20(6)~~, the following principles apply:

⇩ new

   (a) Member States shall demonstrate that the policy measure has been implemented for the purpose of fulfilling the energy savings obligation and achieving end-use energy savings pursuant to Article 8(1). Member States shall provide evidence and their documentation that the energy savings are caused by a policy measure, including voluntary agreements.

↓ 2018/2002 Art. 1.16 and Annex .2
⇨ new

(b~~a~~) t~~T~~he savings shall be shown to be additional to those that would have occurred in any event without the activity of the obligated, participating or entrusted parties, or implementing public authorities. To determine the savings that can be claimed as additional, Member States shall have regard to how energy use and demand would evolve in the absence of the policy measure in question by taking into account at least the following factors: energy consumption trends, changes in consumer behaviour, technological progress and changes caused by other measures implemented at Union and national level;~~.~~

(c~~b~~) s~~S~~avings resulting from the implementation of mandatory Union law shall be considered to be savings that would have occurred in any event, and thus shall not be claimed as energy savings for the purpose of Article 8~~7~~(1). By way of derogation from that requirement, savings related to the renovation of existing buildings may be claimed as energy savings for the purpose of Article 8~~7~~(1), provided that the materiality criterion referred to in point 3(h) of this Annex is ensured. ~~Savings resulting from the implementation of national minimum requirements established for new buildings prior to the transposition of Directive 2010/31/EU can be claimed as energy savings for the purpose of point (a) of Article 7(1), provided that the materiality criterion referred to in point 3(h) of this Annex is ensured and those savings have been notified by Member States in their National Energy Efficiency Action Plans in accordance with Article 24(2).~~ ⇨ Measures promoting energy efficiency improvements in the public sector pursuant to Article 5 and Article 6 may be eligible to be taken into account for the fulfilment of energy savings required under Article 8(1), provided that they result in verifiable, and measurable or estimable, end-use energy savings. The calculation of energy savings shall comply with the requirements of this Annex. ⇦

⇩ new

(d) measures taken pursuant to Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions can be considered material, but Member States have to show that they result in verifiable and measurable or estimable end-use energy savings. The calculation of energy savings shall comply with the requirements of this Annex.

(e) Member States cannot count reduced energy use in sectors, including the transport and building sector, that would have occurred in any event as a result of emission trading pursuant to the EU ETS Directive towards the fulfilment of the energy savings obligation pursuant to Article 8(1). If an entity is an obligated party under a national energy efficiency obligation scheme under Article 9 of this Directive and under the EU Emissions Trading System for buildings and road transport [Reference to proposal], the monitoring and verification system shall ensure that the carbon price passed through when releasing fuel for consumption [according to Article XX of Directive XX] is taken into account when calculating and reporting the energy savings of its energy saving measures.

↓ 2018/2002 Art. 1.16 and Annex .2
⇨ new

(f~~e~~) c~~C~~redit may be given only for savings exceeding the following levels:

(i) Union emission performance standards for new passenger cars and new light commercial vehicles following the implementation of ~~Regulations (EC) No 443/2009[5] and (EU) No 510/2011 of the European Parliament and of the Council[6]~~ Regulation (EU) 2019/631 of the European Parliament and of the Council[7]; ⇨ Member States must provide evidence, their assumptions and their calculation methodology to show additionality to the Union´s new vehicle CO2 requirements; ⇦

(ii) Union requirements relating to the removal from the market of certain energy related products following the implementation of implementing measures under Directive 2009/125/EC;~~.~~ ⇨ Member States shall provide evidence, their assumptions and their calculation methodology to show additionality; ⇦

(g~~d~~) p~~P~~olicies with the purpose of encouraging higher levels of energy efficiency of products, equipment, transport systems, vehicles and fuels, buildings and building elements, processes or markets shall be permitted ⇨ , except those policy measures regarding the use of direct combustion of fossil fuel technologies, that are implemented as from 1 January 2024 ⇦;

⇩ new

(h) Energy savings as a result of policy measures regarding the use of direct fossil fuel combustion in products, equipment, transport systems, vehicles, buildings or works shall not count towards the fulfilment of energy savings obligation as from 1 January 2024.

↓ 2018/2002 Art. 1.16 and Annex .2
⇨ new

(i~~e~~) m~~M~~easures promoting the installation of small-scale renewable energy technologies on or in buildings may be eligible to be taken into account for the fulfilment of energy savings required under Article 8~~7~~(1), provided that they result in verifiable, and measurable or estimable, ⇨ end-use ⇦ energy savings. The calculation of energy savings shall comply with the requirements of this Annex;~~.~~

5 ~~Regulation (EC) No 443/2009 of the European Parliament and of the Council of 23 April 2009 setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO_2 emissions from light-duty vehicles (OJ L 140, 5.6.2009, p. 1).~~

6 ~~Regulation (EU) No 510/2011 of the European Parliament and of the Council of 11 May 2011 setting emission performance standards for new light commercial vehicles as part of the Union's integrated approach to reduce CO_2 emissions from light-duty vehicles (OJ L 145, 31.5.2011, p. 1).~~

7 Regulation (EU) 2019/631 of the European Parliament and of the Council of 17 April 2019 setting CO2 emission performance standards for new passenger cars and for new light commercial vehicles, and repealing Regulations (EC) No 443/2009 and (EU) No 510/2011 (OJ L 111, 25.4.2019, p. 13).

⇩ new

(j) measures promoting the installation of solar thermal technologies may be eligible to be taken into account for the fulfilment of energy savings required under Article 8(1) provided that they result in verifiable, and measurable or estimable, end-use energy savings. The ambient heat captured by solar thermal technologies can be excluded from their end-use energy consumption;

🡻 2018/2002 Art. 1.16 and Annex .2 (adapted)
⇨ new

(k~~f~~) f~~F~~or policies that accelerate the uptake of more efficient products and vehicles, ⇨ except those regarding the use of direct fossil fuel combustion, ⇦ full credit may be claimed, provided that it is shown that such uptake takes place before expiry of the average expected lifetime of the product or vehicle, or before the product or vehicle would usually be replaced, and the savings are claimed only for the period until end of the average expected lifetime of the product or vehicle to be replaced;~~.~~

(l~~g~~) i~~I~~n promoting the uptake of energy efficiency measures, Member States shall, where relevant, ensure that quality standards for products, services and installation of measures are maintained or introduced where such standards do not exist;~~.~~

(m~~h~~) t~~T~~o account for climatic variations between regions, Member States may choose to adjust the savings to a standard value or to accord different energy savings in accordance with temperature variations between regions;~~.~~

(n~~i~~) t~~T~~he calculation of energy savings shall take into account the lifetime of the measures and the rate at which the savings decline over time. That calculation shall count the savings each individual action will achieve during the period from its date of implementation to ⇨ the end of each obligation period ⇦ ~~31 December 2020 or 31 December 2030 as appropriate~~. Alternatively, Member States may adopt another method that is estimated to achieve at least the same total quantity of savings. When using another method, Member States shall ensure that the total amount of energy savings calculated using that method does not exceed the amount of energy savings that would have been the result of their calculation when counting the savings each individual action will achieve during the period from its date of implementation to ~~31 December 2020 or 31 December~~ 2030 ~~as appropriate~~. Member States shall describe in detail in their integrated national energy and climate plans under Regulation (EU) 2018/1999 the other method and the provisions made to ensure that the binding calculation requirement is met.

3. Member States shall ensure that the following requirements for policy measures taken pursuant to Article 10~~87b~~ and Article 28(11)~~20(6)~~ are met:

(a) policy measures and individual actions produce verifiable end-use energy savings;

(b) the responsibility of each participating party, entrusted party or implementing public authority, as relevant, is clearly defined;

(c) the energy savings that are achieved or are to be achieved are determined in a transparent manner;

(d) the amount of energy savings required or to be achieved by the policy measure is expressed in either final or primary energy consumption, using the ⇨ net calorific values or primary energy ⇦ ~~conversion~~ factors ⌦ referred to in Article 29 ⌫ ~~set out in Annex IV~~;

(e) an annual report on the energy savings achieved by entrusted parties, participating parties and implementing public authorities be provided and made publicly available, as well as data on the annual trend of energy savings;

(f) monitoring of the results and taking appropriate measures if progress is not satisfactory;

(g) the energy savings from an individual action are not claimed by more than one party;

(h) the activities of the participating party, entrusted party or implementing public authority are shown to be material to the achievement of the energy savings claimed;~~.~~

⇩ new

(i) the activities of the participating party, entrusted party or implementing public authority have no adverse effects on vulnerable customers, people affected by energy poverty and, where applicable, people living in social housing.

🡻 2018/2002 Art. 1.16 and Annex .2
⇨ new

4. In determining the energy saving from taxation related policy measures introduced under Article 107~~b~~, the following principles shall apply:

(a) credit shall be given only for energy savings from taxation measures exceeding the minimum levels of taxation applicable to fuels as required in Council Directive 2003/96/EC[8] or 2006/112/EC[9];

(b) ⇨ short-run ⇦ price elasticities for the calculation of the impact of the (energy) taxation measures shall represent the responsiveness of energy demand to price changes, and shall be estimated on the basis of recent and representative official data sources~~;~~ ⇨ which are applicable for the Member State, and, where applicable, based on accompanying studies from an independent institute. If a different price elasticity than short-run elasticities is used, Member States shall explain how energy efficiency improvements due to the implementation of other Union legislation have been included in the baseline used to estimate the energy savings, or how a double-counting of energy savings from other Union legislation has been avoided; ⇦

---

8 Council Directive 2003/96/EC of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity (OJ L 283, 31.10.2003, p. 51).

9 Council Directive 2006/112/EC of 28 November 2006 on the common system of value added tax (OJ L 347, 11.12.2006, p. 1).

(c) the energy savings from accompanying taxation policy instruments, including fiscal incentives or payment to a fund, shall be accounted separately;~~.~~

⇩ new

(d) short-run elasticity estimates should be used to assess the energy savings from taxation measures to avoid overlap with Union law and other policy measures.

(e) Member States shall determine distributional effects of taxation and equivalent measures on vulnerable customers, people affected by energy poverty and, where applicable, people living in social housing, and show the effects of mitigation measures implemented in accordance with Article 22(1) to (3).

(f) Member States shall provide evidence, including calculation methodologies, that where there is an overlap in the impact of energy or carbon taxation measures or emission trading according the EU ETS Directive, there is no double counting of energy savings.

🡻 2018/2002 Art. 1.16 and Annex .2 (adapted)

5. Notification of methodology

Member States shall in accordance with Regulation (EU) 2018/1999 notify to the Commission their proposed detailed methodology for the operation of the energy efficiency obligation schemes and alternative measures referred to in Articles 9~~7a~~ and 10~~7b~~, and Article 28(11)~~20(6)~~. Except in the case of taxation, such notification shall include details of:

(a) the level of the energy savings required under ~~point (b) of~~ the first subparagraph of Article 8~~7~~(1) or savings expected to be achieved over the whole period from 1 January 2021 to 31 December 2030;

⇩ new

(b) how the calculated quantity of new energy savings required under the first subparagraph of Article 8(1) or energy savings expected to be achieved will be phased over the obligation period;

🡻 2018/2002 Art. 1.16 and Annex .2

(c~~b~~) the obligated, participating or entrusted parties, or implementing public authorities;

(d~~c~~) target sectors;

(e~~d~~) policy measures and individual actions, including the expected total amount of cumulative energy savings for each measure;

⇩ new

(f) information on policy measures or programmes or measures financed under an Energy Efficiency National Fund implemented as a priority among people affected by energy poverty, vulnerable customers, and, where applicable, people living in social housing;

(g) the share and the amount of energy savings to be achieved among people affected by energy poverty, vulnerable customers, and, where applicable, people living in social housing.

(h) where applicable, information about the indicators applied, the arithmetic average share and the outcome of policy measures established according to Article 8(3);

(i) where applicable, information about impacts and adverse effects of policy measures implemented pursuant to Article 8(3) on people affected by energy poverty, vulnerable customers, and, where applicable, people living in social housing.

🡻 2018/2002 Art. 1.16 and Annex .2

(j~~e~~) the duration of the obligation period for the energy efficiency obligation scheme;

⇩ new

(k) where applicable, the amount of energy savings or cost reduction targets to be achieved by obligated parties among people affected by energy poverty, vulnerable customers, and, where applicable, people living in social housing;

🡻 2018/2002 Art. 1.16 and Annex .2

(l~~f~~) the actions provided for by the policy measure;

(m~~g~~) the calculation methodology, including how additionality and materiality have been determined and which methodologies and benchmarks are used for deemed and scaled savings, and, where applicable, the net calorific values and conversion factors used

(n~~h~~) the lifetimes of measures, and how they are calculated or what they are based upon;

(o~~i~~) the approach taken to address climatic variations within the Member State;

(p~~j~~) the monitoring and verification systems for measures under Articles 9~~7a~~ and 10~~7b~~ and how their independence from the obligated, participating or entrusted parties is ensured;

(q~~k~~) in the case of taxation:

(i) the target sectors and segment of taxpayers;

(ii) the implementing public authority;

(iii) the savings expected to be achieved;

(iv) the duration of the taxation measure; and

(v) the calculation methodology, including the price elasticities used and how they have been established;.

⇩ new

(vi) how overlaps with emission trading in accordance with the EU ETS Directive have been avoided and the risk of double counting has been abolished.

↓ 2012/27/EU
⇨ new

ANNEX VI

MINIMUM CRITERIA FOR ENERGY AUDITS INCLUDING THOSE CARRIED OUT AS PART OF ENERGY MANAGEMENT SYSTEMS

The energy audits referred to in Article 11~~8~~ shall be based on the following ~~guidelines~~ ⇨ criteria ⇦:

(a) be based on up-to-date, measured, traceable operational data on energy consumption and (for electricity) load profiles;

(b) comprise a detailed review of the energy consumption profile of buildings or groups of buildings, industrial operations or installations, including transportation;

⇩ new

(c) identify energy efficiency measures to decrease energy consumption;

(d) identify the potential for cost-effective use or production of renewable energy;

↓ 2012/27/EU

(e~~c~~) build, whenever possible, on life-cycle cost analysis (LCCA) instead of Simple Payback Periods (SPP) in order to take account of long-term savings, residual values of long-term investments and discount rates;

(f~~d~~) be proportionate, and sufficiently representative to permit the drawing of a reliable picture of overall energy performance and the reliable identification of the most significant opportunities for improvement.

Energy audits shall allow detailed and validated calculations for the proposed measures so as to provide clear information on potential savings.

The data used in energy audits shall be storable for historical analysis and tracking performance.

⇩ new

MINIMUM REQUIREMENTS FOR MONITORING AND PUBLISHING THE ENERGY PERFORMANCE OF DATA CENTRES

The following minimum information shall be monitored and published as regards the energy performance of data centres referred to in Article 11(10):

(a) the name of the data centre; the name of the owner and operators of the data centre; the municipality where the data centre is based;

(b) the floor area of the data centre; the installed power; the annual incoming and outgoing data traffic; and the amount of data stored and processed within the data centre.

(c) the performance, during the last full calendar year, of the data centre in accordance with key performance indicators about, inter alia, energy consumption, power utilisation, temperature set points, waste heat utilisation, water usage and use of renewable energy.

↓ 2012/27/EU

ANNEX VII

↓ 2019/944 Art. 70.6

MINIMUM REQUIREMENTS FOR BILLING AND BILLING INFORMATION BASED ON ACTUAL CONSUMPTION OF NATURAL GAS

↓ 2012/27/EU

1. Minimum requirements for billing

1.1. Billing based on actual consumption

In order to enable final customers to regulate their own energy consumption, billing should take place on the basis of actual consumption at least once a year, and billing information should be made available at least quarterly, on request or where the consumers have opted to receive electronic billing or else twice yearly. Gas used only for cooking purposes may be exempted from this requirement.

1.2. Minimum information contained in the bill

Member States shall ensure that, where appropriate, the following information is made available to final customers in clear and understandable terms in or with their bills, contracts, transactions, and receipts at distribution stations:

(a) current actual prices and actual consumption of energy;

(b) comparisons of the final customer's current energy consumption with consumption for the same period in the previous year, preferably in graphic form;

(c) contact information for final customers' organisations, energy agencies or similar bodies, including website addresses, from which information may be obtained on available energy efficiency improvement measures, comparative end-user profiles and objective technical specifications for energy-using equipment.

In addition, wherever possible and useful, Member States shall ensure that comparisons with an average normalised or benchmarked final customer in the same user category are made available to final customers in clear and understandable terms, in, with or signposted to within, their bills, contracts, transactions, and receipts at distribution stations.

1.3. Advice on energy efficiency accompanying bills and other feedback to final customers

When sending contracts and contract changes, and in the bills customers receive or through websites addressing individual customers, energy distributors, distribution system operators and retail energy sales companies shall inform their customers in a clear and understandable manner of contact information for independent consumer advice centres, energy agencies or similar institutions, including their internet addresses, where they can obtain advice on available energy efficiency measures, benchmark profiles for their energy consumption and technical specifications of energy using appliances that can serve to reduce the consumption of these appliances.

↓ 2018/2002 Art. 1.16 and Annex .4 (adapted)

ANNEX VIII~~VIIa~~

MINIMUM REQUIREMENTS FOR BILLING AND CONSUMPTION INFORMATION FOR HEATING, COOLING AND DOMESTIC HOT WATER

1. Billing based on actual consumption or heat cost allocator readings

In order to enable final users to regulate their own energy consumption, billing shall take place on the basis of actual consumption or heat cost allocator readings at least once per year.

2. Minimum frequency of billing or consumption information

⌦ Until 31 December 2021 ⌫ ~~From 25 October 2020~~, where remotely readable meters or heat cost allocators have been installed, billing or consumption information based on actual consumption or heat cost allocator readings shall be provided to final users at least quarterly upon request or where final customers have opted to receive electronic billing, or else twice a year.

From 1 January 2022, where remotely readable meters or heat cost allocators have been installed, billing or consumption information based on actual consumption or heat cost allocator readings shall be provided to final users at least monthly. It may also be made available via the internet and be updated as frequently as allowed by the measurement devices and systems used. Heating and cooling may be exempted from that requirement outside the heating/cooling seasons.

3. Minimum information contained in the bill

Member States shall ensure that the following information is made available to final users in clear and comprehensible terms in or with their bills where those are based on actual consumption or heat cost allocator readings:

(a) current actual prices and actual consumption of energy or total heat cost and heat cost allocator readings;

(b) information about the fuel mix used and the related annual greenhouse gas emissions, including for final users supplied by district heating or district cooling, and a description of the different taxes, levies and tariffs applied. Member States may limit the scope of the requirement to provide information about greenhouse gas emissions to include only supplies from district heating systems with a total rated thermal input exceeding 20 MW;

(c) comparisons of the final users current energy consumption with consumption for the same period in the previous year, in graphic form, climate corrected for heating and cooling;

(d) contact information for final customers' organisations, energy agencies or similar bodies, including website addresses, from which information on available energy efficiency improvement measures, comparative end-user profiles and objective technical specifications for energy-using equipment may be obtained;

(e) information about related complaints procedures, ombudsman services or alternative dispute resolution mechanisms, as applicable in the Member States;

(f) comparisons with an average normalised or benchmarked final user in the same user category. In the case of electronic bills, such comparisons may instead be made available online and signposted to within the bills.

Bills that are not based on actual consumption or heat cost allocator readings shall contain a clear and comprehensible explanation of how the amount set out in the bill was calculated, and at least the information referred to in points (d) and (e).

↓ 826/2019 Art. 1(1) and Annex I (adapted)

ANNEX IX~~VIII~~

POTENTIAL FOR EFFICIENCY IN HEATING AND COOLING

The comprehensive assessment of national heating and cooling potentials referred to in Article 20~~14~~(1) shall include and be based on the following:

Part I

OVERVIEW OF HEATING AND COOLING

1. heating and cooling demand in terms of assessed useful energy[10] and quantified final energy consumption in GWh per year[11] by sectors:
   - (a) residential;
   - (b) services;
   - (c) industry;
   - (d) any other sector that individually consumes more than 5 % of total national useful heating and cooling demand;
2. identification, or in the case of point 2(a)(i), identification or estimation, of current heating and cooling supply:
   - (a) by technology, in GWh per year[12], within sectors mentioned under point 1 where possible, distinguishing between energy derived from fossil and renewable sources:
     - (i) provided on-site in residential and service sites by:
       - heat only boilers;
       - high-efficiency heat and power cogeneration;
       - heat pumps;
       - other on-site technologies and sources;
     - (ii) provided on-site in non-service and non-residential sites by:
       - heat only boilers;
       - high-efficiency heat and power cogeneration;
       - heat pumps;
       - other on-site technologies and sources;
     - (iii) provided off-site by:
       - high-efficiency heat and power cogeneration;
       - waste heat;

[10] The amount of thermal energy needed to satisfy the heating and cooling demand of end-users.
[11] The most recent data available should be used.
[12] The most recent data available should be used.

– other off-site technologies and sources;

(b) identification of installations that generate waste heat or cold and their potential heating or cooling supply, in GWh per year:

(i) thermal power generation installations that can supply or can be retrofitted to supply waste heat with a total thermal input exceeding 50 MW;

(ii) heat and power cogeneration installations using technologies referred to in Part II of Annex III~~I~~ with a total thermal input exceeding 20 MW;

(iii) waste incineration plants;

(iv) renewable energy installations with a total thermal input exceeding 20 MW other than the installations specified under point 2(b)(i) and (ii) generating heating or cooling using the energy from renewable sources;

(v) industrial installations with a total thermal input exceeding 20 MW which can provide waste heat;

(c) reported share of energy from renewable sources and from waste heat or cold in the final energy consumption of the district heating and cooling[13] sector over the past 5 years, in line with Directive (EU) 2018/2001;

3. a map covering the entire national territory identifying (while preserving commercially sensitive information):

(a) heating and cooling demand areas following from the analysis of point 1, while using consistent criteria for focusing on energy dense areas in municipalities and conurbations;

(b) existing heating and cooling supply points identified under point 2(b) and district heating transmission installations;

(c) planned heating and cooling supply points of the type described under point 2(b) and district heating transmission installations;

4. a forecast of trends in the demand for heating and cooling to maintain a perspective of the next 30 years in GWh and taking into account in particular projections for the next 10 years, the change in demand in buildings and different sectors of the industry, and the impact of policies and strategies related to the demand management, such as long-term building renovation strategies under Directive (EU) 2018/844;

Part II

OBJECTIVES, STRATEGIES AND POLICY MEASURES

5. planned contribution of the Member State to its national objectives, targets and contributions for the five dimensions of the Eenergy Uunion, as laid out in Article 3(2)(b) of Regulation (EU) 2018/1999, delivered through efficiency in heating and cooling, in particular related to points 1 to 4 of Article 4(b) and to paragraph (4)(b) of Article 15, identifying which of these elements is additional compared to integrated national energy and climate plans;

[13] The identification of 'renewable cooling' shall, after the methodology for calculating the quantity of renewable energy used for cooling and district cooling is established in accordance with Article 35 of Directive (EU) 2018/2001, be carried out in accordance with that Directive. Until then it shall be carried out according to an appropriate national methodology.

6. general overview of the existing policies and measures as described in the most recent report submitted in accordance with Articles 3, 20, 21 and 27(a) of Regulation (EU) 2018/1999;

Part III

ANALYSIS OF THE ECONOMIC POTENTIAL FOR EFFICIENCY IN HEATING AND COOLING

7. an analysis of the economic potential[14] of different technologies for heating and cooling shall be carried out for the entire national territory by using the cost-benefit analysis referred to in Article 20~~14~~(3) and shall identify alternative scenarios for more efficient and renewable heating and cooling technologies, distinguishing between energy derived from fossil and renewable sources where applicable.

   The following technologies should be considered:

   (a) industrial waste heat and cold;

   (b) waste incineration;

   (c) high efficiency cogeneration;

   (d) renewable energy sources (such as geothermal, solar thermal and biomass) other than those used for high efficiency cogeneration;

   (e) heat pumps;

   (f) reducing heat and cold losses from existing district networks;

8. this analysis of economic potential shall include the following steps and considerations:

   (a) Considerations:

      (i) the cost-benefit analysis for the purposes of Article 20~~14~~(3) shall include an economic analysis that takes into consideration socioeconomic and environmental factors[15], and a financial analysis performed to assess projects from the investors' point of view. Both economic and financial analyses shall use the net present value as criterion for the assessment;

      (ii) the baseline scenario should serve as a reference point and take into account existing policies at the time of compiling this comprehensive assessment[16], and be linked to data collected under Part I and point 6 of Part II of this Annex;

---

[14] The analysis of the economic potential should present the volume of energy (in GWh) that can be generated per year by each technology analysed. The limitations and interrelations within the energy system should also be taken into account. The analysis may make use of models based on assumptions representing the operation of common types of technologies or systems.

[15] Including the assessment referred to in Article 15, paragraph 7 of Directive (EU) 2018/2001.

[16] The cut-off date for taking into account policies for the baseline scenario is the end of the year preceding to the year by the end of which the comprehensive assessment is due. That is to say, policies enacted within a year prior to the deadline for submission of the comprehensive assessment do not need to be taken into account.

(iii) alternative scenarios to the baseline shall take into account energy efficiency and renewable energy objectives of Regulation (EU) 2018/1999. Each scenario shall present the following elements compared to the baseline scenario:

– economic potential of technologies examined using the net present value as criterion;

– greenhouse gas emission reductions;

– primary energy savings in GWh per year;

– impact on the share of renewables in the national energy mix.

Scenarios that are not feasible due to technical reasons, financial reasons or national regulation may be excluded at an early stage of the cost-benefit analysis, if justified based on careful, explicit and well-documented considerations.

The assessment and decision-making should take into account costs and energy savings from the increased flexibility in energy supply and from a more optimal operation of the electricity networks, including avoided costs and savings from reduced infrastructure investment, in the analysed scenarios.

(b) Costs and benefits

The costs and benefits referred to under point 8(a) shall include at least the following benefits and costs:

(i) Benefits:

– value of output to the consumer (heating, cooling and electricity);

– external benefits such as environmental, greenhouse gas emissions and health and safety benefits, to the extent possible;

– labour market effects, energy security and competitiveness, to the extent possible.

(ii) Costs:

– capital costs of plants and equipment;

– capital costs of the associated energy networks;

– variable and fixed operating costs;

– energy costs;

– environmental, health and safety costs, to the extent possible;

– labour market costs, energy security and competitiveness, to the extent possible.

(c) Relevant scenarios to the baseline:

All relevant scenarios to the baseline shall be considered, including the role of efficient individual heating and cooling.

(i) the cost-benefit analysis may either cover a project assessment or a group of projects for a broader local, regional or national assessment in order to establish the most cost-effective and beneficial heating or cooling

solution against a baseline for a given geographical area for the purpose of planning;

~~(ii) Member States shall designate the competent authorities responsible for carrying out the cost-benefit analyses pursuant to Article 14. They shall provide the detailed methodologies and assumptions in accordance with this Annex and establish and make public the procedures for the economic analysis.~~

(d) Boundaries and integrated approach:

(i) the geographical boundary shall cover a suitable well-defined geographical area;

(ii) the cost-benefit analyses shall take into account all relevant centralised or decentralised supply resources available within the system and geographical boundary, including technologies considered under point 7 of Part III of this Annex, and heating and cooling demand trends and characteristics.

(e) Assumptions:

(i) Member States shall provide assumptions, for the purpose of the cost-benefit analyses, on the prices of major input and output factors and the discount rate;

(ii) the discount rate used in the economic analysis to calculate net present value shall be chosen according to European or national guidelines;

(iii) Member States shall use national, European or international energy price development forecasts if appropriate in their national and/or regional/local context;

(iv) the prices used in the economic analysis shall reflect socio economic costs and benefits. External costs, such as environmental and health effects, should be included to the extent possible, i.e. when a market price exists or when it is already included in European or national regulation.

(f) Sensitivity analysis:

(i) a sensitivity analysis shall be included to assess the costs and benefits of a project or group of projects and be based on variable factors having a significant impact on the outcome of the calculations, such as different energy prices, levels of demand, discount rates and other.

Part IV

POTENTIAL NEW STRATEGIES AND POLICY MEASURES

9. overview of new legislative and non-legislative policy measures[17] to realise the economic potential identified in accordance with points 7 and 8, along with their foreseen:

(a) greenhouse gas emission reductions;

(b) primary energy savings in GWh per year;

[17] This overview shall include financing measures and programmes that may be adopted over the period of the comprehensive assessment, not prejudging a separate notification of the public support schemes for a State aid assessment.

(c) impact on the share of high-efficiency cogeneration;

(d) impact on the share of renewables in the national energy mix and in the heating and cooling sector;

(e) links to national financial programming and cost savings for the public budget and market participants;

(f) estimated public support measures, if any, with their annual budget and identification of the potential aid element.

↓ 2012/27/EU (adapted)
⇨ new

ANNEX X~~IX~~

COST-BENEFIT ANALYSIS

~~Part 2~~

Principles for the purpose of Article 24(4)~~14(5)~~ and (6~~7~~)

The cost-benefit analyses shall provide information for the purpose of the measures in Article 24~~14~~(4~~5~~) and (6~~7~~):

If an electricity-only installation or an installation without heat recovery is planned, a comparison shall be made between the planned installations or the planned refurbishment and an equivalent installation producing the same amount of electricity or process heat, but recovering the waste heat and supplying heat through high-efficiency cogeneration and/or district heating and cooling networks.

Within a given geographical boundary the assessment shall take into account the planned installation and any appropriate existing or potential heat ⇨ or cooling ⇦ demand points that could be supplied from it, taking into account rational possibilities (for example, technical feasibility and distance).

The system boundary shall be set to include the planned installation and the heat ⇨ and cooling ⇦ loads, such as building(s) and industrial process. Within this system boundary the total cost of providing heat and power shall be determined for both cases and compared.

Heat ⇨ or cooling ⇦ loads shall include existing heat ⇨ or cooling ⇦ loads, such as an industrial installation or an existing district heating ⇨ or cooling ⇦ system, and also, in urban areas, the heat ⇨ or cooling ⇦ load and costs that would exist if a group of buildings or part of a city were provided with and/or connected into a new district heating ⇨ or cooling ⇦ network.

The cost-benefit analysis shall be based on a description of the planned installation and the comparison installation(s), covering electrical and thermal capacity, as applicable, fuel type, planned usage and the number of planned operating hours annually, location and electricity and thermal demand.

⇩ new

Assessment of waste heat utilization shall take into consideration current technologies. The assessment shall take into consideration the direct use of waste heat or its upgrading to higher temperature levels, or both. In case of waste heat recovery on-site, at least the use of heat exchangers, heat pumps, and heat to power technologies shall be assessed. In case of waste heat recovery off-site, at least industrial installations, agriculture sites and district heating networks shall be assessed as potential demand points.

↓ 2012/27/EU
⇨ new

For the purpose of the comparison, the thermal energy demand and the types of heating and cooling used by the nearby heat ⇨ or cooling ⇦ demand points shall be taken into account.

The comparison shall cover infrastructure related costs for the planned and comparison installation.

Cost-benefit analyses for the purposes of Article 24(4)~~14(5)~~ shall include an economic analysis covering a financial analysis reflecting actual cash flow transactions from investing in and operating individual installations.

Projects with positive cost-benefit outcome are those where the sum of discounted benefits in the economic and financial analysis exceeds the sum of discounted costs (cost-benefit surplus).

Member States shall set guiding principles for the methodology, assumptions and time horizon for the economic analysis.

Member States may require that the companies responsible for the operation of thermal electric generation installations, industrial companies, district heating and cooling networks, or other parties influenced by the defined system boundary and geographical boundary, contribute data for use in assessing the costs and benefits of an individual installation.

ANNEX XIX

GUARANTEE OF ORIGIN FOR ELECTRICITY PRODUCED FROM HIGH-EFFICIENCY COGENERATION

(a) Member States shall take measures to ensure that:

(i) the guarantee of origin of the electricity produced from high-efficiency cogeneration:

– enable producers to demonstrate that the electricity they sell is produced from high-efficiency cogeneration and is issued to this effect in response to a request from the producer;

– is accurate, reliable and fraud-resistant;

– is issued, transferred and cancelled electronically;

(ii) the same unit of energy from high-efficiency cogeneration is taken into account only once.

(b) The guarantee of origin referred to in Article 24(10) shall contain at least the following information:

(i) the identity, location, type and capacity (thermal and electrical) of the installation where the energy was produced;

(ii) the dates and places of production;

(iii) the lower calorific value of the fuel source from which the electricity was produced;

(iv) the quantity and the use of the heat generated together with the electricity;

(v) the quantity of electricity from high-efficiency cogeneration in accordance with Annex III that the guarantee represents;

(vi) the primary energy savings calculated in accordance with Annex III based on the harmonised efficiency reference values indicated in point (f) of Annex III;

(vii) the nominal electric and thermal efficiency of the plant;

(viii) whether and to what extent the installation has benefited from investment support;

(ix) whether and to what extent the unit of energy has benefited in any other way from a national support scheme, and the type of support scheme;

(x) the date on which the installation became operational; and

(xi) the date and country of issue and a unique identification number.

The guarantee of origin shall be of the standard size of 1 MWh. It shall relate to the net electricity output measured at the station boundary and exported to the grid.

↓ 2012/27/EU

ANNEX XII~~XI~~

ENERGY EFFICIENCY CRITERIA FOR ENERGY NETWORK REGULATION AND FOR ELECTRICITY NETWORK TARIFFS

1. Network tariffs shall be cost-reflective of cost-savings in networks achieved from demand-side and demand- response measures and distributed generation, including savings from lowering the cost of delivery or of network investment and a more optimal operation of the network.

2. Network regulation and tariffs shall not prevent network operators or energy retailers making available system services for demand response measures, demand management and distributed generation on organised electricity markets, in particular:

   (a) the shifting of the load from peak to off-peak times by final customers taking into account the availability of renewable energy, energy from cogeneration and distributed generation;

   (b) energy savings from demand response of distributed consumers by energy aggregators;

   (c) demand reduction from energy efficiency measures undertaken by energy service providers, including energy service companies;

   (d) the connection and dispatch of generation sources at lower voltage levels;

   (e) the connection of generation sources from closer location to the consumption; and

   (f) the storage of energy.

   For the purposes of this provision the term ‘organised electricity markets’ shall include over-the-counter markets and electricity exchanges for trading energy, capacity, balancing and ancillary services in all timeframes, including forward, day-ahead and intra-day markets.

3. Network or retail tariffs may support dynamic pricing for demand response measures by final customers, such as:

   (a) time-of-use tariffs;

   (b) critical peak pricing;

   (c) real time pricing; and

   (d) peak time rebates.

↓ 2012/27/EU

ANNEX XIII~~XII~~

ENERGY EFFICIENCY REQUIREMENTS FOR TRANSMISSION SYSTEM OPERATORS AND DISTRIBUTION SYSTEM OPERATORS

Transmission system operators and distribution system operators shall:

↓ 2018/2002 Art. 1.16 and Annex .6

(a) set up and make public their standard rules relating to the bearing and sharing of costs of technical adaptations, such as grid connections, grid reinforcements and the introduction of new grids, improved operation of the grid and rules on the non-discriminatory implementation of the grid codes, which are necessary in order to integrate new producers feeding electricity produced from high-efficiency cogeneration into the interconnected grid;

↓ 2012/27/EU

(b) provide any new producer of electricity produced from high-efficiency cogeneration wishing to be connected to the system with the comprehensive and necessary information required, including:

(i) a comprehensive and detailed estimate of the costs associated with the connection;

(ii) a reasonable and precise timetable for receiving and processing the request for grid connection;

(iii) a reasonable indicative timetable for any proposed grid connection. The overall process to become connected to the grid should be no longer than 24 months, bearing in mind what is reasonably practicable and non-discriminatory;

(c) provide standardised and simplified procedures for the connection of distributed high-efficiency cogeneration producers to facilitate their connection to the grid.

The standard rules referred to in point (a) shall be based on objective, transparent and non-discriminatory criteria taking particular account of all the costs and benefits associated with the connection of those producers to the grid. They may provide for different types of connection.

↓ 2012/27/EU (adapted)

ANNEX XIV~~XIII~~

MINIMUM ITEMS TO BE INCLUDED IN ENERGY PERFORMANCE CONTRACTS ~~WITH THE PUBLIC SECTOR~~ OR IN THE ASSOCIATED TENDER SPECIFICATIONS

⇩ new

– Findings /recommendations of an analysis/ audit carried out before the contract has been concluded that covers energy use of the building with a view to implement energy efficiency improvement measures.

↓ 2012/27/EU

– Clear and transparent list of the efficiency measures to be implemented or the efficiency results to be obtained.

– Guaranteed savings to be achieved by implementing the measures of the contract.

– Duration and milestones of the contract, terms and period of notice.

– Clear and transparent list of the obligations of each contracting party.

– Reference date(s) to establish achieved savings.

– Clear and transparent list of steps to be performed to implement a measure or package of measures and, where relevant, associated costs.

– Obligation to fully implement the measures in the contract and documentation of all changes made during the project.

– Regulations specifying the inclusion of equivalent requirements in any subcontracting with third parties.

– Clear and transparent display of financial implications of the project and distribution of the share of both parties in the monetary savings achieved (i.e. remuneration of the service provider).

– Clear and transparent provisions on measurement and verification of the guaranteed savings achieved, quality checks and guarantees.

– Provisions clarifying the procedure to deal with changing framework conditions that affect the content and the outcome of the contract (i.e. changing energy prices, use intensity of an installation).

– Detailed information on the obligations of each of the contracting party and of the penalties for their breach.

~~ANNEX XV~~

~~CORRELATION TABLE~~

~~Directive 2004/8/EC~~	~~This Directive~~
~~Article 1~~	~~Article 1(1)~~
~~Article 2~~	~~Article 1(1)~~
~~Article 3, point (a)~~	~~Article 2, point (30)~~
~~Article 3, point (b)~~	~~Article 2, point (32)~~
~~Article 3, point (c)~~	~~Article 2, point (31)~~
~~Article 3, point (d)~~	~~Article 2, point (33)~~
~~Article 3, points (e) and (f)~~	~~—~~
~~Article 3, point (g)~~	~~Article 2, point (35)~~
~~Article 3, point (h)~~	~~—~~
~~Article 3, point (i)~~	~~Article 2, point (34)~~
~~Article 3, point (j)~~	~~—~~
~~Article 3, point (k)~~	~~Article 2, point (36)~~
~~Article 3, point (l)~~	~~Article 2, point (37)~~
~~Article 3, point (m)~~	~~Article 2, point (39)~~
~~Article 3, point (n)~~	~~Article 2, point (38)~~
~~Article 3, point (o)~~	~~—~~
~~—~~	~~Article 2, points (40), (41), (42), (43), and (44)~~
~~Article 4(1)~~	~~Annex II, point (f), first subpoint~~
~~Article 4(2)~~	~~Article 14(10), second subparagraph~~
~~Article 4(3)~~	~~—~~
~~Article 5~~	~~Article 14(10), first subparagraph and Annex X~~
~~Article 6~~	~~Article 14(1) and (3), Annex VIII and IX~~

~~Article 7(1)~~	~~Article 14(11)~~
~~Article 7(2) and (3)~~	~~—~~
~~Article 8~~	~~Article 15(5)~~
~~—~~	~~Article 15(6), (7), (8) and (9)~~
~~Article 9~~	~~—~~
~~Article 10(1) and (2)~~	~~Article 14(1) and 24(2), Annex XIV, Part 2~~
~~Article 10(3)~~	~~Article 24(6)~~
~~Article 11~~	~~Article 24(3)~~
~~—~~	~~Article 24(5)~~
~~Article 12(1) and (3)~~	~~—~~
~~Article 12(2)~~	~~Annex II, point (c)~~
~~Article 13~~	~~Article 22(2)~~
~~Article 14~~	~~—~~
~~Article 15~~	~~Article 28~~
~~Article 16~~	~~—~~
~~Article 17~~	~~Article 29~~
~~Article 18~~	~~Article 30~~
~~Annex I~~	~~Annex I, Part II~~
~~Annex II~~	~~Annex I, Part I and Part II, last subparagraph~~
~~Annex III~~	~~Annex II~~
~~Annex IV~~	~~Annex VIII~~
~~—~~	~~Annex IX~~

~~Directive 2006/32/EC~~	~~This Directive~~
~~Article 1~~	~~Article 1(1)~~
~~Article 2~~	~~Article 1(1)~~
~~Article 3, point (a)~~	~~Article 2, point (1)~~

~~Article 3, point (b)~~	~~Article 2, point (4)~~
~~Article 3, point (c)~~	~~Article 2, point (6)~~
~~Article 3, point (d)~~	~~Article 2, point (5)~~
~~—~~	~~Article 2, points (2) and (3)~~
~~Article 3, point (e)~~	~~Article 2, point (7)~~
~~Article 3, points (f), (g), (h) and (i)~~	~~—~~
~~—~~	~~Article 2, points (8) to (19)~~
~~Article 3, point (j)~~	~~Article 2, point (27)~~
~~—~~	~~Article 2, point (28)~~
~~Article 3, point (k)~~	~~—~~
~~Article 3, point (l)~~	~~Article 2, point (25)~~
~~—~~	~~Article 2, point (26)~~
~~Article 3, point (m)~~	~~—~~
~~Article 3, point (n)~~	~~Article 2, point (23)~~
~~Article 3, point (o)~~	~~Article 2, point (20)~~
~~Article 3, point (p)~~	~~Article 2, point (21)~~
~~Article 3, point (q)~~	~~Article 2, point (22)~~
~~Article 3, points (r) and (s)~~	~~—~~
~~—~~	~~Article 2, points (24), (29), (44) and (45)~~
~~—~~	~~Article 3~~
~~—~~	~~Article 4~~
~~Article 4~~	~~—~~
~~Article 5~~	~~Articles 5 and 6~~
~~Article 6(1)(a)~~	~~Article 7(8), points (a) and (b)~~
~~Article 6(1)(b)~~	~~Article 18(3)~~
~~Article 6(2)~~	~~Article 7(1), (5), (6), (7), (9), (10), (11)~~

	~~and (12)~~
—	~~Article 7(2) and (3)~~
~~Article 6(3)~~	~~Article 18(2), points (b) and (c)~~
~~Article 6(5)~~	—
~~Article 7~~	~~Article 17~~
~~Article 8~~	~~Article 16(1)~~
—	~~Article 16(2) and (3)~~
~~Article 9(1)~~	~~Article 19~~
~~Article 9(2)~~	~~Article 18(1), point (d), subpoint (i)~~
—	~~Article 18(1), points (a), (b), (c), (d), subpoint (ii), and (e)~~
~~Article 10(1)~~	~~Article 15(4)~~
~~Article 10(2)~~	~~Article 15(3)~~
—	~~Article 15(7), (8) and (9)~~
~~Article 11~~	~~Article 20~~
~~Article 12(1)~~	~~Article 8(1)~~
~~Article 12(2)~~	—
—	~~Article 8(2), (3), (4), (5), (6) and (7)~~
~~Article 12(3)~~	—
~~Article 13(1)~~	~~Article 9~~
~~Article 13(2)~~	~~Article 10 and Annex VII, point 1.1~~
~~Article 13(3)~~	~~Annex VII, points 1.2 and 1.3~~
—	~~Article 11~~
—	~~Article 12~~
—	~~Article 13~~
—	~~Article 15(1) and (2)~~
—	~~Article 18(2), points (a) and (d)~~

—	~~Article 21~~
~~Article 14(1) and (2)~~	~~Article 24(1) and (2)~~
~~Article 14(3)~~	—
~~Article 14(4) and (5)~~	~~Article 24(3)~~
—	~~Article 24(4) and (7) to (11)~~
—	~~Article 22(1)~~
~~Article 15(1)~~	~~Article 22(2)~~
~~Article 15(2), (3) and (4)~~	—
—	~~Article 23~~
—	~~Article 25~~
~~Article 16~~	~~Article 26~~
~~Article 17~~	~~Article 27~~
~~Article 18~~	~~Article 28~~
~~Article 19~~	~~Article 29~~
~~Article 20~~	~~Article 30~~
~~Annex I~~	—
~~Annex II~~	~~Annex IV~~
~~Annex III~~	—
~~Annex IV~~	—
~~Annex V~~	—
~~Annex VI~~	~~Annex III~~
—	~~Annex V~~
—	~~Annex VI~~
—	~~Annex VII~~
—	~~Annex XI~~
—	~~Annex XII~~
—	~~Annex XIII~~

—	~~Annex XIV~~
—	~~Annex XV~~

↑

ANNEX XV

Part A

Repealed Directive with list of the successive amendments thereto (referred to in Article 36)

Directive 2012/27/EU of the European Parliament and of the Council (OJ L 315, 14.11.2012, p. 1)	
Council Directive 2013/12/EU (OJ L 141, 28.5.2013, p. 28)	
Directive (EU) 2018/844 of the European Parliament and of the Council (OJ L 156, 19.6.2018, p. 75)	only Article 2
Directive (EU) 2018/2002 of the European Parliament and of the Council (OJ L 328, 21.12.2018, p. 210)	
Regulation (EU) 2018/1999 of the European Parliament and of the Council (OJ L 328, 21.12.2018, p. 1)	only Article 54
Decision (EU) 2019/504 of the European Parliament and of the Council (OJ L 85I , 27.3.2019, p. 66)	only Article 1
Commission Delegated Regulation (EU) 2019/826 (OJ L 137, 23.5.2019, p. 3)	
Directive (EU) 2019/944 of the European Parliament and of the Council (OJ L 158, 14.6.2019, p. 125)	only Article 70

Part B

Time-limits for transposition into national law
(referred to in Article 36)

Directive	Time-limit for transposition
2012/27/EU	5 June 2014
(EU) 2018/844	10 March 2020
(EU) 2018/2002	25 June 2020, with the exception of points 5 to 10 of Article 1 and points 3 and 4 of the Annex 25 October 2020 as regards points 5 to 10 of Article 1 and points 3 and 4 of the Annex
(EU) 2019/944	31 December 2019 as regards point (5)(a) of Article 70 25 October 2020 as regards point (4) of Article 70 31 December 2020 as regards points (1) to (3), (5)(b) and (6) of Article 70

ANNEX XVI

CORRELATION TABLE

Directive 2012/27/EU	This Directive
Article 1	Article 1
Article 2, introductory wording	Article 2, introductory wording
Article 2, point 1	Article 2, point 1
-	Article 2, points 2 and 3
Article 2, point 2	Article 2, point 4
Article 2, point 3	Article 2, point 5
Article 2, point 4	Article 2, point 6
Article 2, point 5	Article 2, point 7
Article 2, point 6	Article 2, point 8
Article 2, point 7	Article 2, point 9
Article 2, point 8	Article 2, point 10
Article 2, point 9	-
Article 2, point 10	Article 2, point 11
_	Article 2, points 12 and 13
Article 2, point 11	Article 2, point 14
Article 2, point 12	Article 2, point 15
Article 2, point 13	Article 2, point 16
Article 2, point 14	Article 2, point 17
Article 2, point 15	Article 2, point 18
Article 2, point 16	Article 2, point 19
Article 2, point 17	Article 2, point 20
Article 2, point 18	Article 2, point 21
Article 2, point 19	Article 2, point 22
Article 2, point 20	Article 2, point 23

Article 2, point 21	Article 2, point 24
Article 2, point 22	Article 2, point 25
Article 2, point 23	Article 2, point 26
Article 2, point 24	Article 2, point 27
Article 2, point 25	Article 2, point 28
Article 2, point 26	-
Article 2, point 27	Article 2, point 29
Article 2, point 28	Article 2, point 30
Article 2, point 29	Article 2, point 31
Article 2, point 30	Article 2, point 32
Article 2, point 31	Article 2, point 33
Article 2, point 32	Article 2, point 34
Article 2, point 33	Article 2, point 35
Article 2, point 34	Article 2, point 36
Article 2, point 35	Article 2, point 37
Article 2, point 36	Article 2, point 38
Article 2, point 37	Article 2, point 39
Article 2, point 38	Article 2, point 40
Article 2, point 39	Article 2, point 41
Article 2, point 40	-
Article 2, point 41	Article 2, point 42
Article 2, point 42	Article 2, point 43
Article 2, point 43	Article 2, point 44
-	Article 2, point 45
Article 2, points 44 and 45	Article 2, points 46 and 47
-	Article 2, points 48, 49 and 50
-	Article 3

-	Article 4(1)
Article 3(1), first subparagraph	Article 4(2), first subparagraph
Article 3(1), second subparagraph, introductory wording	Article 4(2), second subparagraph, introductory wording
Article 3(1), second subparagraph, points (a) and (b)	Article 4(2), second subparagraph, points (a) and (b)
Article 3(1), second subparagraph, point (c)	-
Article 3(1), second subparagraph, point (d)	Article 4(2), second subparagraph, point (c)
Article 3(1), third subparagraph, introductory wording	-
-	Article 4(2), second subparagraph, point (d), introductory wording
-	Article 4(2), second subparagraph, points (d)(i), (ii) and (iii)
Article 3(1), third subparagraph, point (a)	Article 4(2), second subparagraph, point (d)(iv)
-	Article 4(2), second subparagraph, point (e), introductory wording
Article 3(1), third subparagraph, point (b)	Article 4(2), second subparagraph, point (e)(i)
Article 3(1), third subparagraph, point (c)	Article 4(2), second subparagraph, point (e)(ii)
Article 3(1), third subparagraph, point (d)	Article 4(2), second subparagraph, point (e)(iii)
Article 3(1), third subparagraph, point (e)	-
Article 3(2) and (3)	-
Article 3(4)	Article 33(6)
Article 3(5) and (6)	-
-	Article 4(3)
-	Article 4(4)
-	Article 5
Article 5(1), first subparagraph	Article 6(1), first subparagraph

Article 5(1), second subparagraph	-
Article 5(1), third subparagraph	Article 6(1), second subparagraph
Article 5(1), fourth and fifth subparagraph	-
Article 5(2) and (3)	-
Article 5(4)	Article 6(2)
Article 5(5)	Article 6(3)
Article 5(6) and (7)	-
Article 6(1), first subparagraph	Article 7(1), first subparagraph
Article 6(1), second subparagraph	-
-	Article 7(1), second subparagraph
Article 6(1), third subparagraph	-
Article 6(2), (3) and (4)	Article 7(2), (3) and (4)
-	Article 7(5) and (6)
-	Article 7(7), second subparagraph
Article 7(1), introductory wording, point (a) and (b)	Article 8(1), introductory wording, point (a) and (b)
-	Article 8(1), point (c)
Article 7(1), second subparagraph	Article 8(5)
Article 7(1), third subparagraph	Article 8(1), second subparagraph
Article 7(1), fourth subparagraph	Article 8(1), third subparagraph
-	Article 8(2), (3) and (4)
Article 7(2)	Article 8(6)
Article 7(3)	Article 8(7)
Article 7(4)	Article 8(8)
Article 7(5)	Article 8(9)
Article 7(6)	Article 8(10)
Article 7(7)	-

Article 7(8)	-
Article 7(9)	-
Article 7(10)	-
Article 7(11)	-
	Article 8(11), (12) and (13)
Article 7(12)	Article 8(14)
Article 7a (1), (2) and (3)	Article 9(1), (2) and (3)
-	Article 9(4), (5) and (6)
Article 7a (4) and (5)	Article 9(7) and (8)
-	Article 9(9)
Article 7a (6) and (7)	Article 9(10) and (11)
Article 7b (1) and (2)	Article 10(1) and (2)
-	Article 10(3) and (4)
-	Article 11(1) and (2)
Article 8(1) and (2)	Article 11(3) and (4)
Article 8(3) and (4)	-
-	Article 11(5)
Article 8(5)	Article 11(6)
-	Article 11(7)
Article 8(6)	Artice 11(8)
Article 8(7)	Article 11(9)
-	Article 11(10)
Article 9	Article 12
Article 9a	Article 13
Article 9b	Article 14
Article 9c	Article 15
Article 10	Article 16

Article 10a	Article 17
Article 11	Article 18
Article 11a	Article 19
-	Article 20
-	Article 21(1)
Article 12(1)	Article 21(2)
Article 12(2), introductory wording and point (a), subpoints (i) to (v)	Article 21(2), second subparagraph, subpoints (i) to (v) Article 21(2), second subparagraph, subpoint (vi)
Article 12(2), point (b)	Article 21(2), third subparagraph
-	Article 21(2), third subparagraph, point (i)
Article 12(2), point (b), subpoints (i) and (ii)	Article 21(2), third subparagraph, points (ii) and (iii)
-	Article 21(2), third subparagraph, point (iv)
-	Article 21(4)
-	Article 21(5), third and fourth subparagraphs
-	Article 22
Article 13	Article 30
Article 14(1) and (2)	-
-	Article 23(1) and (2)
Article 14(3)	Article 23(3), first subparagraph
-	Article 23(3), second subparagraph
Article 14(4)	Article 23(4)
-	Article 23(5) and (6)
-	Article 24(1), (2) and (3)
Article 14(5), introductory wording and point (a)	Article 24(4), introductory wording and point (a)
Article 14(5), points (b), (c) and (d)	-

-	Article 24(4), points (b), (c) and (d) and second subparagraph
Article 14(5), second and third subparagraphs	Article 24(4), third and fourth subparagraphs
Article 14(6), point (a)	Article 24(5), point (a)
Article 14(6), point (b)	-
Article 14(6), point (c)	Article 24(5), point (b)
-	Article 24(5), point (c)
Article 14(6), second and third subparagraphs	Article 24(5), second and third subparagraphs
Article 14(7), (8) and (9)	Article 24(6), (7) and (8)
-	Article 24(9)
Article 14(10) and (11)	Article 24(10) and (11)
Article 15(1), first subparagraph	Article 25(1)
Article 15(1), second and third subparagraphs	-
-	Article 25(2), (3) and (4)
Article 15(1), fourth subparagraph	Article 25(5)
Article 15(2) and (2a)	-
Article 15(3), (4) and (5), first subparagraph	Article 25(6), (7) and (8)
Article 15(5), second suparagraph	-
Article 15(6), first subparagraph	-
Article 15(6), second subparagraph	Article 25(9)
Article 15(7)	Article 25(10)
Article 15(9), first subparagraph	Article 25(11)
Article 15(9), second subparagraph	-
Article 16(1) and (2)	-
-	Article 26(1) and (2)
Article 16(3)	Article 26(3)
-	Article 26(4)

Article 17(1), first subparagraph	-
Article 17(1), second subparagraph	Article 28(3)
Article 17(2)	Article 21(3)
Article 17(3)	-
Article 17(4)	-
Article 17(5)	Article 21(6)
Article 18(1), introductory wording	Article 27(1), introductory wording
Article 18(1), point (a), subpoints (i) and (ii)	Article 27(1), points (a) and (b)
-	Article 27(1), points (c) and (d)
Article 18(1), point (b)	Article 27(2)
Article 18(1), point (c)	Article 27(3)
-	Article 27(4)
Article 18(1), point (d), subpoints (i) and (ii)	Article 27(5), points (a) and (b)
-	Article 27(5), point (c)
Article 18(2), points (a) and (b)	Article 27(6), points (a) and (b)
Article 18(2), point (c) and (d)	-
-	Article 27(6), point (c)
-	Article 27(7)
Article 18(3)	Article 27(8)
Article 19(1), point (a)	Article 21(5), first subparagraph
Article 19(1), point (b)	Article 7(7), first subparagraph
Article 19(1), second subparagraph	Article 21(5), second subparagraph
Article 19(2)	-
Article 20(1) and (2)	Article 28(1) and (2)
-	Article 28(3)
Article 20(3), (3a), (3b) and (3c)	Article 28(4), (5), (6) and (7)
Article 20(3d)	Article 28(8), first subparagraph

-	Article 28(8), second subparagraph
Article 20(4), (5), (6) and (7)	Article 28(9), (10), (11) and (12)
Article 21	Article 29(1)
-	Article 29(2), (3), (4), (5), (6) and (7)
Article 22(1) and (2)	Article 31(1) and (2)
-	Article 31(3)
Article 23	Article 32
Article 24(4a), (5) and (6)	Article 33(1), (2) and (3)
Article 24(7), (8), (9), (10), (12)	-
Article 24(13) and (14)	Article 33(4) and (5)
Article 24(15), introductory wording	Article 33(7), introductory wording
Article 24(15), point (a)	-
Article 24(15), point (b)	Article 33(7), point (a)
	Article 33(7), point (b), (c), (d), (e) and (f)
Article 24(15), second subparagraph	Article 33(7), second subparagraph
Article 25	-
Article 26	Article 34
Article 27, first subparagraph	Article 36, first subparagraph
Article 27, second subparagraph	-
Article 27, third subparagraph	Article 36, second subparagraph
Article 27(2) and (3)	-
Article 28(1), first subparagraph	Article 35(1), first subparagraph
Article 28(1), second subparagraph	-
Article 28(1), third and fourth subparagraphs	Article 35(1), second and third subparagraphs
Article 28(2)	Article 35(2)
Article 29	Article 37
Article 30	Article 38

-	Annex I
Annex I	Annex II
Annex II	Annex III
Annex III	Annex IV
Annex IV	-
Annex V	Annex V
Annex VI	Annex VI
Annex VII	Annex VII
Annex VIIa	Annex VIII
Annex VIII	Annex IX
Annex IX	Annex X
Annex X	Annex XI
Annex XI	Annex XII
Annex XII	Annex XIII
Annex XIII	Annex XIV
Annex XV	-
-	Annex XV
-	Annex XVI

EUROPEAN
COMMISSION

Brussels, 14.7.2021
SWD(2021) 627 final

COMMISSION STAFF WORKING DOCUMENT

Subsidiarity Grid

Accompanying the

Proposal for a Directive of the European Parliament and of the Council

on energy efficiency (recast)

{COM(2021) 558 final} - {SEC(2021) 558 final} - {SWD(2021) 623 final} - {SWD(2021) 624 final} - {SWD(2021) 625 final} - {SWD(2021) 626 final}

Subsidiarity Grid

1. Can the Union act? What is the legal basis and competence of the Unions' intended action?
1.1 Which article(s) of the Treaty are used to support the legislative proposal or policy initiative?
Article 194(2) of the Treaty on the Functioning of the European Union (TFEU), which provides the legal basis for proposing measures on energy and in particular to promote energy efficiency and energy saving, one of the goals of the Union's energy policy, set out in Article 194(1)(c) TFEU. Directive 2012/27/EU (EED), now subject to recast, was also adopted under Article 194(2) TFEU in 2012.
1.2 Is the Union competence represented by this Treaty article exclusive, shared or supporting in nature?
In the case of energy policy, the Union's competence is shared.
*Subsidiarity does not apply for policy areas where the Union has **exclusive** competence as defined in Article 3 TFEU[1]. It is the specific legal basis which determines whether the proposal falls under the subsidiarity control mechanism. Article 4 TFEU[2] sets out the areas where competence is shared between the Union and the Member States. Article 6 TFEU[3] sets out the areas for which the Unions has competence only to support the actions of the Member States.*
2. Subsidiarity Principle: Why should the EU act?
2.1 Does the proposal fulfil the procedural requirements of Protocol No. 2[4]: - Has there been a wide consultation before proposing the act? - Is there a detailed statement with qualitative and, where possible, quantitative indicators allowing an appraisal of whether the action can best be achieved at Union level?
The evaluation roadmap/ inception impact assessment was published on 3 August 2020 and was available until 21 September 2020. The Commission received 189 replies, and 99 stakeholders submitted supplementary statements and information to their replies. The largest number of replies were received from business associations, followed by companies and NGOs. In addition, nine dedicated stakeholder meetings were organised in the period from September to October 2020 with targeted stakeholder groups on specific topics, and a dedicated Energy Efficiency Directive expert group meeting was held on 10 November 2020. The Commission also launched the internet based public consultation from 17 November 2020 until 9 February 2021, in line with the Commission Better Regulation rules. The survey contained multiple choice and open questions covering a wide range of aspects concerning the ex-post evaluation and options for the revision of the Energy Efficiency Directive. In total 344 replies were received from wide range of stakeholder groups. The largest group of respondents covered was business associations (132 replies), individual businesses and companies (92 replies), followed by NGOs (34 submissions).

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:12008E003&from=EN
[2] https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:12008E004&from=EN
[3] https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:12008E006:EN:HTML
[4] https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:12016E/PRO/02&from=EN

The explanatory memorandum and the impact assessment both contain a section on the principle of subsidiarity and address this issue in the context of the policy analysed, where appropriate.

2.2 Does the explanatory memorandum (and any impact assessment) accompanying the Commission's proposal contain an adequate justification regarding the conformity with the principle of subsidiarity?

The proposal builds on the growing importance of energy efficiency as a political and economic challenge and its close interrelation to the policy areas of security of energy supply, climate change, internal market and economic and social development.

<u>The need for EU action</u>
The underlying problems causing a shortfall in energy savings (compared to the optimal level from the perspective of society) are the same across the EU and cannot be sufficiently achieved by Member States alone. EU level action is needed to ensure that Member States contribute to the EU level binding energy efficiency target and that it is collectively and cost-effectively reached – while taking into account Member States national circumstances and context.
Moreover, in view of the external costs of energy consumption (e.g. greenhouse gas emissions, air pollutant emissions, energy security), actions to increase energy efficiency and reduce energy use are likely to lead to benefits beyond national borders. For trans-boundary problems, Member State action is unlikely to lead to optimal outcomes. In the presence of a higher climate target for 2030, which requires a higher energy efficiency target, EU action must supplement and reinforce national and local action.

In addition, the nature of the instrument and the fact that the energy efficiency targets are not binding at national level respects the principle of subsidiarity. Member States retain the same level of flexibility in terms of selecting their policy mix, sectors and the approach to achieve the required energy savings by 2030, by taking into account the national context and specificities.

Energy is a policy field with high investment needs. A coordinated approach at EU level can create trust, reliability and continuity, increasing the likelihood of different actors investing and getting involved. Policies at EU level can also create a just and fair transition for countries and regions with economies that may be significantly impacted by changes in industrial structure or employment as a result of the energy transition towards decarbonisation. Coordinated action at EU level, furthermore, enables taking better account of the different capabilities to act among Member States.

<u>EU added value</u>
Energy efficiency policies are a crucial mechanism to reduce greenhouse gas emissions and other environmental issues like air pollution. The EU's energy and climate targets for 2030 are collective targets. In this regard, coordinated EU policies have a better chance of transforming Europe to a climate neutral continent by 2050. A common approach is the most effective way to ensure the fulfilment of international commitments.
Concrete actions to reduce energy consumption need to be carried out at Member States' level. Nevertheless, an effective framework for those actions is needed at EU level. A coordinated and harmonised approach at the EU level will enable and enhance Member States´ actions, and ensure the four freedoms. A common EU approach will help, for example, to create larger markets for European suppliers, workers and goods, and ensure that the same obligations and rules apply. This will protect and boost competition. A common approach at EU level will allow consumers to enjoy the same basic rights and to receive comparable and recognisable information across the EU. A common EU approach to energy efficiency will enable addressing specific common challenges such as

the need to alleviate energy poverty.

The experience from the implementation of the Energy Efficiency Directive has shown that a common EU framework is socially just, reduces costs, increases benefits from the internal market and allows national policy-makers to learn from each other. The Energy Efficiency Directive effectively complements and catalyses other national and EU measures. Policies adopted at EU level reflect the close interrelation of the policy areas of climate change, security of supply, sustainability, environment, the internal market, social and economic development. Effects on the single market concerning growth, investments and jobs creation can thus be considered when policies and measures are being decided and implemented. This was supported by the Task Force of mobilising Member States efforts to reach 2020 energy efficiency targets, which called for a strong, targeted and common energy efficiency policy framework to attract the necessary investments, ensure the energy savings are achieved in a just and fair way.

Moreover, the EU single market acts as a strong driver for cost-efficiency in achieving GHG emission reductions. A common EU action will ensure that the objectives of the policy are achieved collectively at the lowest possible cost. Therefore, to reach the overall targets collectively, the coordinated action at EU level can enable and enhance efforts at national level by ensuring a more harmonised approach, helping to create markets of scale for European suppliers, and ensuring that they are under the same obligations and rules. An EU-level framework will also provide more investor certainty. It will provide a general impetus across the whole single market to invest in more energy efficient products of all types. The definition of EU and national objectives gives a clear indication on how much efforts are expected in energy efficiency, and it helps defining the size of the market for energy efficient products and services. This will send a signal to suppliers and manufacturers to put more effort into product development in this regard.

Delivering on energy efficiency while empowering consumers requires meaningful, accurate and understandable information on energy use, related costs, and easy access to a competitive market of building construction materials (windows, insulation, etc.), heating and cooling solutions, and other products that help improve energy efficiency. Sector-specific measures, for example aimed at the heating and cooling sector, to ensure appropriate attention to sectors, where the largest reduction of GHG emissions need to be achieved. Harmonised planning ensures comparable quality of the national policies and measures. It also ensures availability of structured information on the sectoral objectives and plans in Member States, thus helping Member States and market participants to plan their activities. In the case of heating and cooling it helps ensuring a sufficient market with common standards for the suppliers of high efficiency equipment for district heating and cogeneration to lower costs and to motivate them to innovate and improve their offer.

By acting at EU level, several barriers to public and private investments can be tackled, addressing the lack of coordination between various authorising bodies at national level and stimulating the administrative capacity to implement cross-border projects and support schemes.

The Energy Efficiency Directive essentially sets the overall energy efficiency objective but leaves the majority of actions to be taken to achieve this objective to the Member States.

- The application of the `Energy Efficiency First´ principle leaves flexibility to the Member States.
- -The Energy Efficiency Directive sets binding energy efficiency targets at EU level, but will not establish binding targets at national level for 2030. Member States should establish their contribution to the collective achievement of the Union's energy efficiency target taking into account the formula provided in the Energy Efficiency Directive.
- The Directive requires that Member States achieve an increased annual energy savings

obligation in end use sectors while leaving freedom to Member States how this obligation should be achieved either via an energy efficiency obligation scheme or alternative policy measures, or a combination of both. Since the energy savings obligation is an effective measure to improve energy efficiency in various sectors, it is also an effective tool to support Member States in the alleviation of energy poverty. Thus, the energy savings obligation will require Member States to achieve an individually calculated share of the total amount of energy savings required towards vulnerable consumers, people affected by energy poverty and, where applicable, people living in social housing. A harmonised approach will contribute to a just energy transition for all European citizens. The energy savings obligation retains full flexibility for Member States with regard to the types of policy measures, their size, scope and content.

- The Energy Efficiency Directive will continue providing an annual rate of renovation required related to the floor area of buildings. The scope of this obligation is extended to buildings owned or occupied by all public bodies on the territory of a Member State. This measure shall ensure that Member States continue to lead by example through upgrading the energy performance of buildings, while retaining the flexibility regarding the choice of measures.
- [An obligation to achieve an annual reduction of the energy consumption in the public sector will ensure that the public sector fulfils its exemplary role, whereas Member States retain full flexibility regarding the choice of energy efficiency improvement measures to achieve the required reduction of the final energy consumption.]

-

- Furthermore, the Energy Efficiency Directive will provide the necessary framework to ensure high energy efficiency performance of products, services and buildings purchased by public bodies, and to consider, where appropriate, wider sustainability, social, environmental and circular economy aspects. A harmonised approach, including considering energy efficiency aspects in tendering processes, will preserve competition, ensure long-term and cost-effective energy savings and allow for continuing markets of scale.

-

- The Energy Efficiency Directive will ensure the same level of basic contractual rights for all European citizens regarding heating, cooling and domestic hot water. Whereas the Energy Efficiency Directive will require the implementation of certain basic contractual rights of customers, the national competences would not be restricted. One level playing field across the EU is also required with regard to consumer information and awareness raising activities. Member States are required to take appropriate measures, whereas the concrete design of such actions remain at their discretion. The EU-wide impacts of economic and health crisis show that a harmonised approach is also required to empower and protect vulnerable consumers and those affected by energy poverty. To ensure the same level of protection and empowerment, the Energy Efficiency Directive requires to implement and finance energy efficiency improvement measures as a priority among those people, which will also support Member States in mitigating distributional effects. Network of experts will facilitate Member States´ actions in this regard and should be established in all Member States.
- While requiring mandatory energy audits for large enterprises, as energy savings can be significant, Member States will retain flexibility to develop programmes to encourage SMEs to undergo energy audits.
- -Regarding the heating and cooling sector, Member States retain their competences to carry out a comprehensive assessment of the potential for high-efficiency cogeneration and efficient district heating and cooling, and may grant exemptions in the area of waste heat recovery through high-efficiency cogeneration or by supplying a district heating or cooling network. The Energy Efficiency Directive will allow Member States to introduce

measures and procedures to promote high efficiency cogeneration installations.

- To contribute to the creation of a single market, all Member States, National Regulatory Authorities, transmission and distribution system operators should apply the `Energy Efficiency First´ principle and remove all regulatory, technical and non-regulatory measures for energy efficiency improvements in the operation of energy networks.
- The development of a market for energy services to ensure the availability of both the demand for and the supply of energy services would remain subject to Member States´ discretion.
- The Energy Efficiency Directive would retain the flexibility for Member States to take action in identifying and addressing regulatory and non-regulatory barriers for energy efficiency improvements.
- Member States and regions would be encouraged to make full use of the Structural and Investments Funds and other financing facilities to trigger investments in energy efficiency improvement measures, to alleviate energy poverty, and to mitigate any distributional effects on vulnerable consumers, households affected by energy poverty, and those living in social housing.

The proposal therefore complies with the subsidiarity principle.

2.3 Based on the answers to the questions below, can the objectives of the proposed action be achieved sufficiently by the Member States acting alone (necessity for EU action)?

(a) Are there significant/appreciable transnational/cross-border aspects to the problems being tackled? Have these been quantified?

The Energy Efficiency Directive sets binding energy efficiency targets at EU level, but will not establish binding targets at national level for 2030. Member States should establish their contribution to the collective achievement of the Union's energy efficiency target taking into account the formula provided in the Energy Efficiency Directive.
These aspects have been considered in detail in the impact assessment and the impacts have been quantified to the extent possible.

(b) Would national action or the absence of the EU level action conflict with core objectives of the Treaty[5] or significantly damage the interests of other Member States?

In accordance with Article 194(1) TFEU, one of the aims of Union energy policy shall be to promote energy efficiency and energy savings. If no action were taken at EU level this aim would be jeopardised.

In its Conclusions of 10 and 11 December 2020, the European Council endorsed a binding EU target of a net domestic reduction of at least 55% in greenhouse gas emissions by 2030 compared to 1990. Energy efficiency is a key area of action, without which the full decarbonisation of the EU economy cannot be achieved (see Communication: A Clean Planet for all – A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy (COM/2018/773 final), where the role of energy efficiency as a condition sine qua non for all decarbonisation scenarios is assessed).

(c) To what extent do Member States have the ability or possibility to enact appropriate measures?

[5] https://europa.eu/european-union/about-eu/eu-in-brief_en

Member States have shown, in their transposition and implementation of the Energy Efficiency Directive, that they can enact appropriate measures to reach the goals of the Directive. The measures included in the proposal leave adequate margin for Member States' specific circumstances to be taken into account, and flexibility is retained to give Member States a sufficient range of possibilities.
(d) How does the problem and its causes (e.g. negative externalities, spill-over effects) vary across the national, regional and local levels of the EU?
The underlying problems causing a shortfall in energy savings (compared to the optimal level from the perspective of society) are the same across the EU. Furthermore, the need to reduce greenhouse gas emissions and other environmental issues like air pollution, for which energy efficiency policies are a crucial mechanism, are global issues.
(e) Is the problem widespread across the EU or limited to a few Member States?
The problems addressed by this initiative are widespread across the EU.
(f) Are Member States overstretched in achieving the objectives of the planned measure?
No, the qualitative and quantitative analysis of the impacts of the planned policies on the Member States, in particular the economic and social impacts, do not point to the conclusion that the Member States are overstretched (section 6 of the Impact Assessment).
(g) How do the views/preferred courses of action of national, regional and local authorities differ across the EU?
Member States will have sufficient room of manoeuvre in the implementation of the Directive considering also the specific climate conditions, social and economic structures at national, regional or local level.
2.4 Based on the answer to the questions below, can the objectives of the proposed action be better achieved at Union level by reason of scale or effects of that action (EU added value)?
(a) Are there clear benefits from EU level action?
Yes, it sets a clear and common framework for the Member States and increases the chances of reaching the Union's climate ambition in effective manner together with the other initiatives proposed under the Fit for 55 package.
(b) Are there economies of scale? Can the objectives be met more efficiently at EU level (larger benefits per unit cost)? Will the functioning of the internal market be improved?
The coordinated action of the EU and the Member States allows for cost-efficient achievement of the agreed targets, economies of scale for suppliers, workers and goods, as well as better functioning of the internal energy market by contributing to the removal of regulatory, technical and non-regulatory measures for energy efficiency improvements in the operation of energy networks; and to the better functioning of energy services markets.
(c) What are the benefits in replacing different national policies and rules with a more homogenous policy approach?
Energy efficiency policies are a crucial mechanism to reduce greenhouse gas emissions and other environmental issues like air pollution. The EU's energy and climate targets for 2030 are collective

targets. In this regard, coordinated EU policies have a better chance of transforming the EU to a climate neutral continent by 2050. A common approach is the most effective way to ensure the fulfilment of international commitments.
Concrete actions to reduce energy consumption need to be carried out at Member States' level. Nevertheless, an effective framework for those actions is needed at EU level. A coordinated and harmonised approach at the EU level will enable and enhance Member States´ actions, and ensure the four freedoms. A common EU approach will help, for example, to create larger markets for European suppliers, workers and goods, and ensure that the same obligations and rules apply. This will protect and boost competition. A common approach at EU level will allow consumers to enjoy the same basic rights and to receive comparable and recognisable information across the EU. A common EU approach to energy efficiency will enable addressing specific common challenges such as the need to alleviate energy poverty. An EU-level framework will also provide more investor certainty.

(d) Do the benefits of EU-level action outweigh the loss of competence of the Member States and the local and regional authorities (beyond the costs and benefits of acting at national, regional and local levels)?

Yes, as presented in the Impact Assessment accompanying the initiative (section 3 and for each measure in section 6.3).

(e) Will there be improved legal clarity for those having to implement the legislation?

The proposal for a recast of the Directive combines a codification and an amendment of the Energy Efficiency Directive, which has been also amended previously in 2018. The recasting technique contributes to simplifying Union legislation by allowing the adoption of a single legislative text which simultaneously makes the desired amendment, codifies that amendment and previous ones the unchanged provisions of the earlier act, and repeals that act and previous amending acts. The purpose is thus simplifying and clarifying the law of the Union so as to make it clearer and more accessible to businesses and citizens, thus giving them new opportunities and the chance to make use of the specific rights it gives them.

[the amended requirements on energy audits give better clarity to enterprises as those requirements would apply on basis of energy consumption rather the size of an enterprise (in line with SME definition (previously)), which created a lot complexity in terms of identifying large enterprises subject to the energy audit requirement.

3. Proportionality: How the EU should act

3.1 Does the explanatory memorandum (and any impact assessment) accompanying the Commission's proposal contain an adequate justification regarding the proportionality of the proposal and a statement allowing appraisal of the compliance of the proposal with the principle of proportionality?

Based on the accompanying Impact Assessment and in accordance with the principle of proportionality, overall the proposed modifications do not go beyond what is necessary to achieve the objectives to reach the higher energy efficiency ambition in view of the increased climate target for 2030.
As regards the energy efficiency targets, the amendments are proportional to the required EU ambition in line with the increased climate target of at least 55% GHG emissions reduction as proposed by the Climate Target Plan. Several amendments set specific targets and obligations for public administrations to achieve energy savings in certain areas – public sector and energy poverty,

which will be overall proportionate. Regarding the [energy savings obligation for the] public sector, public bodies are defined in the Public Procurement Directive 2014/24/EU (contracting authorities). [Member States would need to establish a database with public bodies, including their annual energy consumption. The proposed energy consumption reduction obligation leaves significant flexibility to Member States as to where and how energy savings could be achieved. Given the cost-benefits that would accrue from implementing savings measures, this effort is considered effective and not excessive.]
The Proposal also considers the Energy Efficiency Directive´s aim to address distributional impacts from a possible extension of the ETS. Setting definitions and obligations notably in relation to heating and cooling would be proportionate to the additional energy savings and synergies with the other instruments that could be achieved in this sector. Proportionality of additional monitoring and reporting requirements depend on the balance between increased cost and savings achieved due to a better understanding of the impacts of relevant measures.
The level of constraint imposed is thus proportionate to the objective.

3.2 Based on the answers to the questions below and information available from any impact assessment, the explanatory memorandum or other sources, is the proposed action an appropriate way to achieve the intended objectives?

(a) Is the initiative limited to those aspects that Member States cannot achieve satisfactorily on their own, and where the Union can do better?

Yes. The problem to be tackled is not limited to individual Member States but is Union-wide. Strengthening the efforts to achieve higher Union's energy efficiency targets, to ultimately achieve climate neutrality, cannot be achieved by action at national level alone. The measures proposed are a mix of Union level measures and action at Member State level which is considered proportionate and cost-effective. The individual situations of Member States have been taken into account to the extent possible. The costs are commensurate with the objectives.

(b) Is the form of Union action (choice of instrument) justified, as simple as possible, and coherent with the satisfactory achievement of, and ensuring compliance with the objectives pursued (e.g. choice between regulation, (framework) directive, recommendation, or alternative regulatory methods such as co-legislation, etc.)?

The instrument chosen is a Directive that has to be implemented by the Member States. A Directive is the appropriate instrument and it is consistent with the objectives pursued, as it clearly defines the EU objectives to be reached, while leaving sufficient flexibility to Member States to implement it in the way that suits their particular national circumstances.

The proposal for a recast of the Directive combines a codification and an amendment of the Energy Efficiency Directive, which has been amended previously in 2018. The recasting technique contributes to simplifying Union legislation by allowing the adoption of a single legislative text which simultaneously makes the desired amendment, codifies that amendment and previous ones the unchanged provisions of the earlier act, and repeals that act and previous amending acts. The purpose is thus simplifying and clarifying the law of the Union so as to make it clearer and more accessible to citizens, thus giving them new opportunities and the chance to make use of the specific rights it gives them.

(c) Does the Union action leave as much scope for national decision as possible while achieving satisfactorily the objectives set? (e.g. is it possible to limit the European action to minimum standards or use a less stringent policy instrument og approach?)

Although Member States are left as much freedom as possible, some measures are enhanced, given the critical importance of reducing energy consumption in order to reduce GHG emissions and tackle the climate change emergency,.
(d) Does the initiative create financial or administrative cost for the Union, national governments, regional or local authorities, economic operators or citizens? Are these costs commensurate with the objective to be achieved?
The impacts related to the costs of the initiative have been analysed where appropriate and possible (section 6 of the Impact Assessment). More detail is provided in Annex D and a summary of the costs and benefits is shown in Annex C (section xx The analysis shows that the costs are commensurate with the objectives.
(e) While respecting the Union law, have special circumstances applying in individual Member States been taken into account?
As indicated above, the proposal takes into account the Member States' national circumstances. This is in particular evident in relation to national indicative contributions to achieve the EU energy efficiency target. Member States will be able to set their national contributions on basis of formula considering objective criteria relevant to ensure fairness and balances approach in terms of efforts to achieve the EU target collectively across the Union.

EUROPEAN
COMMISSION

Brussels, 14.7.2021
SWD(2021) 625 final

COMMISSION STAFF WORKING DOCUMENT

EVALUATION

EVALUATION OF DIRECTIVE 2012/27/EU ON ENERGY EFFICIENCY

Accompanying the

Proposal for a Directive of the European Parliament and of the Council

on energy efficiency (recast)

{COM(2021) 558 final} - {SEC(2021) 558 final} - {SWD(2021) 623 final} - {SWD(2021) 624 final} - {SWD(2021) 626 final} - {SWD(2021) 627 final}

Table of contents

Glossary

Term or acronym	*Meaning or definition*
AR	Energy Efficiency Annual Reports under the EED
CA EED	Concerted Action of the Energy Efficiency Directive
CBA	Cost-benefit analysis
CHAP	Central registry for complaints and enquiries
CHP	Combined heat and power generation, or cogeneration
Commission	European Commission, unless specified otherwise
CTP	Climate Target Plan
Directive	Energy Efficiency Directive, unless specified otherwise
EE	Energy efficiency
EED	Energy Efficiency Directive (2012/27/EU)
EPBD	Energy Performance of Buildings Directive (2010/31/EU)
EEOS	Energy efficiency Obligation Schemes
EnPC	Energy performance contracting
ESCO	Energy services company
ESR	Effort Sharing Regulation
ESIF	European Structural and Investment Funds
ETS	Emissions Trading System
EU PDA	EU Project Development Assistance
FEC	Final energy consumption
GHG	Greenhouse gas
GPP	Green public procurement
HVAC	Heating, ventilation and air conditioning
H2020	Horizon 2020
IEM	Internal Energy Market legislation

ICT	Information and Communication Technologies
IRR	Internal Rate of Return
ktoe	kilotonnes of oil equivalent
MS	Member State(s)
Mtoe	Million tonnes of oil equivalent
M&V	Monitoring and verification
NAV	Net Present Value
NECP	National Energy and Climate Plan
NEEAP	National Energy Efficiency Action Plan
NZEB	Nearly Zero Energy Building
OPC	Open public consultation
PEC	Primary energy consumption
RES	Renewable Energy
REDII	Renewable Energy Directive (2018/2001/EU)
SME	Small- and medium-sized enterprise
SWD	Staff Working Document
TCO	Total Costs of Ownership

1. INTRODUCTION

Efficient use of energy is key to achieve the European Green Deal[1] objectives. It allows cost-effective delivery of the EU's current and future climate and clean energy ambitions and contributes to other EU policy objectives. Energy Efficiency First[2] is a guiding principle of EU energy policy, and is highlighted in the European Green Deal as a key means to decarbonise the energy system by 2050. The EU has set headline targets to increase energy efficiency by 20% for 2020 and by at least 32.5% for 2030. These targets are embedded in the Energy Efficiency Directive (EED)[3].

The European Union has set the goal to decarbonise its economy by 2050. To this end, , the Commission has proposed in the Communication on the European Green Deal to increase the EU greenhouse gas emissions target to at least 50% and towards 55% in a responsible way by 2030. In this context, the Commission also announced that it would present an impact-assessed plan to increase the EU's greenhouse gas emission reductions target for 2030 and committed to "review and propose to revise, where necessary, the relevant energy legislation by June 2021", including Directive 2012/27/EU on energy efficiency (EED)[4].

The Commission adopted the Climate Target Plan Communication on 17 September 2020[5], putting forward an emissions reduction target of at least 55% by 2030 as a balanced, realistic, and prudent pathway to climate neutrality by 2050. The Plan also highlights that, to achieve the 55% level of greenhouse gas emission reductions, there is a need to significantly step up energy efficiency efforts (to 36-37% for final and 39-41% for primary energy consumption) by 2030, from the current EU headline target of at least 32.5%. In this context, the Commission confirmed the need to revise the relevant climate and energy legislation, including the EED.

In addition, on 17 September 2020, the Commission also published its assessment of the final National Energy and Climate Plans (NECPs) of the Member States. The assessment shows that Member States' national contributions in these Plans do not add up to the existing 2030 headline EU energy efficiency target of 32.5%[6]. The gap is equal to 2.8

1 COM(2019) 640 final

2 Definition provided in Article 18(2) of the Regulation, EU(2018)1999 on the Governance of the Energy Union and Climate Action

3 Directive 2012/27/EU

4 Annex to the Green Deal Communication, page 2

5 COM(2020) 562 final

6 COM/2020/564 final

percentage points for primary energy consumption and 3.1 percentage points for final energy consumption.

In case the Member States' contributions do not reach the required ambition level of 32.5%, the Commission may propose additional EU-wide measures in line with the Governance Regulation[7].

Therefore, because of the Green Deal and the Climate Target Plan and the recognised role energy efficiency needs to have to achieve the 2050 decarbonisation objective, the process to review and revise the EED formally started in August 2020.

This evaluation report concludes the review process of the EED. The report serves as input for the impact assessment of the EED revision. Chapter 1 introduces the EED and describes the purpose and the scope of the evaluation. Chapter 2 outlines the background of the policy intervention that the EED represents. It sets out the baseline of the EED and describes what would happen without the EED in place. Chapter 3 provides a short overview of the current situation, including the status of the transpositions by Member States and infringement procedures. Subsequently, Chapter 4 describes the method used for this evaluation and gives a brief overview of the stakeholder consultations. In Chapter 5, the actual evaluation takes place, based on the evaluation criteria of the better regulation guidelines. Chapter 6 summarises the concluding findings of this evaluation report.

1.1. Purpose and scope of the evaluation

The EED was adopted in 2012 to promote energy efficiency across the EU, and remove barriers and overcoming market failures that impede efficiency in energy supply and use in different sectors with a view to achieve the EU headline energy efficiency targets for 2020 and 2030. It was subject to a first, limited revision in 2018 as part of the Clean Energy for all Europeans package, which added the EU target for 2030, modified a few provisions and also included a requirement for a further review of the Directive every five years, and a possible upwards revision of that target.

This evaluation covers the full scope of the EED, except for those elements already revised as part of the Clean Energy for all Europeans package[8]. It assesses the implementation of the EED in all 28 Member States since its entry into force in 2012[9].

This evaluation will consider whether the framework of the EED is fit to achieve its objectives of reaching the headline EU energy efficiency targets for 2020 and 2030 especially in the context of the higher climate target for 2030. In addition, the evaluation

[7] Regulation (EU) 2018/1999

8 Amending Directive EU/2018/2002

9 Article 24(15) of the amending Directive EU/2018/2002 requires to carry out a general evaluation by 28 February 2024

will examine whether the EED is fit to overcome remaining regulatory and non-regulatory barriers, and market failures, preventing energy efficiency to be fully part of the energy system. It will also assess whether there are shortcomings, gaps and weaknesses for the existing measures to deliver on their expected results.

More specifically, as part of the general evaluation of the EED, the Commission has also assessed the following aspects (as required by Article 24(15)):

> (a) "Whether to adapt, after 2020, the requirements to renovate 3% of central government buildings to minimum standards and the alternative approach laid down in Article 5[10];
>
> (b) The need to adjust further the Union's energy efficiency policy in accordance with the objectives of the 2015 Paris Agreement on climate change following the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change and in the light of economic and innovation developments"[11].

In addition, for example, this evaluation will assess the effectiveness of the implementation of the definition of small and medium-sized enterprises for the purposes of Article 8(4)[12], and the provisions related to metering, billing and consumer information for natural gas, with the aim of aligning them, where appropriate, with the relevant provisions for electricity in Gas Directive 2009/73/EC[13].

The evaluation of the EED will provide the basis for what needs to be streamlined and strengthened in order to a) address the remaining ambition gap to the existing 2030 target of 32,5% given that the national contributions in the final NECPs submitted by Member States do not add up to achieve[14], and b) deliver on the potential contribution of energy efficiency to a higher greenhouse emissions reduction target for 2030 [footnote to a communication].

Overall, the evaluation aims to assess the policy intervention in the Member States (EU-27) based on the evaluation criteria: effectiveness, efficiency, relevance, coherence and EU added value, in line with the Better Regulation guidelines. The findings and recommendations of the evaluation will feed into the impact assessment for the further amendments of the EED.

---

10 Article 24(15)a) of the amending Directive EU/2018/2002

11 Article 24(15)b of the amending Directive EU/2018/2002

12 Article 24(12) of the amending Directive EU/2018/2002

13 Article 24(14) of the amending Directive EU/2018/2002

[14] COM(2020) 564 final

2. BACKGROUND TO THE INTERVENTION

2.1. Description of the policy intervention and its objectives

Energy efficiency was set as one of the priorities of the Europe Union's 2020 Strategy for smart, sustainable and inclusive growth[15], put forward by the Commission in 2010. It is also one of the key pillars of the 2030 EU Climate and Energy framework[16] and the Energy Union. This framework aims at improving the security of energy supply, implementing the internal energy market, putting energy efficiency first, decarbonisation (including renewable energy development), research, development and facilitating technological innovation and improving competitiveness.

Directive 2012/27/EU on Energy Efficiency (EED) builds on Directive 2006/32/EC on energy end-use efficiency and energy services. It establishes a common framework of measures for the promotion of energy efficiency within the EU, in view of achieving the Union's headline targets on energy efficiency of 20%[17] for 2020 and of at least 32.5%[18] for 2030, and paves the way for further energy efficiency improvements beyond that date. The EED was published in the Official Journal on 14 November 2012 and entered into force on 4 December 2012. Member States had to transpose the EED by 5 June 2014.

The EED is part of the broader EU energy efficiency policy framework, which comprises other key instruments including the Energy Performance of Buildings Directive (2010/31/EU, as amended by Directive 2018/844/EU) (EPBD), the Energy Labelling Framework Regulation ((EU) 2017/1369) and Ecodesign Directive (2009/125/EC). The EED is interlinked with other energy and climate policy areas, notably, the ETS and non-ETS, and security of supply and internal energy market.

Overall, the set of measures are aimed to step up Member States' efforts to use energy more efficiently at all stages of the energy chain, from the generation of energy and its distribution to its final use. The measures are summarised below (see Table 7 in Annex 4 for a more detailed overview):

Table 1 Overview of the Articles in the EED

Article	Objective
Articles 1& 3	To set the EU headline energy efficiency targets for 2020 (of 20%) and for 2030 (of 32.5%) and to set reporting obligations for Member states

15 COM(2010) 2020

16 COM(2014) 15 final

[17] It equals to energy consumption of no more than 1483 Mtoe of primary energy and no more than 1086 Mtoe of final energy in 2020.

[18] It equals to energy consumption of no more than 1273 Mtoe of primary energy and no more than 956 Mtoe of final energy in 2030.

Article 4[19]	Member States had to establish long term renovation strategies for mobilising investment in the renovation of national building stock (until this article was moved to the EPBD in 2018)
Article 5	To require Member States to renovate 3% of their central government buildings of over 250 m²
Article 6	To oblige Member States to purchase energy efficient products, buildings and vehicles
Article 7	To oblige Member States to achieve new energy savings each year
Article 8	To ensure that large companies perform an energy audit every 4 years
Articles 9 to 11[20]	To provide requirements for metering and billing of energy use
Article 12	To encourage Member States to promote and facilitate behavioural change towards energy efficiency
Article 13	To make sure Member States implement penalties for breaching transposed energy efficiency policy
Article 14	To oblige Member states to carry out comprehensive assessments of the potential for efficient heating and cooling
Article 15	To require Member States to take energy efficiency into account in energy transformation, transmission and distribution
Article 16	To require availability of qualification and accreditation schemes for providers of energy services, energy audits and installers
Article 17	To require Member States to disseminate information on available energy efficiency mechanisms and financial and legal frameworks to market actors
Article 18	To require Member States to promote the energy services market, including through the use energy performance contracting
Article 19	To require Member States to remove regulatory and non-regulatory barriers to energy efficiency including split incentives
Article 20	To ensure that Member States facilitate the establishment of financing facilities for energy efficiency
Article 21	Refers to conversion factors set out in Annex IV of the Directive
Article 24	Reporting obligations for the Member States and the Commission[21]

A partial review of the EED was carried out in 2018 as part of the Clean Energy for all Europeans package[22]. In this context, the Commission proposed a binding EU energy efficiency target of 30% for 2030 and a number of focused amendments to selected elements of the EED (and of the EPBD) to align the energy efficiency framework to the 2030 perspective. The package also included a proposal for a Regulation on an integrated climate and energy Governance framework to facilitate the achievement of the 2030

[19] Member States had to notify their long-term renovation strategies under Article 4 twice: in 2014 and 2017 until Article 4 was transferred to the EPBD (by amending Directive EU/2018/844 (and became Art. 2a)

[20] Provisions for electricity were transferred to the Electricity Directive in 2019 by the recast Electricity Directive (EU) 2019/944

[21] The reporting obligations for the period as of 2021 have been transferred to the Governance Regulation

22 https://ec.europa.eu/energy/en/news/commission-proposes-new-rules-consumer-centred-clean-energy-transition

climate and energy targets through the streamlining of the existing reporting and planning obligations. The planning and reporting obligations contained in the EED were transferred to the Governance Regulation[23], which replaced the three-yearly national energy efficiency action plans with the integrated national energy and climate plans for a 10-year period (the first plans should have been submitted by end 2019). The provisions on long-term renovation strategies were moved to Directive 2010/31/EU, where they fit more coherently. The provisions were also strengthened to ensure that the long-term renovation strategies deliver the necessary progress towards the transformation of existing buildings.

This process resulted in amending Directive EU/2018/2002, adopted on 11 December 2018[24], which includes amendments to Articles 1 and 3 on the headline energy efficiency targets (setting the EU headline energy efficiency target for 2030), and to Article 7 on extending the energy savings obligation to 2021-2030 period. It also strengthens the requirements for billing and metering in Articles 9-11 by adding new, more precise and specific provisions applicable for thermal energy (heating and cooling)[25].

Moreover, a number of new review clauses were introduced in Article 24 of the EED (e.g. to review the implementation of the definition of small and medium size enterprises for the purposes of Article 8(4), and introducing the general review clause of the EED with the first review required by 28 February 2024).

All modified provisions had to be transposed by Member States by 25 June 2020, but for the provisions on metering and billing, for which the transposition date was 25 October 2020.

Subsequently, the Commission published a Recommendation on 25 September 2019 to support Member States in transposing the amended provisions of Article 7, 7a, 7b, 20 (6) and Annex V of the Directive. At the same time, the Commission published a Recommendation on the implementation of the new metering and billing provisions of the EED, and on the content of the comprehensive assessment of the potential for efficient heating and cooling under Article 14 of the Directive.

It should be noted that the EED framework provides a great deal of flexibility to Member States on how the required measures are implemented (given that a number of provisions contain conditionalities and derogations) and allows taking into account the national context. In addition, the EED was amended to highlight the need to alleviate energy poverty and the interlinkages with other sectors, e.g. the Water-Energy-Nexus.

The intervention logic of the EED and its articles is provided in Annex 4.

---

[23] Regulation (EU) 2018/1999

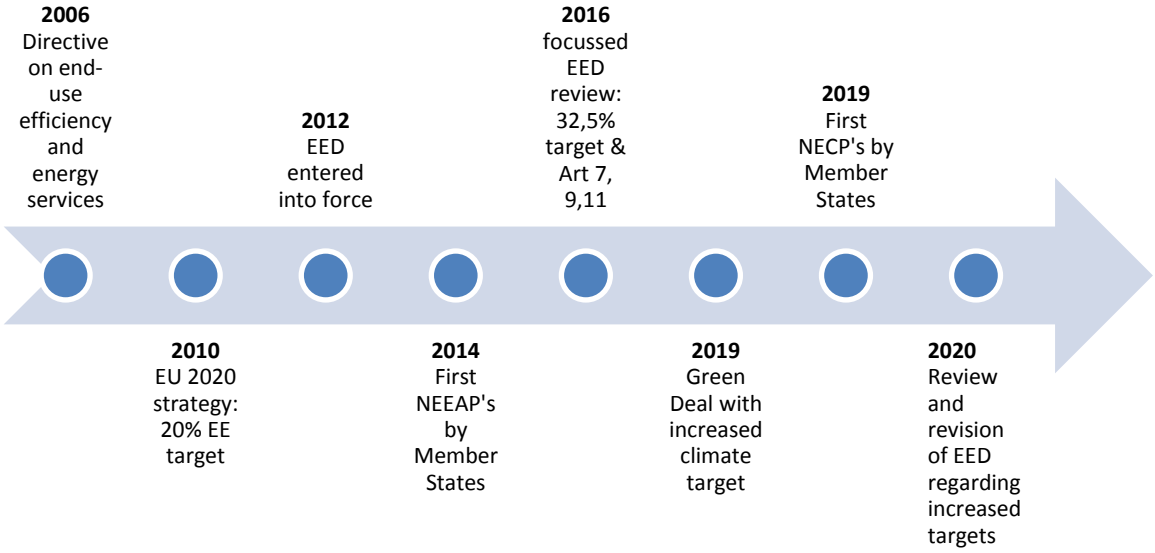
24 Entered into force together with the recast Renewable Energy Directive and a new Governance Regulation on 24 December 2018

25 While removing thermal energy from the original provisions thereby restricting their scope to electricity and gas. Subsequently also electricity has been removed from their scope and instead regulated under the provisions of the recast Electricity Directive: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2019.158.01.0125.01.ENG&toc=OJ:L:2019:158:TOC

In addition to the planning and reporting provisions moved the Governance Regulation[26] specific provisions of the EED were also removed or modified by other legislative instruments, such as Articles 9-11 on metering and billing for electricity and Article 15(8) on demand response services to the Electricity Directive[27], and Article 4 on the long-term renovation strategies to Energy Performance of Buildings Directive by the amending Directive EU 2018/844. (in the context of the "Clean Energy for All Europeans" Package).

Against this background, the Commission has not evaluated yet the EED in its entirety since its entry into force in December 2012 (Figure 1).

Figure 1 - Overview of key milestones of the EED



Source: DG ENER

[26] Regulation (EU) 2018/1999

[27] Directive (EU) 2019/944

2.2. Baseline

In 2007, the EU committed itself to a 20% energy efficiency target in 2020[28], which was embedded in the Europa 2020 Strategy for smart, sustainable and inclusive growth[29] in 2010. At that time, the energy efficiency framework[30] consisted of Directive 2006/32/EC on energy services (ESD) and Directive 2004/8/EC on promotion of cogeneration (CHP Directive) and Directive 2002/91/EC on the energy performance of buildings (preceding the Directive 2010/31/EU. The ESD targeted energy demand and contained an indicative end-use energy savings target of 9%[31] that had to be achieved by each Member State by 2016[32]. Together, the ESD and CHP Directives were amongst the first legislative instruments to tackle the barriers to energy efficiency investments and could be regarded as milestones in energy efficiency policy development. They have contributed to action taken at national level thanks to introduction of a number of concrete policies. However, because of the 'soft' and open provisions, both Directives failed to sufficiently overcome the barriers to energy efficiency existing at that time[33].

2.2.1. Problems at the time of the adoption of the EED

The problems and drivers that the EED was expected to address were identified in the impact assessment of 2011 (accompanying the Commission proposal for the EED).

The main problem was that the EU 20% energy efficiency objective for 2020 would not have be met with the policies and measures in place at the time[34], thus preventing the related environmental, social, economic and security of supply benefits to be realised due to many prevailing market and regulatory failures[35].

Based on the evaluation of the ESD and CHP Directive, the Commission concluded that both directives, if unchanged, would not lead to the sufficient action needed to tackle the problems described in the accompanying impact assessment.

The impact assessment of 2011 outlined the following problem drivers:

1. Insufficient political commitment, policy coordination and long-term political planning to reduce investment insecurity;

28 7224/1/07, REV 1

29 COM(2010) 2020 final

30 Add that EPBD 2010 and Ecodesign/ Energy labelling was also there

31 Mtoe saved against the average of a five year base period

32 Directive 2006/32/EC, Article 4(1)

33 Indicatively, the mid-term evaluation of the ESD showed that it had not succeeded in tapping the full energy saving potential of the sectors it covered, SEC(2011) 779 final and its Annex III

34 Those were national measures and EU measures adopted until 2009 including stemming from the ESD, CHP Directives, and the recast EPBD in 2010 and the Ecodesign and Energy labelling measures that were adopted in 2010.

35https://eur-lex.europa.eu/resource.html?uri=cellar:4bc8ec58-3689-4044-811c-0435b28f8464.0001.01/DOC_2&format=PDF

2. Insufficient incentives for consumers to realise energy efficiency improvements and to tackle high upfront costs and the split incentives problem;
3. Insufficiently developed markets for energy efficiency improvements;
4. Insufficient price incentives for the uptake of energy efficiency measures among energy suppliers;
5. High transaction costs because of lengthy administrative procedures e.g. for cogeneration) or a high number of separate units (e.g. energy efficiency improvements in households);
6. Higher transaction costs and investment risk for the deployment of the co-generation technology;
7. Low awareness of energy saving opportunities and existence of cultural barriers like mistrust of new technologies and lack of willingness to adopt energy savings measures and a historic low penetration of district heating because of the prevalence of individual heating solutions.

2.2.2. How would the situation evolve without the EED in place

The impact assessment of 2011 considered the scenario of taking no further legislative action for the ESD and the CHP Directive. However, according to the mid-term evaluation of the ESD, even if Member States had continued their efforts on energy savings beyond the ESD's target year of 2016, leaving the situation unchanged would lead to primary energy savings of 50-95 Mtoe in 2020, leaving a significant gap towards the 20% saving target (savings of 368 Mtoe).

The progress report of the CHP Directive[36] had also shown the Directive's limited efficiency and effectiveness. The share of electricity from high efficiency CHP had increased only from 10.5% in 2004 to 11.0% in 2008. This showed that the lack of concrete obligations in the Directive regarding the real uptake of the CHP and its soft wording had failed to create the necessary investment security, to decrease the burden of the numerous administrative procedures and to create a playing level field for this technology and its operators.

The impact assessment of 2011 analysed a number of policy options to address the problem and its drivers encompassing the following target areas:

- National targets and objectives;
- Energy Saving Obligations;
- Further measures to realise potential at the end-use stage;
- Measures to realise potential at the stage of energy transformation and distribution;
- National reporting;

36 SEC(2011) 779 final and its Annex IV

- Options concerning the purpose and scope of the legislative proposal and the choice of legal instrument.

In all six areas, the impact assessment showed that the baseline scenario ('Retain the current approach') had the worst impact compared to the proposed policy options in terms of effectiveness, efficiency, coherence with the overarching objectives of EU policy and respect of subsidiarity/proportionality.

The impact assessment provided a qualitative description of the expected developments and confirmed that the package of policy measures put forward with the legal proposal was capable of reaching the 20% objective and reaping additional benefits that would remain tangible beyond 2020. The additional costs of achieving the overall 20% target through the set of measures proposed was estimated as proportionately small to the expected benefits.

With the introduction of the EED, the Commission aimed at creating the right market conditions and legal framework to enable the achievement of the new headline EU 20% energy efficiency target for 2020, covering all end-use (residential, commercial and industry) and energy generation sectors with the exception of transport[37].

3. IMPLEMENTATION OF THE EED / STATE OF PLAY

3.1. Description of the current situation

The EED entered into force in 2012, but builds on the measures already introduced in the ESD and CHP Directives.

The EED requires different reporting obligations with different implementation deadlines. These obligations are described in Table 2below:

Table 2: Key obligations 2013 – 2020 for Member States

Key obligations 2013 – 2020 for Member States	Deadline
General transposition of the EED	5 June 2014
Notification of 2020 national indicative targets under Article 3 (in line with Article 24(1) and Annex XIV)	30 April 2013
Notification of long-term renovation strategies under Article 4[38] as part of the NEEAP	30 April 2014 and every three years thereafter
Notification of inventory of government buildings subject to renovation under Article 5	5 December 2013
Notification of national cumulative energy savings and policy measures under Article 7	5 December 2013
Notification of National Energy Efficiency Action Plans	1st plan by 30 April 2014 and the 2nd in 2017

[37] Transport was subject to the various measures included in the White Paper on transport adopted in 2011

[38] Member States had to notify their long-term renovation strategies under Article 4 twice: in 2014 and 2017 until Article 4 was transferred to the EPBD (by amending Directive EU/2018/844 (ie. Art. 2a)

Notification of Annual Progress Reports	Each year by 30 April
Notification of comprehensive assessments on energy efficiency potential in heating and cooling under Article 14	December 2015, December 2020
Obligations under the revised EED[39]	**Deadline**
Transposition of new rules on energy efficiency obligation schemes (*Amended* Articles 7, 7(a) and 7(b) *and Annex V)*	25 June 2020
Transposition of new rules on metering and billing (*Articles 9, 10, 11 and* a new Annex VII(a))	25 October 2020
Submission of National Climate and Energy Plans including detailed plans on implementation of Article 7 in line with Annex III	December 2019

The general transposition deadline of the EED was 5 June 2014.

In line with Article 3 of the EED, Member States had to notify their national indicative energy efficiency targets by December 2013 in view of achieving the EU level target for 2020[40] (1483 Mtoe of primary energy consumption and 1086 Mtoe of final energy consumption).

In line with Article 4 of the EED, Member States had to notify their first long-term strategy for mobilising investment in the renovation of the national stock of residential and commercial buildings, both public and private by 30 April 2014. An updated strategy was due every three years thereafter, submitted to the Commission as part of the National Energy Efficiency Action Plans.

In addition, separate notifications were required under Article 5 (inventory of central government buildings that was subject to renovation under the default approach) and under Article 7 (energy savings obligation).

Member States were required to notify by December 2013 their plans calculated cumulative energy savings for the period 2014-2020 and the policy measures: energy efficiency obligation schemes or alternative policy measures to be implemented to achieve the required amount by end 2020.

Reporting obligations for the 2030 framework

The national contributions to achieve the Union's energy efficiency targets for 2030 referred to in the amended EED had to be notified by the end 2019 as part of National Energy and Climate Plans (NECPs) of the Governance Regulation[41]. Although with some delays, all Member States notified their contributions in the course of 2020. However, not all Member States properly met the requirements related to the notification of the

[39] All reporting obligations have been transferred to the Governance Regulation (EU/2018/1999)

[40] https://ec.europa.eu/clima/policies/strategies/2020_en

[41] Regulation (EU) 2018/1999

contributions and, in quite a few cases, the information about the trajectory, methodology used or translation of the contributions into absolute values of PEC and FEC was missing.

Similarly, the notification on the energy savings requirements, planned measures and detailed methodologies to implement Article 7 for the next period 2021-2030 had to be notified under the Governance Regulation as part of the NECPs (Annex III).

3.2. Status of transposition and infringements

The Commission monitors how the Energy Efficiency Directive is transposed and implemented and works closely with the Member States to this end. After the transposition deadline of the Directive 2012/27/EU (EED) of 5 June 2014, the Commission services carried out transposition checks to assess whether the EED had been properly transposed into the national legal orders of all Member States. As a result of this exercise, the Commission launched infringements for the cases where Member States failed to communicate transposition measures covering all provisions of the Directive. All of these infringements have been closed.

Furthermore, in order to clarify certain questions regarding the transposition and implementation of the EED, in 2017 the Commission services launched a structured dialogue with Member States, via EU Pilot information requests.

Following an assessment of replies from EU pilots, the Commission launched infringement proceedings between July 2018 and January 2019 under Article 258 of the Treaty on the Functioning of the European Union, against all Member States for their failure to comply with obligations under the Energy Efficiency Directive.

In February 2021 the state of play of these infringements was as follows:

- Thirteen cases have been closed (Denmark, Estonia, Finland, France, Ireland, Italy, Netherlands, Latvia, Luxembourg, Malta, Slovakia, Spain and Sweden);
- Fifteen ongoing cases, at different stages.

The infringement proceedings progressed at different speed, but Member States' clarifications and commitments have resolved a majority of the concerns the Commission raised. The following issues have been raised in most infringement proceedings:

- Renovation of public buildings under Article 5;
- Calculation of energy savings claimed from the implementation of alternative policy measures under Article 7(9)[42];
- Energy audits under Article 8(4);
- Metering and billing rules under Articles 9 to 11;

42 According to the amending Directive (EU)2018/2002, Art. 7(9) have been replaced by the new Art. 7b.

- Individual metering (or "sub-metering") of heat in multi-apartment buildings required under Article 9(3); and
- Comprehensive assessments and cost-benefit analysis for energy efficiency in heating and cooling under Article 14;

Other significant points raised were the minimum requirements for establishing functioning of energy services markets under Article 18 of the EED, also demand response rules required under Article 15(8), and split of incentives under Article 19(1).

Finally, there was an infringement case against Spain, originated from a complaint, which concerned the implementation of sub-metering obligations under Article 9(3) EED. The case was brought to the Court of Justice (C-347/19) and the judgement was delivered in December 2020.

Transposition of the provisions of the amended Directive (EU) 2018/2002

Following the amendment of the EED in 2018[43], Member States had to transpose new rules on energy savings obligation (*i.e.* the new Articles 7, 7(a) and 7(b) *and Annex V* by 25 June 2020.

In addition, by 25 October 2020, Member States had to transpose new rules on metering and billing (*i. e.*, new Articles 9, 9(a), 9(b) and 9(c), 10 and 10(a) and 11 and 11(a) and a new Annex VII(a)).

In the light of Member States notifications with respect to the transposition of those amended provisions, the Commission sent 23 letters of formal notice to the Member States that had notified partial transposition, to the Member States that had not notified any transposition measures and to the United Kingdom.

4. METHOD

4.1. Short description of methodology

The Commission used several information sources to evaluate the EED, notably the analysis of the implementation and transposition of the EED in all Member States, national energy efficiency action plans and annual energy efficiency reports submitted by Member States, and various studies and reports available on the EED. The work carried out in the EED Concerted Action also proved to be very valuable.

The Commission commissioned an external study to support it with data collection and the evidence-based assessment. The study was carried out during the period of June 2020 to March 2021. A dedicated smaller study was also carried out to support the analysis of the open public consultation (launched on 17 November 2020 until 9 February 2021).

The evaluation was supported by an inter-service group consisting of the following Commission Directorates General: SG, ECFIN, GROW, JUST, CLIMA, MOVE,

43 Directive (EU)2018/2002

REGIO, ENV, AGRI, RTD, TRADE, CNECT, ESTAT, COMP, and also JRC and EASME. The inter-service group met five times between June 2020 and March 2021, and it provided feedback on the most relevant deliverables of the evaluation and its process.

The evaluation followed the Commission better regulation guidelines and examined the following five evaluation criteria in line with better regulation guidelines: effectiveness, efficiency, relevance, coherence and EU added value, as described below.

- **Effectiveness**

The evaluation looked at the overall effectiveness of the EED and to what extent the objectives of promoting energy efficiency were achieved in view of reaching the Union's headline targets on energy efficiency for 2020 and 2030, by analysing the quantitative and qualitative impacts (per target group and sectors). In addition, the evaluation looked at which factors were behind the effects of the intervention including which areas of the intervention were more / less successful and what were the drivers / barriers behind successes / failures, and what external factors have affected/ continue to affect reaching the objectives of the EED.

- **Efficiency**

Efficiency refers to what extent the costs involved in the implementation of the EED have been justified given the changes/effects that have been achieved (including wider benefits), and to what extent were the costs borne by different stakeholder groups proportionate to the benefits it has generated.

- **Relevance**

In relation to the relevance, the evaluation looks at the extent to which the EED framework and its measures are still relevant for promoting energy efficiency to ensure the achievement of the EU headline 2020 and 2030 targets. It assesses whether the EED still corresponds to the needs and the latest technological or environmental developments in the EU, and to what extent the EED is fit to achieve the higher climate target (of at least 55% for 2030), in particular in the context of the objectives of the European Green Deal.

- **Coherence**

The evaluation examines whether the EED is internally coherent and whether it complements or conflicts with other existing policies and strategies, as well as new ones, particularly in the context of policies adopted and planned under the European Green Deal.

- **EU Added value**

The evaluation looks at the additional value that the EU level energy efficiency target and EU measures have, compared to what would be achieved by Member States acting at national or regional levels without EU intervention.

A detailed overview of the evaluation questions per criterion is provided in Annex 3.

4.2. Data collection and tools

More in details, the following data collection tools were used in evaluating the EED:

- Analysis of the National Energy Efficiency Action Plans of 2014 and 2017 submitted in line with Article 24(2) and Member State annual energy efficiency reports submitted from 2014 to 2020 submitted in line with Article 24(1)[44];
- Analysis of national measures notified by Member States to transpose the EED;
- Analysis of the final National Energy and Climate Plans submitted under the Governance Regulation[45];
- Analysis of the Long-Term Renovation Strategies submitted under Article 4 of the EED (2014 and 2017) as part pf the National Energy Efficiency Action Plans.
- Targeted stakeholder consultation with broad range of stakeholders identified in the Consultation strategy, including national authorities, interest groups, civil society and academia. The targeted stakeholder consultation was carried out in the form of stakeholder workshops, evaluation questionnaires and interviews with the aim to gather inputs on assessing the different provisions of the EED. In total nine workshops were held during the period from September to November 2020;
- A dedicated Energy Efficiency Directive Expert Group was held on 10 November 2020 with the aim to present and discuss with the Member States and stakeholders the preliminary findings of the evaluation with an aim to fine-tune the analysis;
- An internet based public consultation was launched on 17 November 2020 and lasted for 12 weeks until 9 February 2021, targeting a broad stakeholder audience and the general public[46];
- Literature review of relevant documents, reports and studies to support the evaluation.

More details on the stakeholder consultation activities can be found in Annex 2 and the technical assistance study.

4.3. Limitations and robustness of findings

Member States' annual reports

---

44 The National Energy Efficiency Action Plans (were submitted under the EED in 2014 and 2017) were required to cover significant energy efficiency improvement measures and expected and/ or achieved energy savings, including those in the supply, transmission and distribution of energy as well as energy end-use, in view of achieving the national energy efficiency targets referred to in Article 3(1). The National Energy Efficiency Action Plans shall be prepared in line with Part II of Annex XIV. The Annual reports should be prepared in line with Part I of Annex XIV of the EED.

45 COM(2020) 564 final

46 https://ec.europa.eu/info/sites/info/files/better-regulation-guidelines-evaluation-fitness-checks.pdf

The last Commission progress report was published in October 2020 and covers the 2018 data[47] based on Member States' annual reports submitted in 2020. Even though the full assessment on the achievement of the 2020 targets and thus the complete overview of implementation of the EED would be available only in the spring 2022, when Eurostat will be publishing the 2020 data, the latest Commission progress report gives indications on progress towards the achievement of the EU energy efficiency target and national indicative targets. It includes quantitative and qualitative information on the implementation of some of the key provisions of the EED that contain annual reporting obligations: Article 3 on national energy efficiency targets, Article 5 on exemplary role of public bodies' buildings and Article 7 on energy savings obligation[48].

Availability of data

It should be stressed that quantification of the impacts attributed to the EED intervention taking into other energy efficiency interventions and contributing to the EU targets is challenging. There is limited data available on ex-post evaluation of national energy efficiency measures, including, data on costs and benefits for most of the measures. The most complete information on energy savings and costs is available for measures implemented under Article 7 for which the EED sets specific reporting and monitoring requirements.

Therefore, major limitations were related to assessing the effectiveness of the EED on basis of decomposition analysis by attributing specific benefits and quantified impacts (energy savings, contribution to energy efficiency targets, etc.) to individual EED measures or articles.

The gaps in quantification of impacts have been filled by input received from stakeholders (targeted consultations and open public consultation).

5. ANALYSIS AND ANSWERS TO THE EVALUATION QUESTIONS

5.1. Effectiveness

5.1.1. Evaluation Question 1: To what extent has the objective of the EED to promote energy efficiency in the EU in view of reaching the Union's headline targets on energy efficiency for 2020 and 2030 been achieved?

As reflected in the intervention logic, the EED consists of a set of common measures that aim at promoting energy efficiency in the EU across the different sectors with a view to achieve the EU energy efficiency targets for 2020 and for 2030[49].

---

[47] COM(2020) 954 final

[48] In line with requirements of Annex XIV(1) of the EED

49 The scope of this evaluation is assessing the 2020 targets. The 2030 target was introduced with the amending Directive (EU)2018/2002.

The achievement of the EU energy efficiency targets depends not only on the implementation of the measures in the EED, but also on other EU legislative acts such as the Energy Performance of Buildings Directive, the Ecodesign Directive, the Energy Labelling and Tyre Labelling Regulations, and other measures taken at national level. Therefore, the EED is not the only instrument contributing to the EU energy efficiency targets, and the evaluation of its effectiveness in contributing to achieving the targets also needs to take into account external factors that are not always linked to the implementation of the EED.

The majority of stakeholders that shared their views consider that the Directive has largely achieved its objectives, thanks to the wide sectoral coverage of the Directive, as if it were to be a framework Directive. They shared the view that the EED contributed to improved energy efficiency, reduction of GHG emissions, and numerous other benefits such as improved energy security, reduced energy bills for consumers and greater awareness of the benefits associated with energy efficiency (e.g. health improvements, energy poverty alleviation).

5.1.1.1. *Sub-question a: What have been impacts in different sectors achieved with the intervention?*

The developments in sectors are quite different when looking at energy consumption trends. This is related to the fact that different factors drive energy consumption in different sectors. Besides, policy instruments also do not focus on all sectors in the same manner. It should be noted that there is no exact data available on what impact specific measures of the EED had on the different sectors, except for Article 5 and Article 7 for which the EED has specific reporting requirements.

The final industry energy consumption[50] in the EU-28 decreased in absolute terms from 332 Mtoe in 2005 to 285 Mtoe in 2018 (-14%). After 2015 an increase in consumption can be observed again, though. Compared to 2017, the EU's final industry energy consumption increased by 0.8% in 2018.

The final energy consumption in residential sector (calculated using the old energy balances methodology) sharply fell by 10.4% from 310 Mtoe in 2005 to 278 Mtoe in 2018 (but only by 4.6% when applying the weather correction). However, energy use rose by 0.1% between 2015 and 2018 (with a -1.6% year-on-year fall in 2018). In 2018, higher energy consumption was mainly observed in the transport (+1.3% year-over-year increase compared to 2017) and industry sectors (+0.6%). By contrast, energy consumption declined in the residential sector (-1.6%) and in the services sector (-1.4%). The services sector recorded a small increase in energy consumption (calculated using the old energy balances methodology) between 2005 and 2018 (+1.5%). However, a year-on-year drop in energy consumption of 1.4% was recorded in 2018. The EU's final transport energy consumption increased by 3.6% from 368 Mtoe in 2005 to 381 Mtoe in

[50] Calculated with the old methodology of energy balances

2018. The growing trend accelerated in recent years and compared to 2017 the energy consumption rose by 1%[51].

As regards the impact of specific energy efficiency policies on energy sectors, the EED requirements targets both the supply and end use sectors. As mentioned above, most of the data is available for measures implemented under Article 5 (exemplary role of public bodies' buildings) and Article 7 (energy savings obligation) received from Member States in their annual reports. Most of the energy savings have been achieved in the buildings sector thanks to the measures under Article 5 and Article 7 aiming at renovations or upgrading of heating systems (some 50% of energy savings are achieved in buildings sector).

However, other sectors also observe positive effects which could be attributed to some extent to the EED. For example, the requirement for large companies to carry out energy audits (in Article 8) have increased awareness amongst enterprises of energy savings potential, which in some cases followed by energy efficiency improvement measures. However, there is not much information on the extent Article 8 had contributed to energy efficiency impacts in industry (more analysis in chapter 5.1.2).

5.1.1.2. *Sub-question b: To what extent are the EU and the Member States on track to achieve their 2020 and 2030 targets?*

According to the latest Commission progress report[52] on the achievement of the EU-28 energy efficiency targets for 2020, the Eurostat figures for 2018 indicate that final energy consumption in the EU-28 fell by 5.9%, from 1194 Millions of tons of oil equivalent (Mtoe) in 2005 to 1124 Mtoe in 2018. However, this is still 3.5% above the **2020 final energy consumption target of 1086 Mtoe**. In 2018, it increased by 0.1% compared to the previous year. Primary energy consumption in the EU-28 dropped by 9.8%, from 1721 Mtoe in 2005 to 1552 Mtoe in 2018, which is 4.6% above **the 2020 target of 1483 Mtoe**. Following three years of increase, a year-on-year drop in primary energy consumption of 0.6 % was recorded in 2018. For both indicators, the trend in 2018 was above a linear trajectory to the 2020 targets.

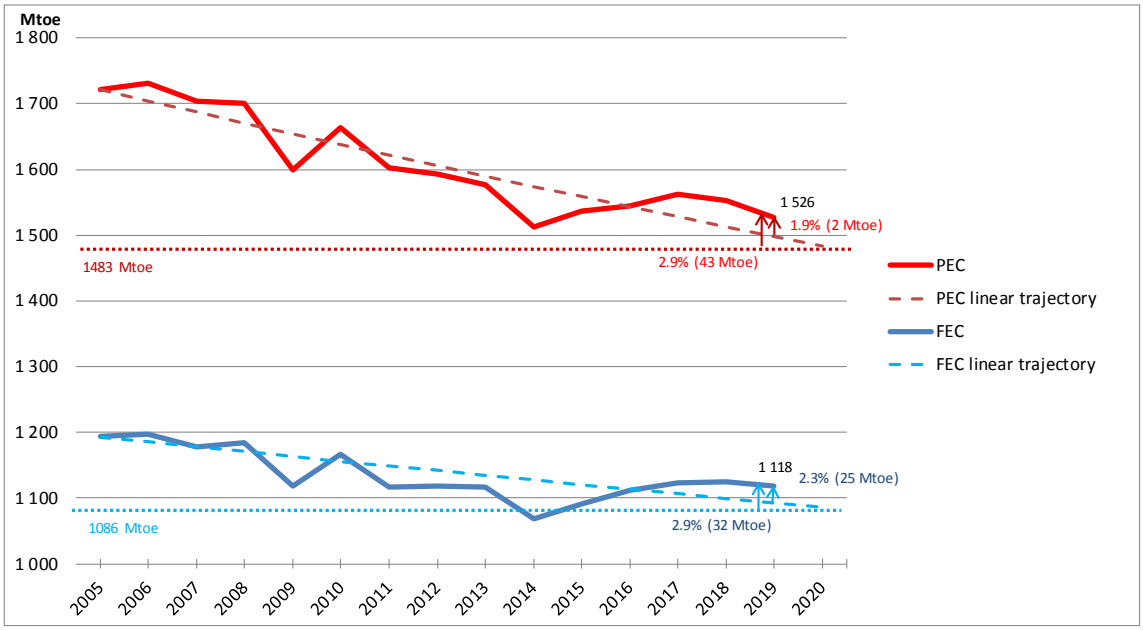
It should be noted that the achievement of the EU level target is influenced by a set of different factors, which are described in more detail below (see chapter 5.1.2). The growth in economic activity continues to be one of the main factors contributing to the increased energy consumption. Policies and measures implemented by the Member States in 2018 were not sufficient to offset it. To this end, it seems increasingly unlikely that the 2020 targets could be reached without a strong impact of external factors, such as the COVID-19 crisis. The impact of COVID-19 on energy consumption in 2020 has been assessed as significant in the above mentioned progress report.

[51] `Cf COM(2020) 326 final and COM(2020) 954 final

52 COM(2020) 954 final

Member States indicated in their annual energy efficiency reports that stable and growing final energy consumption in 2018 was driven by economic growth and an increase in: (i) production/ value added (industry); (ii) transport of passengers and goods (transport); (iii) the number of households and disposable income (residential); and (iv) value added and employment (services).

Figure 2: Progress towards 2020 targets at EU-28 level



Source: Eurostat data, DG ENER's own calculations

The Commission monitors progress towards the achievement of the national 2020 energy efficiency targets and the implementation of the EED in line with the reporting obligation under Article 24(3)[53]. The Commission assessment is based on energy efficiency annual reports submitted by Member States, in line with Article 24(1)).

The achievement of the EU targets also depends on the commitment made by Member States in setting the national indicative targets (in line with Article 3 of the EED). The recent analysis shows a gap to the EU 2020 targets (see Table 8 in Annex 4).

In response to the growing energy consumption trends, the Commission had set up the dedicated Task Force 2020 to mobilise efforts to reach the EU energy efficiency targets for 2020[54], which looked into the causes of an increased energy consumption and looked for potential solutions for remedy. The incomplete and sometimes delayed implementation of the energy efficiency legislation (including the EED) together with the

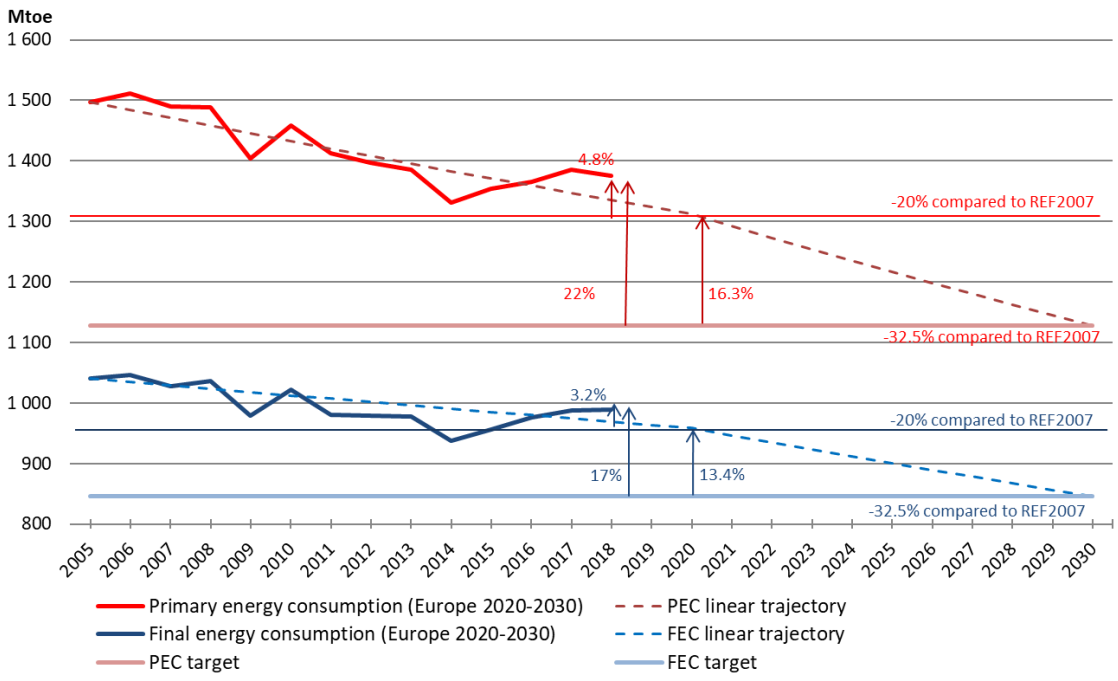
[53] The Commission reporting obligations for 2030 energy efficiency targets are part of the Governance Regulation EU/2018/1999.

[54] Report_of_the_work_of_task_force_mobilising_efforts_to_reach_eu_ee_targets_for_2020.pdf (europa.eu)

observed difference in the estimated energy savings and the energy savings achieved were mentioned by Member States as one of the possible causes that have contributed to the increased energy consumption over the recent years, which have put the achievement of the EU energy efficiency target for 2020 at risk.

In relation to the EU 2030 targets, the assessment of the national energy and climate plans (NECPs)[55] identifies a collective ambition gap of national contributions of 2.8 percentage points for primary and 3.1 percentage points for final energy consumption.

Figure 3: Progress towards 2030 targets at EU-27 level



Source: Eurostat data, DG ENER's own calculations

Due to the insufficient progress towards the 2020 targets until 2018, the distance to the 2030 targets is also bigger than expected and stands at 22% for primary energy consumption and 17% for final energy consumption (Figure 3). The delivery gap to the 2020 targets and the ambition gap to the 2030 targets indicate that additional efforts are needed.

The 2020 progress report also showed that progress towards achieving the **indicative national energy efficiency targets** (assuming a linear trajectory that is the same level of efforts each year) was insufficient in twelve countries (Belgium, Bulgaria, Denmark, Germany, Ireland, Spain, France, Cyprus, Austria, the Netherlands, Poland, and Sweden) for primary energy consumption, and in fifteen (Belgium, Bulgaria, Germany, Estonia, Ireland, France, Lithuania, Luxembourg, Hungary, Malta, Austria, Poland, Slovakia, Sweden and the United Kingdom) for final energy consumption.

[55] COM(2020) 564 final

JRC analysis shows that several Member States have updated their national targets (notified in the annual reports) which gives the sum of national 2020 absolute consumption targets of 1536.8 Mtoe in terms of primary energy and 1090.4 Mtoe in terms of final energy (which is 0.4% above of the EU target compared to 1086 Mtoe). In addition, the sum of the indicative national targets for primary energy is 3.6% above the EU target (1483 Mtoe) and corresponds to 17.1% savings (instead of 20%) compared to the PRIMES baseline projections[56].

5.1.1.3. *Sub-question c: Did the EED have other positive or negative impacts beyond its main objective, such as reducing greenhouse gas (GHG) emissions and energy imports.*

Energy efficiency delivers a number of benefits further to improvements in energy efficiency and energy savings. Notably energy efficiency and the EED have contributed to the reduction of GHG emissions, both in terms of direct emissions from fossil fuel combustion or consumption and indirect emissions reduction from electricity generation. Overall, energy efficiency plays an important role in tackling climate change, with the EED being one of the key instruments contributing to the EU GHG emissions reduction targets.

It The CO_2 emissions reduction is depicted[57] for all energy efficiency policies as the precise effect of the EED on GHG emissions cannot be accurately quantified. Table 10 in Annex 4 presents the total GHG emission reduction generated by energy efficiency policies including the EED which points to a positive effect of energy efficiency policies in terms of their contribution to GHG emissions reduction.

As regards specific sectors, similar conclusions can be drawn as those presented in the section on energy consumption trends). More specifically, the analysis indicates that the estimated reductions in CO_2 emissions in the building sector can be attributed to a large extent to the implementation of measures under Article 7. On the other hand, the largest part of the estimated reductions of CO_2 emissions in the transport sector and industry could be attributed to other measures not reported under Article 7. The detailed results of the analysis of GHG emissions reduction by sector are presented in the support study (Appendix E).

Based on Eurostat data, the decrease of primary energy production in the EU28 over the past decades was accompanied by an increase in the imports of primary energy and energy products. More than half (55.6 %) of the EU28's gross available energy in 2018

[56] JRC analysis of Member States annual energy efficiency reports under the EED, Tsemekidi-Tzeiranaki, S., Paci, D., Cuniberti, B., Economidou, M. and Bertoldi, P., EUR 30517 EN, Publications Office of the European Union, Luxembourg, 2020, ISBN 978-92-76-27416-2, doi:10.2760/180952, JRC122742

[57] To calculate the CO_2 emissions reductions achieved, the emissions factors by fuel (in tonCO2/ toe) were used corresponding to the observed energy consumption and the ones that correspond to the counterfactual scenario (as presented in the above section). By deducting the two (i.e. counterfactual minus observed), the reduction in CO_2 emissions was derived.

came from imported sources. However as illustrated in the section below, without energy efficiency measures energy demand would be much higher and would also have to be met with additional energy imports. Consequently, a reduction of energy consumption, which was to a large extent a result of the EED measures, also contributed to a moderation of the energy products import needs.

Energy efficiency thus remains a key contributor to energy security. A 2019 Eurobarometer survey[58] shows that 9 out of 10 EU citizens agree that the EU's energy policy priorities should aim to ensure secure, clean, and affordable energy for all Europeans.

In addition, analysis shows the wider socio-economic benefits such as reduced energy bills, reduced energy poverty and improved health that are associated to the energy efficiency improvement measures. However, it is challenging to quantify those benefits in relation to the implementation of the EED. A more detailed analysis on benefits is provided in chapter 5.2.1 on efficiency.

5.1.2. Evaluation question 2: To what extent can the observed effects be credited to the EED? In what areas was the intervention more / less successful and what were the drivers/ impeding factors behind successes / failures?

The analysis from the evaluation study[59] shows that overall the EED has contributed to promoting energy efficiency in the EU and to the achievement of the EU 2020 energy efficiency targets.

The majority of stakeholders agree that the EED contributed to the increased awareness of energy efficiency and its role to decarbonisation objectives, also the EED led to greater access to energy efficiency funding and uptake of energy services market. As regards the negative effects, a significant number of stakeholders held the view that the obligations under the EED complicated further the existing rules at national level or led to rather diverging implementation across Member States.

To better understand the impacts associated to the implementation of the EED, the decomposition analysis was performed to obtain the difference between the counterfactual scenario and the observed energy consumption by type of measure contributing to energy efficiency. Data on different energy efficiency measures and estimated energy savings[60] was used from the MURE database and other studies. A top-down modelling approach taking into account energy statistics and macroeconomic

---

[58] Eurobarometer (2019) Europeans' attitudes on EU energy policy. https://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/survey/getsurveydetail/instruments/special/surveyky/2212

[59] Chapter 4.1 of the final report of technical assistance study on evaluating the EED, COWI, 2021

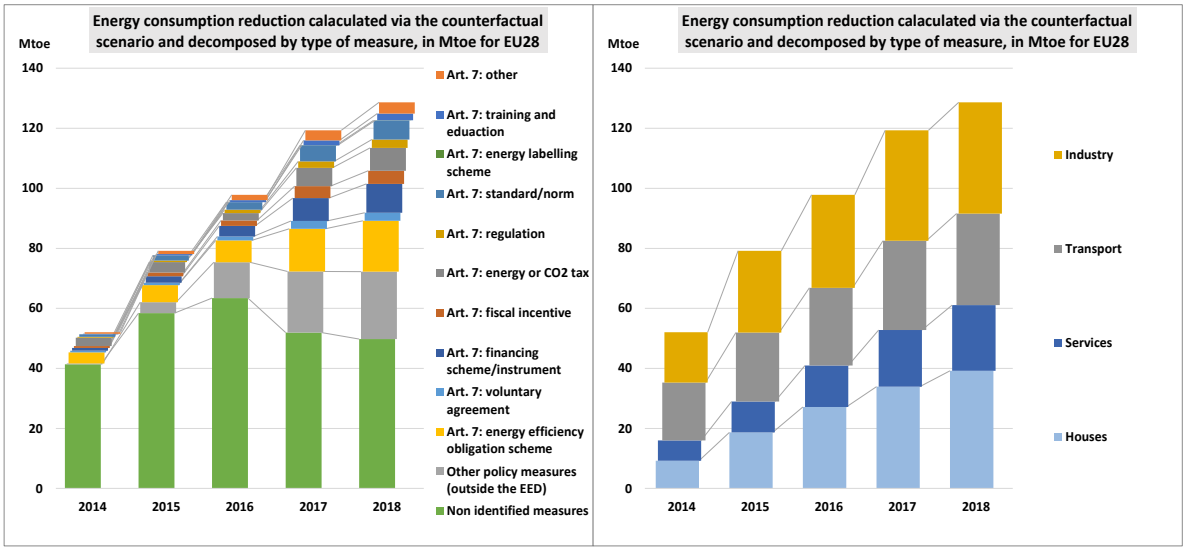
[60] Estimations are based on a bottom-up methodology and rely on calculations provided by the Member States in their annual reports. Data is mostly available for Article 7 measures.

drivers (i.e. energy intensity of GDP) was applied to estimate the counterfactual scenario to assess the impact of energy efficiency policies for the period 2014-2018[61].

The main conclusions are as follows:

- The counterfactual scenario used for estimating total energy savings from policy measures over the period 2014-2018 indicates that energy efficiency policies (not limiting only to the EED) have had significant energy consumption reductions over those reference years.
- It could be concluded that Article 7 was responsible for the majority of savings delivered under the EED (see Figure 4). In addition, measures implemented under Article 7 have mostly contributed to energy savings in the buildings sector (households and services) and to a lesser extent in transport and industry sectors (see Figure 28 in Annex 4). Significant contribution of savings in buildings comes from energy efficiency obligation schemes, fiscal and financial incentives and the standards and norms (e.g. building codes).

Figure 4 - Energy consumption reduction calculated via the counterfactual scenario and decomposed by type of measures, in Mtoe for EU 28



Source: Technical assessment study on evaluating the EED, COWI (2020)

This is also reflected in the Commission's annual energy efficiency progress report[62], which assessed the implementation of some of the key EED provisions.

[61] Results of this analysis should be interpreted with caution as the estimated energy savings may not be fully realised, they may not take into account rebound effects and possible overlaps, thus leading to overestimation of impacts.

62 SEC(2011) 779 final

The EED requires that Member States introduce national measures to fulfil the different obligations covering both the supply and demand sectors. Those energy efficiency improvement measures implemented at national level have contributed to the achievement EU energy efficiency target for 2020. To answer this question, to what extent the observed effects can be attributed to the EED intervention, the evaluation takes into account the assessment of specific articles having major impact as they have different objectives and target different stakeholder groups.

- ***Article 5 on exemplary role of public bodies buildings***

According to the data available, only 11 Member States chose to apply the default approach[63] under Article 5(1), while 17 Member States chose to fulfil the renovation obligation via the alternative approach (Article 5(6)), through a set of measures such as renovations, energy management, information campaigns and behavioural change, etc., see Table 3. These alternative measures should attain an equal amount of energy savings as under Article 5(1).

Amongst those Member States that chose the default approach, only three Member States: Bulgaria, Lithuania and Luxemburg achieved their annual targets for renovated floor area (out of those that had available reports in 2020). Four countries (Spain, Italy, Luxembourg and Lithuania) fulfilled their total targets for the period 2014-2019. Among the Member States that implemented the alternative approach, only three countries (Austria, Poland and Slovakia) achieved their annual energy saving targets in 2019. Croatia and France achieved their targets for 2018. At the same time, six countries (Austria, Finland, Ireland, Slovakia, Poland and United Kingdom) provided data showing that they fulfilled their total target for 2014-2019. France, Belgium, Croatia and the Netherlands fulfilled their total target for the period 2014-2018.

Table 3 - Achievement of obligations under default approach, Article 5(1) and alternative approach, Article 5(6)) of the EED

	DEFAULT APPROACH	ALTERNATIVE APPROACH
Member States applying default / alternative approach	11 Member States Bulgaria, Estonia, Greece, Spain, Hungary, Italy, Lithuania, Luxembourg, Latvia, Romania, Slovenia	17 Member States Austria, Belgium, Cyprus, Czechia, Germany, Denmark, Finland, France, Croatia, Ireland, Malta, Netherlands, Poland, Portugal, Sweden, Slovakia, UK

63 The default approach refers to measures taken to renovate 3% of the total floor area of heated and/or cooled buildings over 250 m2 owned and occupied by central government, which do not meet minimum energy requirements. The alternative approach refers to other cost-effective measures taken to achieve equivalent energy savings

	DEFAULT APPROACH	ALTERNATIVE APPROACH
Member States achieving their targets for period 2014-2019	3 Member States Spain, Italy, Luxembourg, Lithuania achieved targets for 2014-2019	6 Member States Austria, Finland, Ireland, Slovakia, Poland, UK achieved targets for 2014-2019 4 Member States France, Belgium, Netherlands, Croatia achieved targets for 2014-2018

Source: Technical assistance study on evaluating the EED (2020)

As can be seen from the analysis, the EED led to increased energy efficiency of central government buildings although the impact differs per country.

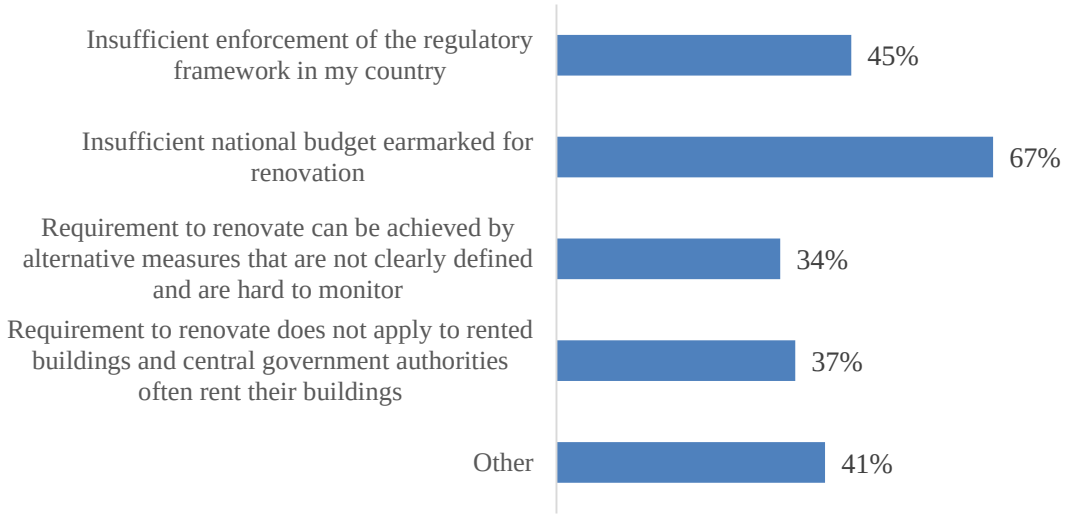
Even though a substantial part of the energy savings under alternative approach was achieved through renovations, overall most of the savings were reached through other measures such as energy management, information campaigns and behavioural change. There are two limitations related to the current reporting requirements. First, the reporting requirements pose challenges that impair the effective monitoring of progress towards targets. Specifically, Article 5 does not include the requirement to report on energy savings delivered under the alternative approach. This makes difficult assessment of progress and the comparison of achievements of Member States that have chosen the alternative approach.

Second, Article 5 does not require Member States that apply the alternative approach to develop an inventory of buildings (as required under the default approach) which would be essential for designing further measures.

Another risk to the effectiveness of Article 5 is related to the possibility to fulfil the obligation by taking out of use of buildings by more intensive use of other buildings (Article 5 (4)), which may evolve further if not properly addressed. Following new ways of working established due to Covid-19 pandemic, some public bodies were looking into possibilities to reduce their number of buildings linked to more teleworking. This could lead to not having to undergo renovation of inefficient buildings that remain in use.

The majority of stakeholders consider that Article 5 has contributed to making central government buildings in Member States more energy efficient. However, many stakeholders mentioned insufficient enforcement of regulatory measures and insufficient national budget as limiting factors of effective and efficient renovations of central government buildings (see Figure 5).

Figure 5 - What are the main factors limiting central government in effective and efficient renovation of its buildings



Source: Feedback from public consultation

A large number of stakeholders believe that further efforts would be necessary to ensure the achievement of the targets and obligations under Article 5 in all Member States, for example through extending renovation obligation to other public administration levels.

In addition, stakeholders consider that insufficient progress was achieved at regional and local level due to the limitations of the legal framework - there is no obligation to renovate other buildings than those owned and occupied by central government, also lack of incentives, resources and technical assistance. In addition, alternative approach proved hard to monitor and led in many cases to short term energy savings. To address the issue, some stakeholders pointed out to the need for stricter requirements to the alternative approach.

- ***Article 6 on public purchasing***

Analysis shows that central governments are applying energy efficiency requirements in **public procurement**, albeit to the greater extent for products and to a lesser extent for services and buildings[64].

The application of high energy efficiency criteria goes hand in hand with the use of award criteria other than the lowest purchase price such as further energy-efficiency criteria or Total Costs of Ownership (TCO) where the energy costs over lifetime and optionally also costs related to impact on external environment have been assessed. However, the Single Market Scorecard for Public Procurement on award criteria[65]

64 Final report of technical Assessment study on evaluating the EED, COWI, 2020

65 European Commission (2019), Scoreboard Performance per policy area. See: https://ec.europa.eu/internal_market/scoreboard/performance_per_policy_area/public_procurement/index_en.htm

indicates that a large share of public procurement is carried out with the price as the only award criteria. It also showed that in 2019, more than 60% of the procurement procedures in 16 Member States were awarded solely on the basis of the lowest price criterion. The scoreboard data still give an indication of a large amount of public institutions not using TCO as award criteria with the annual energy costs taken into account, or considering higher levels of energy efficiency as award criteria above the minimum requirements referred to in accompanying Annex III to Article 6, which shows that the intervention was less successful in this area.

Article 6 was subject to a first evaluation in 2016[66]. The evaluation concluded that it was too early at that stage to judge the achievement of the objectives of Article 6 (including achievements by central governments) given that the transposition deadline for the article was 5 June 2014 and there was insufficient time and experience in the Member States on implementing the requirements of Article 6. The evaluation further found that there was no data allowing the quantification of progress in the rate of public procurement applying energy efficiency criteria, which is due to the lack of clear reporting requirements in the legal basis.

To this date, it remains a key limitation. Feedback received from public authorities show that due to the absence of systematic monitoring and reporting requirements in Article 6, there is no sufficient information on the impacts. In addition, studies[67] and feedback received from stakeholders show that there are still some barriers to taking into account energy efficiency requirements into public procurement practices (complexity of procedures, legal and institutional barriers, higher initial costs of energy efficiency works, equipment, buildings, services, lack of resources and budget, knowledge and tools, time constraints), and a high proportion of tender procedures in the EU are awarded on the basis of the lowest price. The conditionalities in Article 6 also limit the effectiveness of the uptake of energy efficiency requirements as Member States can bypass them on grounds of cost-effectiveness, economic or technical feasibility, which was widely recognised by stakeholders in the public consultation feedback.

The stakeholders' feedback also revealed that regional and local public bodies are generally aware of the benefits of applying energy requirements in public purchasing, but very often they lack sufficient resources, tools, financing and skilled staff to apply them. To address these barriers, specific legislation, guidance and support tools are needed.

The stakeholder feedback points out that legislation is one of the key factors incentivising the application of energy efficiency criteria in public procurement, but also support measures contribute to the application of energy efficiency criteria in public procurement such as awareness raising, training, guidance, financial resources etc.

66 SWD (2016) 402 final

67 European Commission (2019), Public procurement of energy efficient works, supplies and services. See: https://ec.europa.eu/easme/sites/easme-site/files/easme_public_procurement_projects_study_2020.pd

Nevertheless, some Member States have introduced the specific rules or guidance to require that energy efficiency criteria have been taken into account[68].

For example, in Portugal the National Strategy for Ecological Public Procurement 2020 (ENCPE 2020) as a main objective includes environmental criteria in public contracts, aligned them with economic and social aspects[69]. Thus, the Portuguese authorities expect that these criteria will be considered in public purchases. In Estonia, energy efficiency criteria are applied for instance when procuring IT equipment, such as laptops, computers and printers, and also for new buildings[70]. Guidelines for public procurement are also integrated as part of Green Public Procurement National Action Plan in Malta that launched it in September 2019 which included guidelines for the application of energy efficiency criteria for different product categories[71].

It should be noted that the expiry of the Energy Star programme[72] has led to an absence of standards for office equipment in particular, as far as they are not covered by the EU provisions on energy labelling or ecodesign, so public procurement for such items has no baseline unless the Member States are seeking to take into account the standards published by the US authorities on voluntary basis.

- ***Article 7 on energy savings obligation***

Article 7 is a key provision of the EED estimated to contribute to the EU 2020 energy efficiency target by about half of expected energy savings stemming from the EED[73]. This is also confirmed by stakeholders that view Article 7 as a central element contributing to the achievement of the EED objectives.

Energy efficiency improvements have been largely achieved thanks to the measures introduced by Member States to achieve the **energy savings obligations**[74] in end-use under Article 7 for the period 2014-2020 (see Table 13 in Annex 4).

According to the latest energy efficiency progress report[75], Member States achieved by the end of 2018 about 55% (126 Mtoe) of the total sum of the cumulative end-use energy savings obligations for 2014-2020 (230 Mtoe), which overall is a positive indicator at EU level. However, the progress at national level varies. A more detailed overview of energy savings achieved per Member State is provided in Table 13 in Annex 4.

---

[68] SWD/2013/0446 final

[69] According to the General Directorate for Energy and Geology, Portugal

[70] According to the Ministry of Economic Affairs and Communications, Estonia

[71] MIEMA, Energy Agency, Malta

[72] https://ec.europa.eu/energy/topics/energy-efficiency/energy-efficient-products/energy-star_en

73 EED Impact assessment of 2011

[74] New annual energy savings of 1.5% of annual energy sales for the period 2014-2020, and new annual savings of 0.8% of final energy consumption for the period 2021-2030.

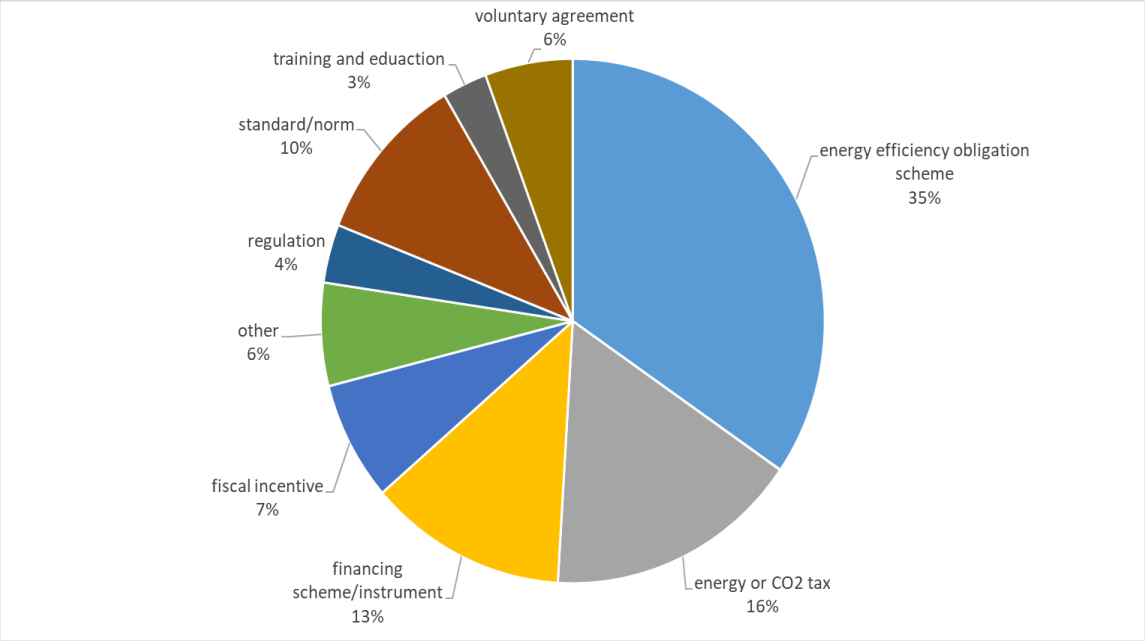
75 COM(2020) 954

The Commission forecasted the likelihood of achieving the required cumulative energy savings per Member State by 31 December 2020, the basic assumption is that all implemented policy measures continue delivering new annual savings in 2019 and 2020 as they did in 2018. The cumulative energy savings are then compared to the required energy savings by 31 December 2020 per Member State. The analysis did not consider potential concerns about eligibility and additionality. Besides, the possible impacts of the COVID-19 crisis on the amount of new annual savings achieved in 2020 are difficult to estimate at this stage.

According to the analysis, six Member States (Bulgaria, Croatia, Czechia, Luxemburg, Portugal, and Romania) will very likely not achieve the required amount of energy savings by 31 December 2020, if they do not take additional actions. Another eight (Estonia, Germany, Greece, Hungary, Italy, Slovenia, Spain, Sweden) are unlikely to achieve the required amount of energy savings without additional actions taken. And the remaining fourteen Member States will likely or very likely achieve the required amount of cumulative energy savings[76].

The majority of the savings are achieved by the energy efficiency obligation scheme (EEOS) currently implemented in 15 Member States which provides about 35% energy savings according to 2018 data reported by Member States. Other types of measures are financing schemes that contribute around 13% of the energy savings. Taxes on energy and CO2 taxes account for 16% of total achieved energy savings (see Figure 6).

Figure 6 - Share of reported energy savings by type of policy measure at EU-level

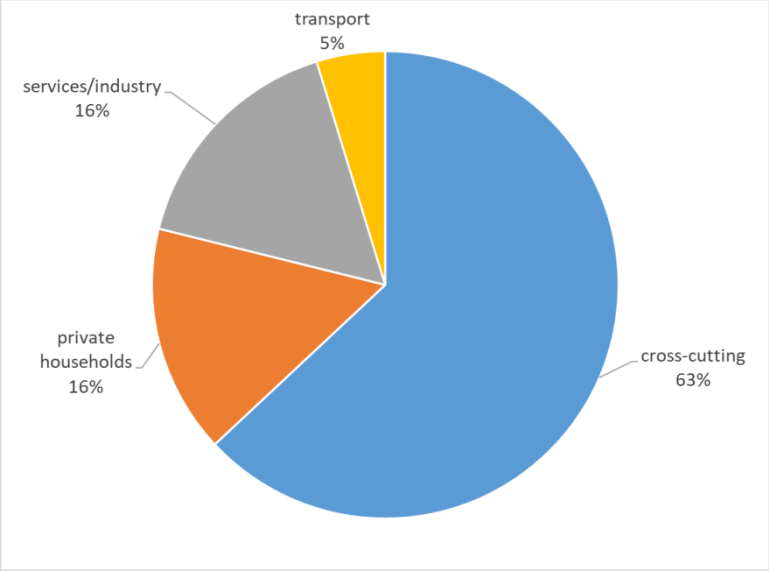


Source: DG ENER's own calculations based on the 2020 national annual reports.

[76] COM(2020) 954 final

On the sectors targeted by the implemented policy measures, the largest share of energy savings reported by Member States results from cross-cutting measures, which cannot be attributed to a single sector. Most of the measures (by count of reported measures) target services and industry, and the public sector (except for housing owned by public bodies, which is included in the private households sector (see Figure 7). In total 36 new measures were reported in 2020 annual reports (for the year 2018) under Article 7.

Figure 7 - Share of reported savings by sector



Source: DG ENER's own calculations based on the 2020 national annual reports

- ***Article 8 on energy audits and energy management systems***

Literature review and feedback received from stakeholders reveal that Member States have established mandatory schemes for **energy audits** for non-SMEs, which have carried out the energy audits in line with requirements in Annex VI of the EED. Around 750,000 enterprises in the EU fall within the scope of these schemes, and the potential energy savings from these schemes are estimated to be approximately 7% of the total energy consumption of all enterprises[77].

As regards the impact of the provisions aiming at SMEs, the Member States have implemented various schemes that include regulatory instruments, information based instruments, financial instruments and voluntary agreements[78]. Almost 80% are related to information dissemination or financial or economic incentives.

[77] Technical assistance on assessing the effectiveness of the implementation of the definition of small and medium-sized enterprises for the purposes of Article 8(4) of the Energy Efficiency Directive

[78] A Study on Energy Efficiency in Enterprises: Energy Audits and Energy Management Systems - Report on the fulfilment of obligations upon large enterprises, the encouragement of small- and medium-sized companies and on good-practice

The EED does not contain any specific reporting obligation for Member States on the implementation and impact of Article 8, which poses difficulties to measure the effectiveness of this measure. In particular, the extent to which energy audits recommendations are followed up, which is not required under Article 8, and the extent to which these yield energy savings are not systematically monitored and analysed in the Member States. Furthermore, analysis retrieved only gives limited information about energy audits carried out by SMEs and households.

Even though this information is not directly reported under Article 8, some indications of the types of programmes implemented and the magnitude of their impact for specific stakeholder groups is reported under Article 7 of the EED (e.g. voluntary agreements and white certificate schemes). For example, Member States' annual energy efficiency reports reveal that overall 20 Mtoe cumulative energy savings have been achieved in the period 2014-2018 through the different programmes and schemes targeting different stakeholder groups having energy audits or energy management systems as an integral part. Evidence provided by then five Member States (Germany, Latvia, Romania, Slovakia and the United Kingdom) indicates that over the period 2014-2018, total cumulative energy savings of 1,686 ktoe were achieved from the measures implemented as a result of mandatory energy audits in large enterprises[79] .

The most detailed source of information on how audits have been implemented and their impacts available from Germany[80].

In terms of the impact of the provisions of Article 8 on SMEs not much evidence on the implementation or the impacts is available in the literature. According to the findings of the dedicated study on the implementation of Article 8(4) on energy audits[81], Member States apply different approaches to support the implementation of energy audits in SMEs. Some examples point to voluntary approaches in line with Article 8(5), e.g. Finland, the Netherlands and the UK. In Germany, Austria and Croatia, SMEs are given tax reductions in return of conducting energy audits. In Denmark and Sweden, the approach has been to provide the SMEs with relevant information. On the other hand, for example, in Latvia it is mandatory that the undertakings with electricity consumption exceeding 500 GWh per year (most of them are SMEs) should carry out an energy audit and implement certain measures indicated in the energy audit (on which they need to

[79] Technical Assistance study on assessing progress in implementing Article 7 of the EED and preparing the policy implementation in view of the new obligation period 2021-2030, Fraunhofer, 2020

80 Analyse der Entwicklung des Marktes und Zielerreichungskontrolle für gesetzlich verpflichtende Energieaudits and PwC (2018). Evaluierung der Förderprogramme „Energieberatung im Mittelstand" und „Energieberatung für Nicht-wohngebäude von Kommunen und gemeinnützigen Organisationen". Endbericht Frankfurt, September 2018

81 European Council for an Energy Efficient Economy (2016), Enhancing the impact of energy audits and energy management in the EU, A Review of Article 8 of the Energy efficiency Directive, See: https://tech-action.unepdtu.org/wp-content/uploads/sites/2/2016/04/eceeereport-article8review-correctedformat.pdf

report annually). In the Netherlands, large companies should also carry out certain energy efficiency measures with a payback period up to five years.

The effectiveness of the provisions on SMEs was also addressed as part of the targeted stakeholder consultation. The 20 Member States that responded to the questionnaire mentioned some 36 different schemes targeting SMEs. Of these 40% are related to information activities and 35% are financial or economic schemes. Some stakeholders stated that the article has contributed to a higher uptake of energy audits and energy management systems in SMEs.

Regarding awareness raising on energy audits in households, Member States have implemented a number of different measures including information activities or financial or economic incentives, which are implemented for the purposes of other articles of EED, e.g. Article 7, 9, 10, 12 and 17 and for the purposes of provisions in the EPBD.

In conclusion, despite the positive impact observed due to Article 8, the analysis reveals the following limitations to reaping energy savings potential:

- Lack of monitoring and reporting requirements for energy audits and on the measures implemented as a result of the energy audit;
- Difficulties related to application of the SMEs definition (Article 8(4));
- Lack of requirements/ incentives for implementing energy management systems;
- No requirements for enterprises to implement the energy saving opportunities identified in an energy audit;
- Lack of energy auditors and low technical competence in some Member States.

Feedback received in stakeholder consultation indicate significant support for energy audit obligation to be based on energy consumption. A large number of stakeholders also point out that the obligation should be accompanied by requirements to carry out certain measures identified in the audit, and that energy audits should include recommendations on use of renewable energy and resource efficiency.

More specifically in relation to the assessment of Article 8(4) in line with Article 24(12), a detailed assessment of the **implementation of the non-SME definition** has been carried out[82]. This highlights the main difficulties encountered by Member States in implementing the Article 8(4) provision. In practical terms the main challenges relate to the difficulty of establishing connections between different SMEs, in particular cross-border ones, that might bring them within the scope of Article 8(4). From an economic perspective, it appears that the use of the current definition brings a proportion of enterprises within its scope for whom the economic costs of carrying out an energy audit are not justified by the potential energy savings. The assessment explores alternative

[82] Technical assistance on assessing the effectiveness of the implementation of the definition of small and medium-sized enterprises for the purposes of Article 8(4) of the Energy Efficiency Directive

definitions based upon energy use or cost or a mixture of size and energy use. It concludes that most alternatives offer a lower administrative burden, however in some cases these result in a significant shift in the types of enterprises within the scope – primarily covering more transport companies.

- ***Articles 9-11 on metering and billing***

Requirements on metering and billing contributed to achieving energy savings, thanks to the increased awareness of energy consumption patterns at an end-user level. However, certain gaps that impeded the full tapping of the energy savings were identified in the dedicated evaluation in 2016[83] and were subjected to revision in 2018. Examples of gaps and areas of improvement included the definition of the end user to complement that of the final customer, the availability of transparent heat cost allocation rules, the frequency of billing information to consumers, etc.

The impact of the new provisions cannot be assessed at this stage as the transposition deadline was only 25 October 2020[84].

Castellazzi[85] and Zangheri, Serrenho & Bertoldi[86] studied the impact of the provisions of these Articles and concluded that metering of energy consumption can contribute to reducing a household's energy consumption in a range of 5 to 10%. The Empirica guidelines for sub-metering[87] refer to a meta-study that found a median of 3% reduction in heating consumption when using basic consumption information services. They also refer to a pilot where a median of almost 6% reduction was found when using advanced consumption information services. Thus, it confirms the findings of the EED evaluation in 2016 that metering and billing have contributed to the achievement of the overall energy efficiency targets.

- ***Article 12 on consumer information and empowerment***

In terms of promoting consumer information and empowering programmes, the stakeholder consultation showed that Article 12 had a moderate effect in terms of empowering consumers and tackling energy poverty. Although Member States take many measures at national level to raise awareness and provide information to energy

[83] SWD(2016) 399 final

[84] Revised provisions for the metering and billing of electricity have been included in the Electricity Directive 2019/944 and their transposition deadline is 31 December 2020

[85] https://ec.europa.eu/jrc/en/publication/analysis-member-states-rules-allocating-heating-cooling-and-hot-water-costs-multi-apartmentpurpose

[86] https://www.mdpi.com/1996-1073/12/19/3788/htm

[87] https://ec.europa.eu/energy/studies/specific-guidance-sub-metering-thermal-energy-multi-unit-buildings-implementation-articles-9_en?redir=1

consumers, citizens, and energy stakeholders[88], there is no concrete data to allow for the measurement of their effectiveness and their contribution towards the overall achievements of the objectives of the EED as a whole. In addition, exchange of good practices and coordination between Member States and stakeholders is incidental due to the non-binding form of the Article.

- ***Article 14 on energy efficiency in heating and cooling***

Interim findings indicate that Article 14 helped increase the awareness of energy efficiency potentials in the heating and cooling sector in the Member States leading to implementation of energy efficiency measures. This is mainly due to the requirement to carry out a comprehensive assessment of the potential for efficient heating and cooling, in line with Article 14(1). Assessments of the high-efficiency cogeneration and efficient district heating potentials were performed in most Member States, and significant economic potential of high efficiency cogeneration and efficient district heating and cooling were identified in most cases. Important potential to reduce losses in existing heat networks were also identified by many Member States. However, in general, no or only very few heating and cooling policies and measures implemented in the Member States are directly linked to the comprehensive assessments. Stakeholders' feedback largely confirm this finding.

Analysis shows that almost all Member States have introduced policies in the heating and cooling sector either aimed at improving energy efficiency or increasing use of renewable energy and therefore also primary energy efficiency. However, most of the measures targeting heating and cooling at an end-use level have been introduced for the purposes of energy savings obligation in line with Article 7 (e.g. installation of more efficient heating systems at building level) or provisions under the Renewable Energy Directive. On the contrary, a vast majority of Member States have not identified new measures to realise the identified potential for high efficiency cogeneration and efficient district heating and cooling, in line with Article 14(2) and (4)[89]. An overview of the measures reported in the final NECPs submitted in 2019-2020 is presented in Table 14 in Annex 4.

The requirements in Article 14 have to some extent contributed to promoting high efficiency cogeneration and efficient district heating and cooling, mainly as a result of the identification of potential in the comprehensive assessments, the cost-benefit analysis requirement in Article 14(5) and mandating public support exclusively to high efficiency

[88] Examples can be found in: https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/effective-information-measures-promote-energy-use-reduction-eu-member-states; Rivas Calvete S.; Cuniberti B.; Bertoldi P. Effective information measures to promote energy use reduction in EU Member States . EUR 27997 EN. Luxembourg (Luxembourg): Publications Office of the European Union; 2016. JRC100661.

[89] https://publications.jrc.ec.europa.eu/repository/bitstream/JRC112225/jrc112225_synthesis_report_final.pdf

cogeneration in line with Article 14(11). However, economic potential for cogeneration identified by Member States in 2011 has in most cases not been achieved[90]. The situation differs among Member States. While in some, the construction of new cogeneration facilities is promoted and the share is growing, some Member States expect reduced capacity in cogeneration due to more difficult competitive situation in their national markets.

In particular, the cost-benefit analysis requirement in line with Article 14(5) is lacking impact on increasing efficient supply of heating and cooling. There are several shortcomings influencing the overall effectives of this requirement. These analyses in practice focus mostly on power-only installations and are not applied to heat-only installations, thus preventing improvements e.g. in process heat generation. In addition, the analysis for potential utilization of waste heat is limited only to industrial installation, thus leaving a range of potential sources of waste heat from other business activities in the service sector. Moreover, the effectiveness of the link between the results of the analysis and authorization criteria in line with Article 14(7) is questionable, taking into account the overall awareness of this requirement is considered as low. In addition, the wide use of the existing exemptions to the requirement in line with Article 14(6) without justification reduces the overall effectiveness of the requirement. Finally, the requirement does not address the whole range of potential efficient heating technologies and solutions and therefore reduces the effectiveness in increasing primary energy efficiency of heat supply.

As regards efficient district heating and cooling, despite being defined in the EED, it is addressed in Article 14 only to a limited extent, in particular by the requirements in Article 14(1) and (4). However in light of the abovementioned low impact of these provisions and taking into account the fact that NECPs do not foresee a significant expansion of (efficient) district heating and cooling in the period of 2021 to 2030 either, the effectiveness of Article 14 in increasing of the uptake of efficient district heating and cooling remains somewhat limited.

Indirectly, Article 14 has contributed to the use of EU funds to upgrade district heating systems. For measures to promote high efficiency co-generation and reconstruction of district heating systems planned under the ERDF and CF funds for the period 2014-2019 were 5028 billion euro, total amount of funds decided during the same period were 2,153 billion euro.

Despite its established scope of heating and cooling, the overwhelming majority of provisions in Article 14 address solely heating supply without addressing cooling. Although heating currently represents a much larger share of energy consumption than

[90]https://publications.jrc.ec.europa.eu/repository/bitstream/JRC112225/jrc112225_synthesis_report_final.pdf

cooling, energy consumption associated with cooling is steadily increasing[91]. Despite its increasing importance, only a minority of Member States address cooling wzith specific policy measures. A comprehensive framework for addressing cooling is missing in Article 14 and the whole Directive, e.g. measures promoting energy system integration or utilization of waste heat from cooling systems and processes in buildings and industries.

Utilisation of waste heat is to some extent in the current scope of Article 14, most notably in terms of increasing the awareness of the existing potential in waste heat utilization by the way of carrying out the comprehensive assessments and the cost-benefit analysis in case of industrial installations (Article 14(5)). However, the overall effectiveness of the current provisions is insufficient, due to its limited scope. The existing requirements in Article 14 are limited to waste heat produced in industrial installations, thus leaving out some sources of waste heat, such as data centres or other services such as shopping centres or buildings in general. In general, the support for waste heat reuse is not very common among Member States, however the assessment of the NECPs shows that some Member States have implemented or are planning to implement measures in order to support waste heat utilisation.

In some Member States, district heating services are subject to a price regulation. Possibilities to promote energy efficiency through price regulation have not been utilized in EED. Some of these regulation frameworks address also the efficiency aspects through obligations to undertake energy efficiency measures, and some of them incentivize operators to improve energy efficiency of the district heating service.

The stakeholder consultation, including the stakeholder workshop on heating and cooling revealed that many Member States believe that Article 14 has contributed only to small efficiency improvements and that relevant areas are left out of Article 14 such as data centres, higher system integration (use of waste heat, electrical and thermal efficiencies), building-level measures (heating systems and heat pumps) and local planning and development. Furthermore, the comprehensive analysis have been lacking on the implementation side i.e. the utilization of the identified potential has not been supported by implementation of policies and measures.

Article 15 on energy transformation, transmission and distribution

Some provisions with a view to improve efficiency of energy transformation, transmission and distribution (Article 15) have been effectively implemented in the Member States, for example, treating energy losses as a separate item in the national efficiency regulations and incentivising demand-side resources in Member States. However, the use of common methodologies and reporting is still not in place and their impact therefore cannot be assessed. In fact, there is no uniform definition of energy losses across the EU which results into a sub-optimal data quality.

[91] According to estimates a three- to five- fold increase by 2030

Even though the available information shows a gradual increase in energy efficiency (equivalent to a reduction in energy losses – see Table 4), the feedback obtained from stakeholders show limited evidence to fully evaluate the effectiveness of Article 15.

Table 4: Energy losses as a percentage of energy available for consumption in the EU

Energy source	2012	2013	2014	2015	2016	2017	2018
Gas	0.96%	0.83%	0.84%	0.85%	0.72%	0.72%	0.75%
Electricity	7.53%	7.60%	7.43%	7.51%	7.39%	7.28%	7.44%

Source: Eurostat

A study in 2015[92] shows various technical solutions for improving grid efficiency: in electricity networks for example as confirmed by other studies[93,94] the most relevant potential lays in transformers; Commission Regulation 2019/1783 establishes higher efficiency standards (Tier 2) for all transformers installed since July 2021 thus steering the network development towards better efficiency. Although there is no common definition of "non-technical losses", in some countries they are significant; and the gradual deployment of smart meters will help substantially reduce losses by making their detection easier and faster. Article 19 of the new Electricity Directive 2019/944 gives a strong impulse to this evolution; the current state of play is the object of a specific report[95]. Other more technical instruments, like replacing the conductors or raising the voltage should be addressed on a case by case basis, as their effectiveness depends on the specific punctual condition and are therefore unfit for an EU action.

In gas networks the circumstances are more complex, as energy losses take different forms[96], which can be divided into two groups: the first, and most likely the largest, is represented by the energy contained in the methane released as such into the atmosphere, the second is gas own consumption i.e. used as an energy source within the networks to move or heat the gas itself. The first issue is already actively addressed by the "Methane Strategy[97]", as the methane leaked in the atmosphere (not only in gas networks) is a

[92] Study on Identifying Energy Efficiency improvements and saving potential in energy networks, including analysis of the value of demand response, in support of the implementation of Article 15 of the EED, Tractabel, 2015 (https://ec.europa.eu/energy/sites/ener/files/documents/GRIDEE_4NT_364174_000_01_TOTALDOC%20-%2018-1-2016.pdf)

[93] https://setis.ec.europa.eu/sites/default/files/reports/Report-on-saving-potentials-energy-transmission-and-distribution.pdf

[94] https://ec.europa.eu/energy/studies/identifying-energy-efficiency-improvements-and-saving-potential-energy-networks-and-demand_en

[95] https://ec.europa.eu/energy/studies_main/final_studies/benchmarking-smart-metering-deployment-eu-28_en

[96] Chapters 5 & 6 : https://ec.europa.eu/energy/studies_main/final_studies/benchmarking-smart-metering-deployment-eu-28_en

[97] https://ec.europa.eu/energy/sites/ener/files/eu_methane_strategy.pdf

powerful greenhouse gas in its own merit as well as for safety reasons. The second, which only occurs in the transmission system and represents a smaller share, can be addressed by replacing the existing compressors with more efficient ones, incurring high investment costs.

The literature review indicates that most European regulations targeting gas and electricity tariffs do not treat energy losses as a separate item (instead, energy losses are included in the costs subject to the general regulatory benchmarks). Hence, the evidence indicates that most of the Member States incentivize the energy transmission operators to reduce energy losses if those reductions are economically efficient[98].

The analysis shows that implementing a common methodology to measure energy losses across Member States poses a number of challenges. One of the reasons is that implementing a common methodology can be too prescriptive as the regulatory systems and starting points of each Member States are different, also confirmed by the stakeholders that participated in the workshop, which was held to discuss the findings of the study.

In addition, there is a trade-off between flexibility and efficiency that should be considered in a local context, e.g., of how increased flexibility can incur costs to the end-consumers and negatively affect energy poverty[99]. A majority of stakeholders thus showed reluctance to introducing additional common efficiency requirements supported only by the minority of the respondents[100].

Article 15 also contained requirements for promoting demand side resources before they were repealed by the new Electricity Directive in 2019 (to be transposed by Member States by 1 January 2021). In meeting the requirements for balancing and ancillary services, TSOs and DSOs must treat demand response[101] providers, including aggregators, in a non-discriminatory way with Member States engaging in defining technical parameters to promote access and participation of demand response in balancing, reserve and other system services markets. National Regulatory Authorities should also guarantee that clear technical rules and operational requirements (tendering, contractual arrangements, etc.) are disclosed, based on which demand response can take part in the balancing market and in other system services[102].

---

[98] https://www.ceer.eu/documents/104400/-/-/fd4178b4-ed00-6d06-5f4b-8b87d630b060

[99] Based on results from the workshop held on 16 September 2020

[100] Outcome of the stakeholder workshop on Article 15 of the EED, held on 16 September 2020

[101] According to Electricity Directive (Article 2(20)) "Demand response means the change of electricity load by final customers from their normal or current consumption patterns in response to market signals, including in response to time-variable electricity prices or incentive payments, or in response to the acceptance of the final customer's bid to sell demand reduction or increase at a price in an organised market as defined in point (4) of Article 2 of Commission Implementing Regulation (EU) No 1348/2014 (17), whether alone or through aggregation".

[102] JRC report: Demand Response Status in the Member States, 2016. Zancanella, P., Bertoldi, P. and Kiss, B., EUR 27998 EN, Publications Office of the European Union, Luxembourg, 2016, ISBN 978-92-79-59818-0, JRC101191

According to the JRC study of 2016 and information collected from the Member States, the EED constitutes a significant step towards the development of demand response in Europe. Even though a majority of Member States faced challenges to introduce the necessary parameters for ensuring demand response in their countries, this trend has been changing positively with more Member States taking necessary steps to overcome the barriers. While back in 2013 demand response was almost non-existent in Europe, today consumers have the opportunity to participate in demand response services in many Member States in accordance to the EED and now in line with the provisions of the new Electricity Directive[103].

For example, in the Netherlands a scheme has been developed to ensure that providers of demand side response services can compete in the market for the provision of system services if, by switching installations on and off, can contribute to the balancing of the system. Similar schemes have been adopted in other European countries[104].

More recently, the Electricity Directive (Article 17)[105] sets forth a more detailed framework for transmission and distribution operators.

Moreover, analysis shows that the Article 15(1) EED requires that national energy regulatory authorities pay due regard to energy efficiency in carrying out the regulatory tasks [106], and provide suitable incentives to network operators, due to the interpretation given in several Member States the role played to date has been modest.

Despite evidence on energy efficiency potential in energy grids and on technical instruments, the pursuit for an EU level action has been inconclusive so far, due to the following factors:

- The natural evolution of the grids will lead towards energy efficiency, especially the electricity ones;
- The results of the CBA often advise against a massive elective intervention;
- Concern that energy efficiency investments may ultimately result in higher prices for the final consumers;
- Gas network operators are reluctant to invest because of the uncertainty about the long term role of this energy source;
- Reluctance to have a “common methodology” given the diversity of grids.

- ***Article 16 on availability of qualification, accreditation and certification schemes***

[103] Demand Response Status in the Member States, JRC 2016

[104] Based on Concerted Action – Energy Efficiency Directive (2016), National EED Implementation Reports (NIR), see https://www.ca-eed.eu/content/download/3519/file/National%20Implementation%20Report%20-%20Consolidated%20document%202016.pdf

[105] Directive EU/2019/944

[106] And also, indirectly, Articles 58 and 59 of Directive 2017/944/EU

Findings suggest that the majority of Member States have established qualification, accreditation and certification schemes covering energy services, energy audits, energy managers and installers[107]. Overall, it seems that the Directive has contributed to setting up the schemes, although in some Member States the schemes existed before.

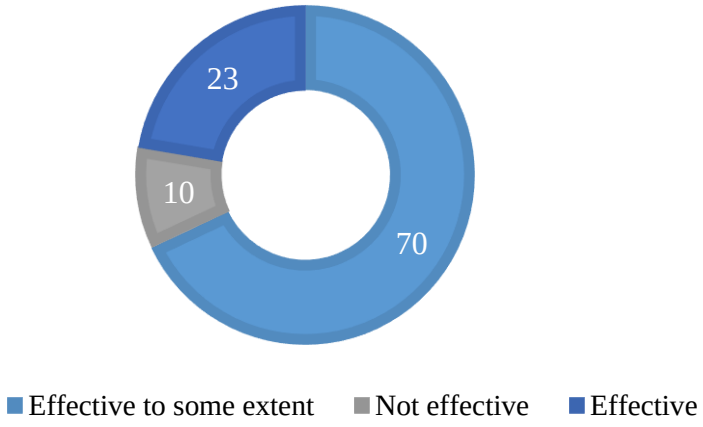
There is limited information available, though, on whether the qualification and certification schemes are effective in ensuring the right level of technical competence in Member States for all energy efficiency specialists (required by Article 16).

Article 16 does not contain any specific requirement for Member States to report in the level of qualifications nor on the availability of schemes. However, Member States were required to assess whether the level of technical competence was sufficient before end 2014. The information received from Member States in the 2014 Annual Reports showed that 10 Member States have reported to have sufficient schemes available (Belgium, Bulgaria, Cyprus, Denmark, Croatia, Lithuania, Malta, the Netherlands, Poland and the United Kingdom).

Feedback received from stakeholders show that the EED largely contributed to setting up the schemes, and this was mostly due to the other EED provisions such as the requirements to carry out energy audits in non-SMEs in line with Article 8 and ensure the need for certified energy services providers in line with Article 18 of the EED.

The majority of stakeholders hold view that qualification and certification schemes are effective to some extent, and the effectiveness of the schemes varies across the Member States (see Figure 8 below).

Figure 8 - Effectiveness of the existing certification and/or accreditation schemes in the EU



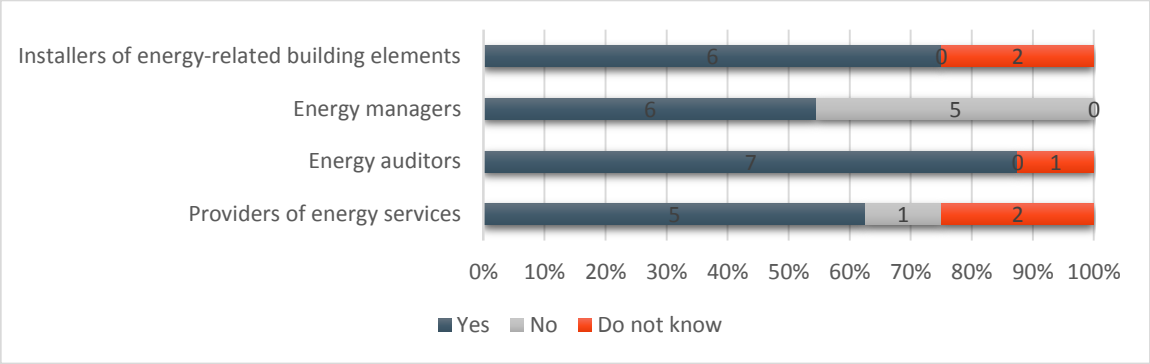
Source: feedback from the open public consultation

In addition, the level of technical competence varies across the category of specialists (see Figure 9) and the technical competence seems to be satisfactory for energy auditors

[107] Final report of technical assistance study on evaluating the EED, COWI, 2021

given the high demand for these specialists linked also to the obligation for non-SMEs to carry out energy audits every four years.

Figure 9 – Do you think the level of technical competence of providers of energy services, energy auditors, energy managers and installers of energy-related building elements is sufficient in your country?



Source: Technical assistance study on evaluating the EED (2020)

Given that the greater focus is placed on boosting skills and technical competence of the renovation sector in the context of the Renovation Wave, there is a scope for streamlining the provisions in Article 16 to bring them in line with the new policy context.

- ***Article 18 on energy services and energy performance contracting***

The EED largely contributed to functioning of **energy services** markets and to promoting the use of **energy performance contracting** in renovation practices in the EU both in public and private sectors[108], thanks to the requirements for Member States to provide information to SMEs and consumers about the available contracts and financing instruments and the available energy services providers that are certified (in line with Article 16).

Before the entry into force the concept of energy performance contracting was a novelty for most of the Member States. Provisions in Article 18 triggered the basis for establishing the necessary market conditions and regulatory framework that were vital to establish trust to this business model[109]. However, the EED provisions were implemented at a varying level (see Table 15 in Annex 4) and it was not the only instrument to promote the energy services markets. Supportive financing framework and measures introduced at EU level and national level have also largely contributed such as measures promoted under the Smart Finance for Smart Buildings initiative, ELENA project

[108] JRC Report on energy services markets in the EU, 2019. Bertoldi, P., Boza-Kiss, B. and Toleikyte, A., Energy Service Market in the EU, EUR 29979 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-13092-5, doi:10.2760/45761, JRC118815JRC

[109] JRC Report on energy services markets in the EU, 2019. Bertoldi, P., Boza-Kiss, B. and Toleikyte, A., Energy Service Market in the EU, EUR 29979 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-13092-5, doi:10.2760/45761, JRC118815

development assistance, European Structural and Investment Funds, Horizon 2020 and EIB guarantee funds.

Overall, requirements of Article 18 have been implemented to some extent by most of the Member States[110]. However, success in addressing regulatory and market barriers since the entry into force of the EED was somewhat modest as there are still important barriers that impede the functioning of energy services markets and the uptake of energy performance contracting (see Table 16 in Annex 4)[111], namely:

- Inexperience of actors: lack of technical knowledge, lack of experience in procurement etc.;
- Low trust to energy service providers and energy performance contracting from the (potential) clients: absence of credible reference cases, lack of standardisation of measurement and verification of savings;
- Ambiguities in the legislative framework: ambiguities in the legislative framework supporting the development of the ESCO market;
- Low level of awareness: lack of information among consumers on the potential of energy savings.

Uptake of energy performance contracting in public sector proved to be to some extent effective thanks to the specific obligations requiring Member States to provide model contracts and information on best practices on available contracts and tools such as the cost-benefit analysis. However, the implementation of these obligations depended very much on the political commitment and measures taken at national level (see Table 17 in Annex 4). More specifically barriers encountered by the public sector are mostly related to trust and ambiguities of the legislation framework, also lack of expertise to prepare the projects, especially as regards to complex tendering procedures), but also competing contracts – cheap loans and grants are preventing the public authorities to take risks of entering contract with the energy services provider.

As demonstrated in the recent JRC analysis, the updated Eurostat Guide in September 2017 on the treatment of EnPC in government accounts (and the EIB Practitioners' Guide on the updated Eurostat guidance in May 2018) have facilitated the appetite for concluding more energy performance contracts[112] in the public sectors even though some

---

110 JRC Report on energy services markets in the EU, 2019. Bertoldi, P., Boza-Kiss, B. and Toleikyte, A., EUR 29979 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-13092-5, doi:10.2760/45761, JRC118815

111 More detail could be found in JRC reports on energy services markets of 2019 and of 2020 (i.e. Moles-Grueso, S., Bertoldi, P. and Boza-Kiss, B., Energy Performance Contracting in the Public Sector of the EU, 2020, EUR 30614 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-30877-5, doi:10.2760/171970, JRC123985)

112 Allowing EnPC to be treated "off-balance sheet of government accounts" or "Maastricht neutrality" if specific conditions are ensured.

Member States reported that they still face difficulties to apply the rules at national level (due to complexity of rules, ambiguities of national legislation and lack of experts)[113].

Over 75% of respondents to the JRC survey 2018[114] underlined that the Energy Efficiency Directive has been instrumental in promoting the energy services market in the Member States, and has contributed to achieving energy savings in Europe.

Stakeholders feedback confirm that Article 18 contributed to the functioning of energy services markets even though the provisions ought to be strengthened to ensure better enforcement and tackling of remaining barriers. Amongst the most important factors that contributed to the development of the energy services market in Member States, stakeholders point out to awareness raising measures and access to financing, followed by certification and qualification of energy services providers. There is a need to consider setting requirements of minimum qualifications of service providers, or measurement and verification procedures to ensure better enforcement of Article 18 in the future.

- ***Article 19 on split of incentives & public purchasing and annual budgeting and accounting***

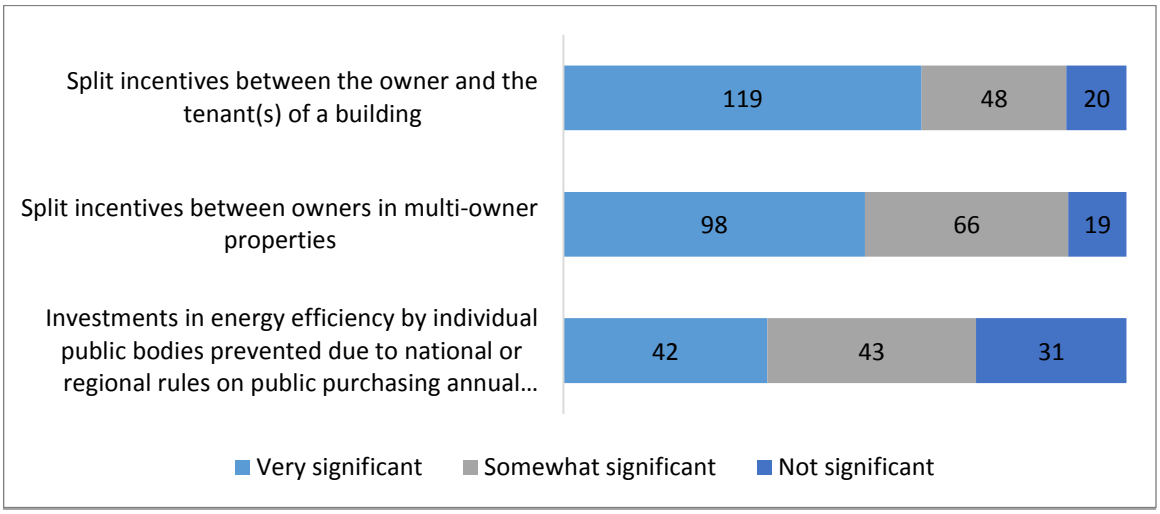
Feedback from stakeholders, during the targeted consultation, indicated that the EED has a small extent contributed to addressing the **split of incentives** and to removing of market and other types of barriers for public purchasing, annual budgeting or accounting (see

Figure 10).

[113] JRC report on Energy Performance Contracting in the Public Sector of the EU, 2020. Moles-Grueso, S., Bertoldi, P. and Boza-Kiss, B., EUR 30614 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-30877-5, doi:10.2760/171970, JRC123985

[114] JRC Report on energy services markets in the EU, 2019. Bertoldi, P., Boza-Kiss, B. and Toleikyte, A., Energy Service Market in the EU, EUR 29979 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-13092-5, doi:10.2760/45761, JRC118815

Figure 10 - How do you perceive the existence of regulatory, legal or administrative barriers to energy efficiency in the following areas?



Source: Feedback from the public consultation

Stakeholders assessed existing barriers as significant in relation to both the split of incentives (Article 19(1)) and the legal and regulatory provisions, and administrative practices, regarding public purchasing and annual budgeting and accounting (Article 19(2)). It is difficult to quantify the impact due to the implementation of Article 19.

In 2019, JRC carried out a study[115] to assess the progress made by Member States in relation to Article 19(1). The study found that 20 Member States had taken measures to address the issue of the split of incentives, whereas considering the criterion of multiple measures, less than half of the Member States (12) had implemented more effective policy mixes.

Concerning the removal of barriers related to (Article 19(1)b), 12 Member States had not provided information concerning the removal of these barriers or deemed it not relevant. Moreover, 14 Member States had not taken any measures in this regard.

- ***Article 20 on National Energy Efficiency Fund and financing mechanisms***

The findings show that provisions in Article 20 have partially contributed to establishing **financing facilities** across Member States. However, the lack of available data on the level of energy efficiency investments and financing in the Member States does not allow

[115] JRC report on assessement of progress made by Member States in relation to Article 19(1) of the EED, 2019. Economidou, M. and Ribeiro Serrenho, T., EUR 29653 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-79-99649-8, doi:10.2760/070440, JRC115314

to fully assess the magnitude of the financing measures put in place. In particular, due to its voluntary, coordinating and non-binding nature effects of provisions in Article 20 have not be widespread to all Member States.

On the other hand, the requirement for the Commission to assist the Member States in setting up financing facilities and technical support has been effective. To a large extent this is due to the active role the Commission had played over the past years through the EU funding programmes, in particular through the ESIF (European Structural and Investments Funds) and EFSI (European Fund for Strategic Investments) and various projects supported under the Horizon 2020, in particular the ELENA technical assistance facility. In this regard, the Commission has been particularly active also via a set of support measures to step up energy efficiency financing, in particular the Smart Finance for Smart Buildings initiative, the national roundtables of Sustainable Investment Forums, and the different working groups of the Energy Efficiency Financial Institutions Group (EEFIG).

It should be pointed out that Article 20 contributed to keeping a high focus on challenges and barriers to energy efficiency financing in the Member States. Despite the number of financing facilities in Member States have not significantly grew in the period under assessment, the number of cross-Member States initiatives and forums for the exchange of best practices have notably improved, contributing to the general streamlining and standardization of energy efficiency financing measures across Member States.

Furthermore, it should be underlined that the provisions of Article 20 allow for the use of the National Energy Efficiency Funds as an alternative to fulfil the renovation obligation of central government buildings under Article 5(1) through the contribution to the Fund or permitting the obligated parties to make contributions to the fund for the purposes of achieving the energy savings obligation under Article 7(1). There is not much evidence though available in relation to the contributions made for fulfilling the obligation under Article 5(1); however, in relation to Article 7(1) Spain has made an explicit use of this possibility in the context of its EEOS. Slovenia also uses the National fund for collecting payments from the obligated parties as an alternative to the EEOS to implement energy efficiency improvement measures.

According to the available data[116], Member States have introduced financial measures including national energy efficiency funds and financial and fiscal measures (such as taxation) and market-based instruments to one or more sectors in 2017 compared to 2014 indicating that the contribution to the establishment of financing facilities has not been widespread to all Member States.

Although Article 20 does not contain any specific obligations for monitoring and reporting on the implementation and the impacts, according to literature Member States

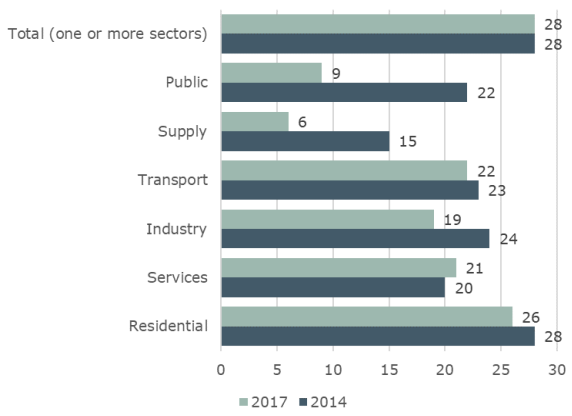
[116] Final report of technical assistance study on evaluating the EED, COWI, 2021

have established and made use of different financial instruments for the purpose of energy efficiency improvements.

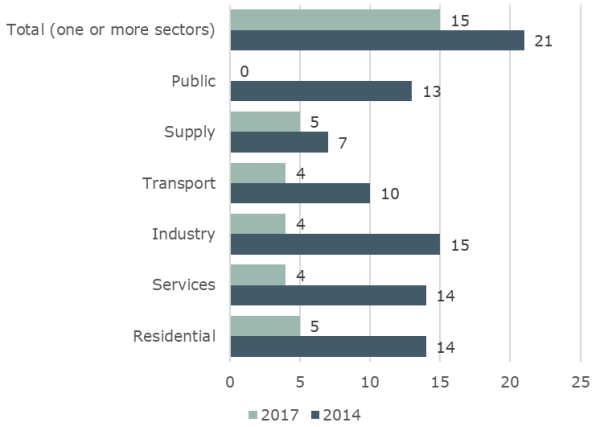
Figure 11 provides an overview of the market-based instruments (including white certificates) that were operational in 2017 compared to 2014 in selected sectors.

Figure 11 - Overview of the market-based instruments

10a: Application of Funds, financial and fiscal measures (including taxation)



10b: Application of market-based instruments (e.g. EEOS)



Source: Technical assistance study on evaluating the EED (2020)

Information received from Member States in the (NEEAPs)[117] show that all Member States have introduced financial and fiscal measures with a view to promote energy efficiency in their country, targeting different end use sectors: buildings, industry and transport sectors[118]. Information obtained in the annual reports also confirm the trend that implementation of the financial measures were relatively prioritized in all three years compared to other types of measures[119].

More specifically, around 130 public financial and fiscal schemes supporting energy renovations in buildings have been identified: around 61% of these are in the form of

117 The UK and EU-28 are included in the analysis in order to obtain larger data set for ex-post evaluation.

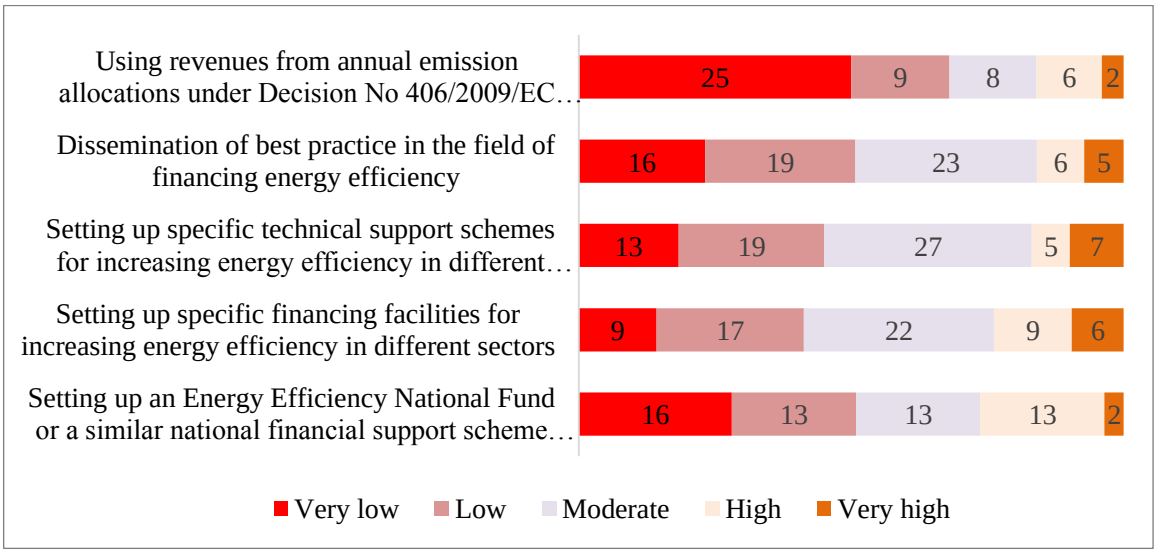
118 JRC assessment of the first and second NEEAPs under the EED, see: https://publications.jrc.ec.europa.eu/repository/bitstream/JRC110304/110304_neeap_2017_synthesis_final.pdf and http://publications.jrc.ec.europa.eu/repository/bitstream/JRC102284/jrc102284_jrc%20synthesis%20report_online%20template.pdf

119 Analysis of the annual reports under the EED, JRC, 2017 and 2018 see http://publications.jrc.ec.europa.eu/repository/bitstream/JRC115238/kjna29667enn.pdf, and Joint Research Centre (2020), Analysis of the annual reports 2019 under the Energy Efficiency Directive, http://publications.jrc.ec.europa.eu/repository/bitstream/JRC120194/synthesis_report_final.pdf

grants and subsidies, 19% soft loans, 10% tax incentives and the rest 10% combination of the above[120].

About half of the stakeholders consider that Article 20 have contributed to facilitated access to finance for energy efficiency projects. As regards the specific provisions of Article 20, stakeholders did not see that they would have led to the significant impact (as confirmed in feedback from the public consultation, see Figure 12).

Figure 12 - What was the impact of Article 20 in your country in the following areas?



Source: Feedback from public consultation

5.1.3. Evaluation question 3: What external factors have affected / continue to affect reaching the objectives of the EED?

Energy consumption trends are affected by various external factors that can strengthen or offset the impacts of energy efficiency policies. The Odyssee-Mure decomposition analysis[121] confirms that energy savings played a major role in reducing final energy consumption since 2005, but structural effects and climate effects were also leading to additional energy savings. These impacts were largely offset by growth in activity and to a lesser extent by changes in lifestyles and other effects.

According to Member States reporting, the recent increases in final energy consumption were driven by growth and an increase in: (i) production/ value added (industry); (ii) transport of passengers and goods (transport); (iii) the number of households and disposable income (residential); and (iv) value added and employment (services).

For the residential and services sector were space heating is an important use of energy, weather fluctuations also play a role and warmer winters in recent years helped to lower

[120] Report on accelerating energy renovation investments in buildings, JRC, 2019

[121] http://www.indicators.odyssee-mure.eu/decomposition.html

energy demand in those sectors. In transport, fuel prices affect to some extent transport activity in particular in for passenger transport. In addition, the growing share of new registrations for petrol cars, in particular sport utility vehicles (SUVs), seems to be another factor contributing to the increased energy consumption in road transport. The impact of COVID-19 on energy consumption in 2020 will be significant, mainly through the reduction of economic activity and mobility. This impact will, nonetheless, most likely be temporary and the subsequent recovery may lead to a rebound of energy demand.

Summary on findings of the effectiveness:

- The EED led to energy efficiency improvements across the EU thanks to its targets and binding measures (notably Article 7). However, the analysis (2018 data) shows that energy consumption both for final & primary are falling short of the EU targets for 2020 (1483 Mtoe – PEC, 1086 Mtoe – FEC).
- In 2018, progress towards the indicative national targets was insufficient in 12 Member States for PEC and in 15 Member States for FEC.
- Energy efficiency delivers a number of benefits further to improvements in energy efficiency and energy savings. Notably energy efficiency and the EED have contributed to the reduction of GHG emissions, both in terms of direct emissions from fossil fuel combustion or consumption and indirect emissions reduction from electricity generation
- Evaluation shows that different factors drive energy consumption in different sectors. The EED targets both the supply and end use sectors, through a set of measures and obligations. It should be noted that there is no exact data available on what impact specific measures of the EED had on the different sectors, except for Article 5 (exemplary role of public buildings) and Article 7 (energy savings obligations) which show that most of the energy savings have been achieved in the buildings sector.
- Article 7 (energy savings obligations) remains an effective measure. Despite the sufficient progress at EU level (according to 2018 data), 14 Member States risk not to reach their requirements by end 2020.
- Obligations for public sector (Articles 5 & 6) proved key to demonstrate its exemplary role of central governments in promoting energy efficiency via renovations and public procurement; however, the measures had overall a narrow scope and were implemented at a limited scale, and there are a number of limitations that prevent reaping energy savings potential in the public sector.
- The EED was key to promoting the use of energy audits across the EU, however important limitations remain such as lack of monitoring requirements for energy audits and the follow up, difficulties related to application of the SMEs definition (Art. 8(4)), lack of requirements/ incentives for implementing energy management systems amongst others;

- Article 14 on heating and cooling in particular the comprehensive assessments helped to increase the overall importance and awareness of heating and cooling in Member States; however, overall impact of Article 14 is rather low due to the several factors such as lack of follow-up policies and measures for implementing the potential identified in the comprehensive assessments, waste heat reuse not being sufficiently addressed, lack of focus on local aspects of planning and development of heating and cooling amongst others.
- Some provisions with a view to improve efficiency of energy transformation, transmission and distribution (Article 15) have been effectively implemented in the Member States, such as treating energy losses and incentivising demand-side resources. However, the use of common methodologies and reporting is still not in place and therefore their impact cannot be assessed. There is no uniform definition of energy losses across the EU which results into a sub-optimal data quality.
- The EED contributed to setting up the certification and qualification schemes (Article 16) to some extent, and the majority of Member States have established schemes covering energy services, energy audits, energy managers and installers. However, effectiveness of the schemes varies across the countries (the level of technical competence varies across the category of specialists).
- The EED largely contributed to the development of energy services markets and energy performance contracting (Article 18), however important barriers still remain and impede the uptake of EnPC such as ambiguities in the legislative framework, complex procurement procedures, lack of facilitators and technical capacity and lack of certified energy services providers, grants competing with public funding.
- Evaluation shows that the EED had a moderate effect to empower consumers as well as to tackle societal challenges like energy poverty given that a lot of measures have been taken at national level to raise awareness and provide information to general public, but difficulty to assess their effectiveness. Analysis shows that the EED contributed to some extent to address the issue of split incentives (Article 19), but their impact is strongly determined by the national context and the legal framework.
- The findings show that Article 20 on financing mechanisms has partially contributed to establishing financing facilities across Member States. The lack of available data on the level of energy efficiency investments and financing does not allow to fully assess the magnitude of the financing measures put in place in Member States. The requirement for the Commission to assist the Member States in setting up financing facilities and technical support has been effective.

5.2. Efficiency

In examining the evaluation questions on efficiency, a distinction, where appropriate and feasible, is made between the direct costs, the indirect costs, and the enforcement costs[122]. Each of these three types of costs cover a number of more specific sub-types of costs and are to a different degree borne by different stakeholder groups such as public administrations, business, and citizens and consumers.

5.2.1. Evaluation question 4: To what extent the costs involved in the implementation of the EED have been justified given the changes/effects that have been achieved (including wider benefits)? To what extent were the costs borne by different stakeholder groups proportionate to the benefits it has generated?

The counterfactual evaluation baseline established as part of the evaluation methodology has allowed to evaluate what would have been the outcome in terms of energy efficiency improvements, GHG emissions and other related benefits in the EU if the EED had not been implemented.

In order to understand the scale of costs and benefits attributed to the EED, it is necessary to assess the cost-efficiency of the various measures of the EED given their specific nature aiming at reaching different objectives.

The lack of data to quantify the impacts of multiple benefits[123] of the energy efficiency action has been recognised as an important obstacle in this evaluation, beyond the monetary value of energy savings. A magnitude of the impacts is provided by the EU-funded COMBI project[124]. The project showed that including monetised multiple impacts to a cost-benefit analysis of energy efficiency actions can increase the annual benefits by at least:

- 50% for a mix of energy efficiency actions[125];
- 70% for the residential buildings refurbishment actions.

The COMBI project modelled the ex-ante benefits of energy efficiency measures for the period 2020-2030, even though the qualitative findings of the positive multiple benefits of energy efficiency can show the positive impacts of already implemented energy efficiency measures.

In terms of costs Article 5 on **exemplary role of public buildings** generates a number of costs, which are borne principally by the national authorities implementing the obligation to renovate central government buildings or implement alternative measures. These include both costs related to administration (direct and enforcement), and investment

[122] According to the BRG Tool #58

[123] Indicatively air pollution, use of resources, social welfare, macroeconomic impacts and energy security

[124] https://combi-project.eu/

[125] Actions in 18 categories (4 for residential buildings, 4 for non-residential buildings, 4 for transport and 6 for industry)

costs associated with the renovation of buildings. Under alternative approach Member States incurred administrative costs linked to implementing various measures such as information campaigns, behavioural measures, optimisation of building use and energy management. The scale of costs varies between the measures.

In terms of benefits, those are the achieved energy savings and the reduction of GHG emissions as a result of the implemented energy efficiency improvement measures. In addition, wider socio-economic benefits such as improved work conditions and productivity of the buildings' users, and improved health of users and visitors are also expected to have arisen from the implementation of Article 5.

The DEEP database[126] shows the median avoidance costs (average cost in Eurocent for each kWh energy saved over the lifetime of the measure) of energy efficiency projects in public buildings is of 7.89 c/kWh (75% percentile is 12.24 c/kWh), in health care buildings of 2.53 c/kWh (75% percentile is 8.05 c/kWh) and in educational buildings of 2.77 c/kWh (75% percentile is 7.71 c/kWh).

The DEEP also shows the building fabric measures to be the most cost efficient and the integrated renovation as less cost efficient. The median simple payback time of verified energy efficiency projects in health care buildings is of 4.54 years in educational buildings is of 5.79 years and in public buildings is of 4.59 years. In the public buildings, at 4% discount rate and costs of energy of 0.11 Eurocents/kWh, integrated renovations show the highest net present value per investment and internal rate of return, followed by building fabric measures HVAC and lighting. Also in health care and educational buildings the integrated renovations show the highest IRR and NPV/Investment, with HVAC second and building fabric measures third, which lighting has a negative IRR. On the basis of the projects collected in the DEEP database, it can be concluded that at a discount rate close to interest rate accessible to public bodies, integrated renovations of public, health care and educational buildings are cost effective and provide a higher return on investment than lighter energy efficiency measures.

In 2018, BPIE quantified the benefits of energy renovation investments in schools, offices and hospitals[127]. It calculated that energy renovation investments could boost labour force productivity by up to 12%, worth up to 500 billion euros per year, improve educational performance of students and reduce the average length of stay in hospitals by 11%, potentially saving the European health sector up to 42 billion euros per year.

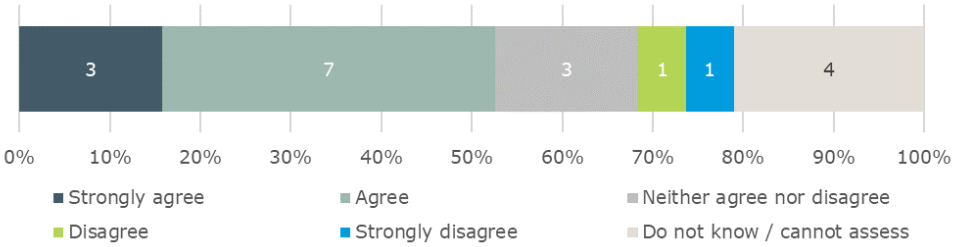
Feedback received from stakeholders, as part of the targeted consultation, suggests that the costs and benefits of implementing Article 5 are well balanced (see Figure 13). Stakeholders also highlighted that the benefits arising from energy efficiency measures in

[126] https://deep.eefig.eu/ . In the DEEP database, public buildings, health care buildings and educational buildings best correspond to the public bodies' buildings among the 13 categories that those who fill in their projects can choose.

[127] http://www.bpie.eu/publication/building-4-people-valorising-the-benefits-of-energy-renovation-investments-in-schools-offices-and-hospitals/

public buildings include other benefits that are not always factored into cost-benefit analyses, e.g. improved indoor air quality, increased comfort, better lighting, etc.

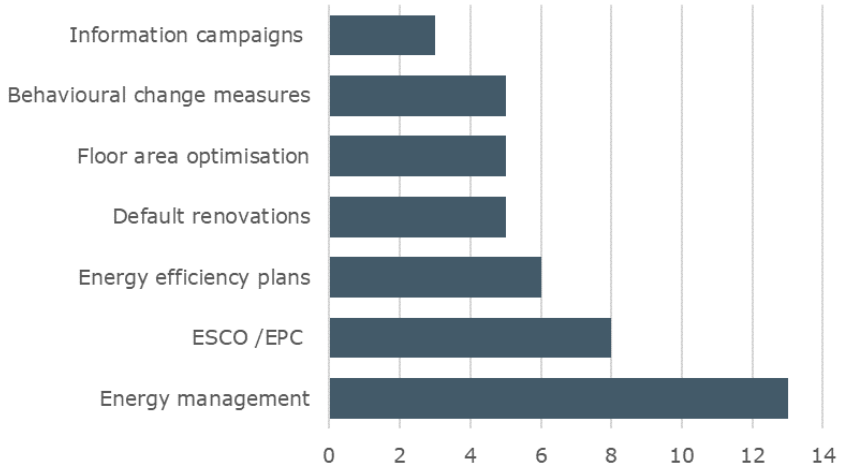
Figure 13 - To what extent do you agree with the following statement "The costs and benefits of implementing Article 5 are well balanced"?



Source: Technical Assistance study on evaluating the EED (2020)

Stakeholders also indicated which types of measures to ensure energy efficiency in public buildings they consider as the most cost-effective (see Figure 14 below). These include energy management, and use of energy performance contracting (ESCO/EnPC).

Figure 14 - Which types of measures to achieve energy efficiency in public buildings are most cost-effective?



Source: Technical Assistance study on evaluating the EED (2020)

The implementation of the EED on **purchasing of public bodies** (Article 6), is based on the principle that even if the initial purchase cost for energy efficient products, services and buildings is higher, extra costs usually are paid back over the lifetime thanks to the lower energy consumption. Examples of how this principle is effectively applied include the Ecodesign Directive the Energy Labelling Regulation appliances covering appliances[128].

[128] https://ec.europa.eu/growth/industry/sustainability/product-policy-and-ecodesign_en

Some small additional costs (indirect administrative costs) by implementing the legislation and changing procurement procedures, using internal or external support are expected to be very small compared to the benefits over time[129]. Until now, no public administration has raised the issue of these additional costs being a barrier.

As regards **energy efficiency obligation schemes** (EEOS) and alternative policy measures under Article 7 on energy savings obligations, the costs (programme and administrative costs) usually are distributed among programme users, obligated and participating parties, and public authorities.

Fraunhofer calculated the average weighted programme cost at EUR 0.011 per kWh lifetime energy savings. Adding both societal and administrative cost, the total cost is assessed to reach EUR 0.030/kWh saved. This is significantly lower than the corresponding average retail price of supplied energy, making the EEOS as very cost-efficient policy instrument[130].

The 2016 evaluation of the EED concluded that the alternative policy measures can also be cost-effective, depending on the level of the ambition of the measure, type of measure, its design and targeted sector[131].

When it comes to the wider benefits stemming from the EEOS, in addition to the achieved energy savings, EEOS trigger utility system benefits (for example reduced line losses resulting from load reduction within the electricity grid) and wide range of non-energy related benefits (such as GHG emission reductions and improvements of air quality)[132].

As regards **energy audits and energy management systems** (Article 8) the costs can be divided into three types: the administration of the relevant provisions by the public authorities, the cost of the energy audits and, if applicable, the necessary investments by the enterprises to implement the energy saving measures identified in the energy audit. There are no consistent data on the implementation of energy saving measures, primarily because Member States are not required to gather and report this data. Since implementation of the recommendations is voluntary it can reasonably be assumed enterprises will only implement those measures that make economic sense. Information on TIPCHECK industry heat audits shows that payback periods for the TIPCHECK insulation projects initiated typically were in most cases 2 years or less[133].

[129] Final report of technical assistance study on evaluating the EED, COWI, 2021

[130] Technical Assistance study on assessing progress in implementing Article 7 of the EED and preparing the policy implementation in view of the new obligation period 2021-2030, Fraunhofer, 2020

[131] SWD(2016) 403 final

[132] Final report of technical assistance study on evaluating the EED, COWI, 2021

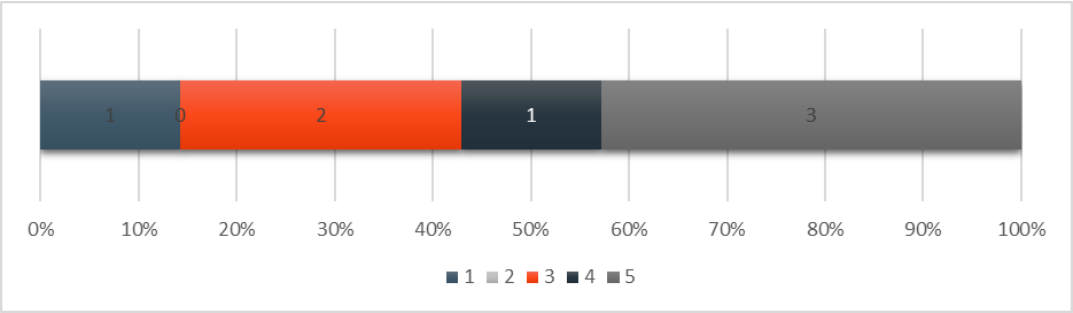
[133] https://www.eiif.org/tipcheck/tipcheck-benefits-industry

As part of the feedback received during the targeted workshops, two Member States (Germany and Denmark) provided data that shows that energy audits in enterprises is not cost-effective for relatively small or large but non-energy intensive enterprises.

Provisions concerning the **metering and billing** (Articles 9-11), especially the ones asking for the installation of (smart and/or remotely readable) individual meters are being implemented by each Member State under the condition of cost effectiveness and technical feasibility. Thus, benefits are expected to surpass costs in all cases[134].

During the targeted consultation, stakeholders indicated that the costs associated with the implementation of Article 14(1) and (3) in relation to **comprehensive assessments of the potential for efficient heating and cooling**, are proportionate to the achieved energy savings and other benefits (see Figure 15).

Figure 15 - To what extent were the costs associated with the implementation of Article 14 (including related annexes and definitions) proportionate to the achieved energy savings and other benefits? (n=7, 1: disproportionate -> 5: proportionate)



Source: Technical assistance study on evaluating the EED

The relevant JRC studies[135,136,137] and the feedback received from stakeholders during the targeted consultation suggest that measures under Article 19 (**split of incentives & public purchasing and annual budgeting and accounting**) are cost-efficient as they include either (low-scale) administrative costs and legislative actions, or technical help and financial schemes that lead to the unlocking of important energy savings potential.

[134] Directive (EU) 2018/2002 amending Directive 2012/27/EU on energy efficiency

[135] https://ec.europa.eu/jrc/en/publication/assessement-progress-made-member-states-relation-article-191-directive-201227eu

[136] https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/overcoming-split-incentive-barrier-building-sector

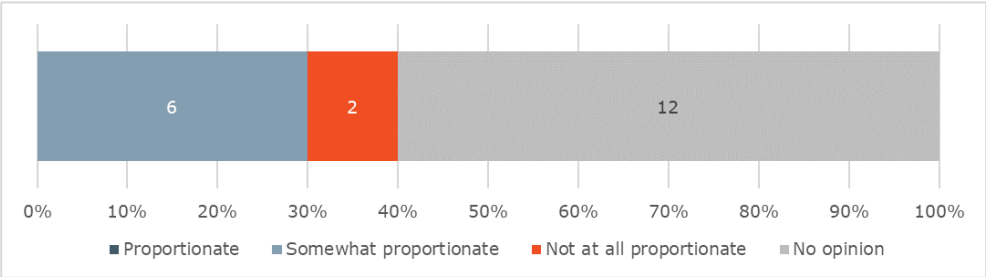
[137] https://publications.jrc.ec.europa.eu/repository/handle/JRC101251

5.2.2. *Evaluation question 5: To what extent were the scale of costs and administrative burden borne by different stakeholder groups proportionate to the benefits it has generated?*

The available evidence does not allow to capture the complete scale of costs and benefits per stakeholder group. Hence, the assessment is mainly done on basis of literature review and stakeholder feedback received from the targeted consultation.

In fact, stakeholders pointed out that they have difficulties in providing information concerning the scale of the administrative costs and burden associated with the implementation of the EED. When specifically asked, the majority of stakeholders either had no opinion, or otherwise, considered that the costs and benefits were proportionate (see Figure 16).

Figure 16 - How do you assess the administrative burden related the transposition and implementation of the EED? To what extent were these costs proportionate to the achieved energy savings and other benefits?

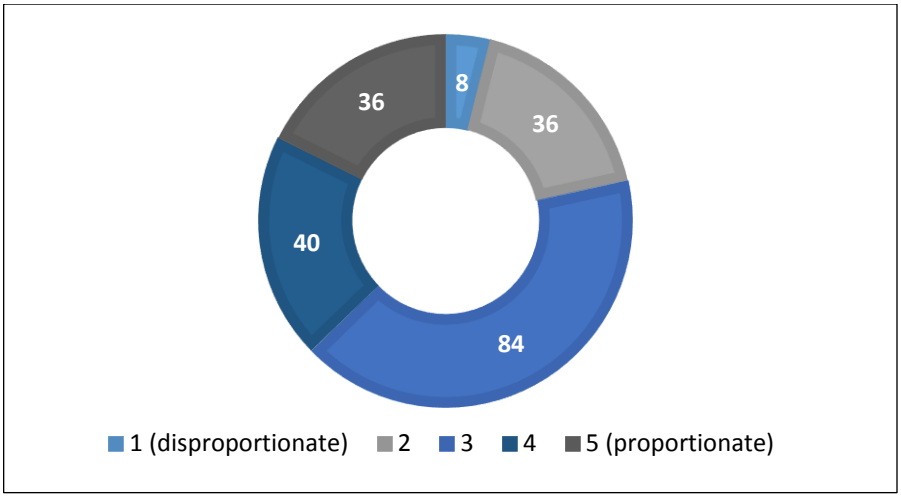


Source: Technical assistance study on evaluating the EED (2020)

Similarly, stakeholders responded that they had difficulties in assessing the scale of the costs for market actors that were generated by the EED. Most stakeholders (15 out of 20) indicated that they could not provide such information.

These results were confirmed by the public consultation feedback. A mere 22% shared the view that the costs associated with the implementation of the EED were (highly) disproportionate to the benefits. This implies that the great majority considers these costs to be proportionate to the outcome.

Figure 17 - To what extent were the costs associated with the implementation of the EED proportionate to the achieved energy savings and other benefits?



Source: feedback from the public consultation

Table 18 in Annex 4 summarises the main findings for the costs and benefits for the different stakeholder groups.

5.2.3. Evaluation question 6: What were the factors that influenced the efficiency of policy intervention and the implementation of the EED?

Lack of quantitative data hinders the effort to understand the factors that influence the efficiency of the EED and all its Articles.

On the **purchasing of public bodies** (Article 6), the main factor influencing the efficiency is how public bodies interpret and implement the requirements for cost-effectiveness or what capacity they have to make the initial investment. This is because the most energy-efficient solutions are typically more expensive to buy even if a lifecycle analysis makes the case for their cost-benefit efficiency.

For **energy audits and energy management systems** (Article 8), the majority of the Member States does not any longer see the barrier of the insufficient number of qualified energy auditors, a situation that could create bottlenecks and artificial delays or increased prices. More than 75% of the stakeholders responded during the consultation that the number of qualified energy auditors is sufficient to meet the demand of mandatory energy audits in non-SMEs.

On the implementation of the **metering and billing** provisions (Articles 9-11), the efficiency of policy intervention is mainly influenced by the national realities (e.g. tenancy and ownership norms) and condition of the building stock and how these determine the cost-benefit analysis that defined the technical or regulatory approach that each Member State followed[138,139].

[138] SWD(2016) 399 final

5.2.4. Evaluation question 7: Are there significant differences in costs (or benefits) amongst Member States, and if yes, what is causing them? How do these differences link to the intervention?

Little evidence on differences in costs amongst Member States has until now been provided and analysed.

On the **exemplary role of public buildings** (Article 5), Member States and stakeholders have reported a range of costs for the renovation of buildings, mostly determined by the level of renovation, the interventions that are typically included and differences in costs such as labour and building materials.

On the **energy savings obligation** (Article 7), information received from several Member States indicate a range of costs depending on the country and the policy measure. Differences in costs among Member States result from differences in the design of the policy measures, which entail the following:

- Whether the programme is focusing on one fuel or more;
- Sectoral coverage;
- Graphical coverage;
- Different evaluation, measurement and verification processes;
- Level of programme ambition;
- Programme objectives and support to beneficiaries

As a result, programme costs can vary from an average of €0.005 per kWh of lifetime savings in Austria, Denmark, France and Italy up to €0.035 per kWh of lifetime savings in the United Kingdom[140].

The implementation of the **metering and billing** provisions (Articles 9-11) depend on the cost-benefit analysis that each Member State carried out. This means that for all Member States benefits are expected to outweigh costs regardless of the degree and technical approach to implement the provisions[141].

The implementation of Article 14 on **promotion of efficiency in heating and cooling** and in particular the comprehensive assessments have incurred different scale of costs depending on the scope of the assessment and actions identified and taken[142].

<u>Conclusions on efficiency:</u>

---

[139] JRC, "Analysis of Member States' rules for allocating heating, cooling and hot water costs in multi-apartment-purpose buildings supplied from collective systems", 2017

[140] Technical Assistance study on assessing progress in implementing Article 7 of the EED and preparing the policy implementation in view of the new obligation period 2021-2030, Fraunhofer, 2020

[141] Directive (EU) 2018/2002 amending Directive 2012/27/EU on energy efficiency

[142] Final report of technical assistance study on evaluating the EED, COWI, 2021

- Overall, the EED had contributed to achieving energy savings in the EU in a cost-effective manner.
- Energy Efficiency Obligation Schemes under Article 7 have been a cost-efficient instrument in countries that have chosen to implement it. The costs largely depend on the level of ambition, type and design of measures.
- The implementation of several of the obligations in the EED is subject to "conditionalities" (e.g. Articles 5, 6, 9-11, 14), so that Member States are only required to act if it is cost-effective/ economically feasible/ technically possible. This allows Member States significant flexibility and allows them to adopt cost-effective measures (however Member States have not always demonstrated how the feasibility was established).
- In terms of efficiency, there are no indications for significant differences in the magnitude of costs amongst the Member States for most of the provisions of the EED, except for Article 7.

5.3. Relevance

The primary needs that the EED addressed was to tackle climate change thanks to the increased energy efficiency, take action to decrease dependence on energy imports and scarce energy resources, and overcome the economic crisis by improving the competitiveness of the European industry. These needs remain as relevant as when the Directive entered into force in 2012.

The key consideration under this criterion is whether the right market conditions and legal environment to enable the achievement of the EU 20% energy efficiency target for 2020 have been ensured or whether there remains a need and scope for further improvements in the future.

In addition, the evaluation examined whether the EED is able to adapt to new and emerging challenges and policy objectives, including the existing EU headline energy efficiency targets for 2030 of at least 32.5%[143] and the need to increase the energy efficiency efforts to achieve the higher climate target of at least 55% for 2030, as proposed by the Commission in the in the Climate Target Plan for 2030[144].

143 https://ec.europa.eu/energy/topics/energy-strategy/clean-energy-all-europeans_en

144 https://ec.europa.eu/clima/policies/eu-climate-action/2030_ctp_en

5.1.8. *Evaluation question 8: Did the Directive provide the right framework to reach the 20% energy efficiency target? To what extent is the EED framework still relevant in promoting energy efficiency in the EU?*

As indicated above, the EED contributes to reducing greenhouse gas emissions in a cost-effective way. EU greenhouse gas emissions have declined partly thanks to the EED[145]. Analysis from the European Environment Agency[146] shows that these reductions in GHG emissions have been achieved by a combination of factors including energy efficiency. The 2030 targets and the recent Climate Target Plan, which announced an increase of the climate ambition to at least 55% in a responsible way by 2030, continues to call for effective and efficient policy interventions to increase energy efficiency and reduce primary and final energy consumption across the EU.

The Impact Assessment accompanying the Climate Target Communication, clearly shows that achieving a GHG target of at least 55% requires a moderate or a high increase of energy efficiency across all energy system sectors[147].

The study on Article 7[148] investigated how the different energy efficiency policies at national and EU level contribute to the achievement of the EU energy efficiency target for 2030 and the EU 2050 decarbonisation goals. The study assessed the gap to the 2030 targets using data from the updated PRIMES Reference Scenario for EU28 and a EUCO32/32.5 scenario, designed to correspond to a 32% share of renewable energy in gross final energy consumption and a 32.5% energy efficiency target[149] in the EU.

For 16 Member States (adding up to 91% of the of final energy demand of the EU28), the impacts of energy efficiency measure result in a sum of 2053 PJ savings in 2030 in the baseline (excluding correction factors such as rebound effect and overlaps between the measures). This leaves a gap of 4310 PJ (more than two thirds) based on the results of the updated EUCO32/32.5 scenarios, making the case that EED is not only still relevant but in addition, needs to be strengthened to meet the 2030 targets[150] (see Figure 18).

Figure 18 - Impact of energy savings from energy efficiency measures ("Top1-5" & "Other measures" part of the bar) and gap for 2030 (yellow part of the bar) as compared to the updated EUCO scenarios for a select group of 16 Member States

[145] COM/2020/326 final

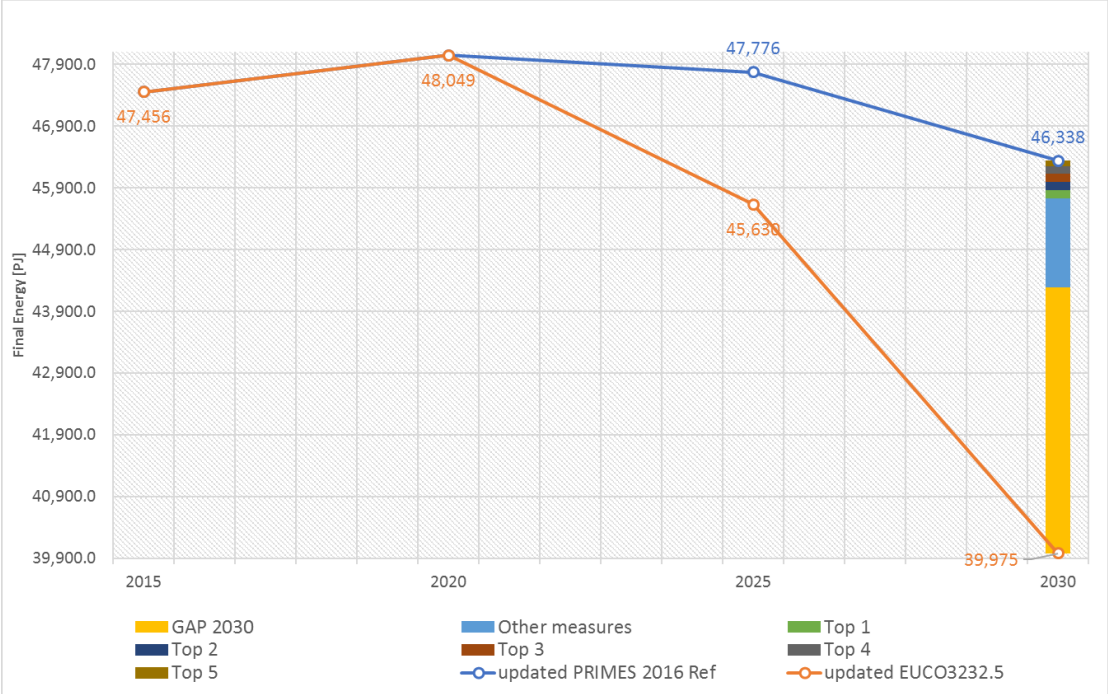
[146] EEA, 2020

[147] SWD(2020) 176 final

[148] Interim Report of technical Assistance study on assessing progress in implementing Article 7 of the Energy Efficiency Directive and preparing the policy implementation in view of the new obligation period 2021-2030

[149] The energy efficiency target in the EU, calculated as a reduction from the projections for the year 2030 compared to the 2007 baseline scenario (i.e. a 32.5% reduction from a primary energy consumption of 1887 Mtoe in 2030 and a final energy consumption of 1416 Mtoe projected for 2030 in the 2007 baseline).

[150] Interim Report of technical assistance study to develop a tool for assessing energy efficiency policies and measures, Fraunhofer, 2020

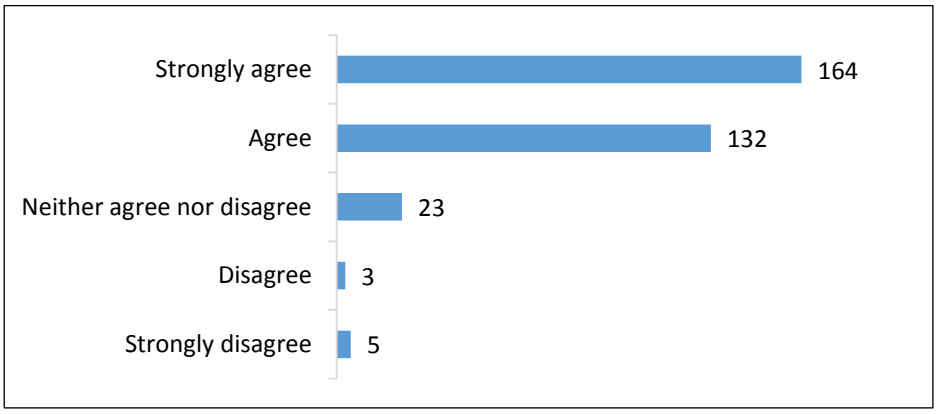


Source: Fraunhofer technical assistance study on assessing the energy efficiency policies (2020)

In the feedback received from stakeholders (as part of targeted consultation) it was suggested that the EED is a key legislative act, and there is a need for more ambitious energy efficiency targets for 2030 to achieve at least 55% greenhouse gas emissions reduction by 2030.

Participants in the public consultation were asked to assess the relevance of the EED to increase energy efficiency and remove barriers and market failures. A majority of stakeholders agreed that the EED has contributed positively to increase energy efficiency (see Figure 19**Error! Reference source not found.**).

Figure 19 - To what extent do you agree with the following statement? "The original objectives of the EED - to increase energy efficiency across the EU and to remove barriers and market failures in energy supply and energy use - are still relevant?



Source: Feedback from the public consultation

The provisions of the EED remain relevant as they set out a variety of instruments that lead to concrete energy efficiency actions and/or address a wide range of market and regulatory failures to enable energy efficiency services and investments. These objectives become even more relevant in the context of the 2030 ambitious climate and energy objectives[151].

Looking closer to the provisions on the exemplary role of public bodies (Article 5 and Article 6), the relevance of EED in improving the energy performance of public buildings (Article 5) and purchasing the most energy efficient products, services, buildings and vehicles (Article 6) is still present. The public sector is responsible for around 5% to 10% of the total final energy consumption in EU Member States [152]. Both EU interventions are providing better value for money in the operations of public administrations by reducing energy costs. This encourage manufacturers and suppliers to place more energy efficient products, services and buildings on the market. In addition, the intervention also supports a market transformation towards greater efficiency allowing final consumers to reduce their energy costs and providing a further market pull.

Specifically for Article 5 (exemplary role of public bodies' buildings), stakeholders mentioned during the targeted workshop that since a large proportion of public buildings across the Member States still do not meet the minimum energy performance standards, the need for obligations in Article 5 remain strong, supporting the continued relevance of the Article. Moreover, the stakeholders emphasised that the current scope of Article 5 leaves out a large volume of public buildings (for example, schools, hospitals and administrative buildings under the responsibility of regional and local authorities), with a significant savings potential.

In 2018, Article 7 on energy efficiency obligations was amended[153], so the intervention remains appropriate and relevant in light of the current policy context. As almost half of the savings of the EED are expected to be delivered through Article 7, the provisions play an essential role in unlocking the energy saving potential in the end use sectors[154] - buildings, industry and to some extent transport.

Given the untapped energy saving potential, energy audits and energy management systems as stipulated in Article 8 remain also relevant in all end-use sectors throughout the EU, given the still untapped energy savings potential. The ongoing CEPS study[155] estimates that the energy savings potential for non-SMEs, within the scope of Article

---

151 COM(2020) 562 final: Climate Target Plan

152 Energy Performance Contracting in the Public Sector of the EU, JRC, 2020

153 SWD (2016) 402 final

154 SWD (2016) 402 final

155 CEPS (2020), Technical assistance on assessing the effectiveness of the implementation of the definition of SMEs for the purposes of Article 8(4) of the EED

8(4), amounts to 7% of total company final energy consumption as an EU average. Moreover, energy audits and management systems have proven to be an effective tool for specifically identifying energy saving opportunities and their financial feasibility in enterprises.

The relevance of the provisions on metering and billing (Articles 9-11) was evaluated positively in 2016 during the targeted revision of the EED. The revised provisions concerning heating, cooling and domestic hot water came into force on 25 October 2020.

During the targeted consultation, stakeholders not only agreed that Article 12 (consumer information and empowerment) is still relevant but that it should also be strengthened to deliver more impact, particularly in tackling social challenges like energy poverty.

The strong focus is put on heating and cooling (referred to in Article 14) to reach the higher climate targets for 2030, as set out in the European Green Deal. In fact, energy consumption in heating and cooling amounts for 80% of energy consumed in the residential buildings in the EU[156]. To improve energy efficiency in this sector, heating and cooling strategies in Member States very crucial. Comprehensive assessments on the potential for high-efficiency cogeneration and district heating/cooling (Article 14 and Annex III of EED), is a very relevant tool to support these strategies. In addition, improving energy efficiency in transformation, transmission and distribution sector in Member States, as required by Article 15, will remain a relevant area as well. However, stakeholders feedback received in the targeted consultation suggests that the objectives of Article 15 have not been fully appropriate and should better reflect how the different grid elements can contribute to the improvement of the overall energy system efficiency, for instance, in terms of smart grid deployment.

Article 16 (availability of certification and qualification schemes) and Article 18 (energy services) remain relevant in light of the increased climate ambition and in support of the implementation of the Renovation Wave initiative[157]. Article 16 aims to ensure a sufficient number of necessary professionals competent in the field of energy efficiency. Its relevance lies mainly in the need for Member States to ensure the necessary competences for the energy services providers, auditors and energy managers at national level[158]. Article 18 on energy services has been a key contributor to developing energy services markets in the EU and still remains relevant to reap the energy savings potential in the building sector.

The effectiveness assessment of Article 19 on regulatory and non-regulatory barriers, concluded that the EED contributed to a limited extent to addressing split incentives, and that the barriers for public purchasing, annual budgeting or accounting are still

[156] COM(2020) 662 final: A Renovation Wave for Europe

[157] COM(2020) 562 final: Climate Target Plan

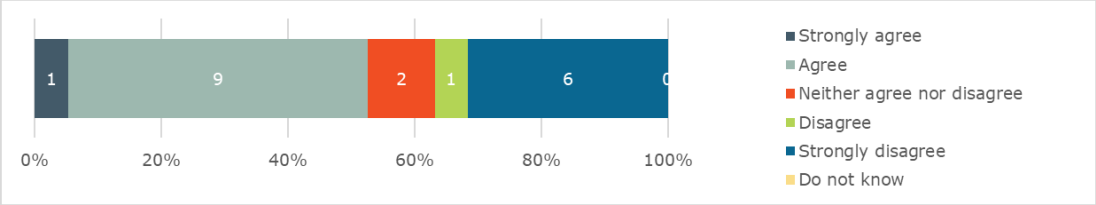
[158] Assessment of the Second NEEAPs under the Energy Efficiency Directive, JRC 2018

considered as being significant. Removing these barriers is therefore still relevant given its original need to increase energy efficiency in buildings and the public sector, especially in the context of the Renovation Wave initiative.

In relation to Article 20 on Energy Efficiency National Funds, Financing and Technical Support, there is still a prevailing perception that financial measures and facilities should be developed and adapted in the Member States. Several financial initiatives have evolved after (and possibly because of) the introduction of the Article 20[159]. This indicates that the Article 20 is still relevant to develop the necessary market and mobilise private investments towards energy efficiency.

During the targeted consultation, a majority of stakeholders agreed that the objectives and the provisions of the EED still correspond to the needs within the EU (see Figure 20).

Figure 20 - To what extent do you agree with the following statement: "The objectives and the provisions of the EED [still] correspond to the needs within the EU"?



Source: Technical Assessment study on evaluating the EED (2020)

Stakeholders that disagreed that the objectives correspond to the needs of the EED, clarified that the main reason of disagreement is the fact that the energy efficiency targets are not in line with the 2030 climate objectives and consider that those targets should be increased.

5.1.9. Evaluation question 9: How well do the original objectives for promoting energy efficiency (including its role in achieving GHG emission reduction objectives) to ensure the achievement of the EU headline 2020 and 2030 targets still correspond to the needs and the latest technological or environmental developments in the EU, in particular in the context of the European Green Deal?

The objectives for promoting energy efficiency remain pivotal to meet the overall energy and climate targets for 2030. Moreover, the EED remains relevant in the context of the implementation of the European Green Deal, as the EED is expected to play a substantial role in contributing to the increased climate target for 2030 as proposed in the Climate Target Plan[160].

[159] More information on the effectiveness of Article 20 can be found in Paragraph 5.1 (effectiveness of the EED)

[160] COM(2020) 562 final: Climate Target Plan

There is a considerable potential for enhanced and expanded measures under the EED that could deliver higher amount of energy savings[161]. The Climate Target Plan calls for effective and efficient policy interventions to increase energy efficiency and reduce primary and final energy consumption across the EU. The Impact Assessment accompanying the Climate Target Plan stressed that energy efficiency is a key avenue of action, without which full decarbonisation of the EU economy cannot be achieved in the longer term (see Table 5).

Table 5 - Interaction of 2030 GHG ambition with renewable energy share and energy savings

Scenarios	Total GHG vs 1990[106]	Renewables share[107] Overall	Energy savings[108]	
			Primary energy consumption[109]	Final energy consumption[110]
BSL	-46.9%	32.0%	-34.2%	-32.4%
MIX-50	-51.0%	35.1%	-36.8%	-34.4%
REG	-55.0%	38.7%	-40.1%	-36.6%
MIX	-55.0%	38.4%	-39.7%	-35.9%
CPRICE	-55.0%	37.9%	-39.2%	-35.5%
ALLBNK	-57.9%	40.4%	-40.6%	-36.7%
Variant MIX-non-CO_2	*-55.1%*	*37.5%*	*-39.3%*	*-35.9%*

Source: Impact Assessment accompanying Climate Target Communication[162]

The System Integration Strategy[163] defines two challenges in relation to energy efficiency:

- Applying the energy-efficiency-first principle[164] consistently across the energy system;
- Untapping the full potential of local energy sources, such as the reuse of waste heat from industrial sites, which are so far insufficiently used in buildings and communities.

The Energy Efficiency Directive in addition to the EBPD and RED, is clearly mentioned as a regulatory framework to effectively address these recent needs for system integration (for example, Article 14 on heating and cooling). Further strengthening will be required

[161] Interim report of technical assistance study to develop a tool for assessing energy efficiency policies and measures, Fraunhofer, 2020

[162] SWD(2020)176

[163] COM(2020) 299 final

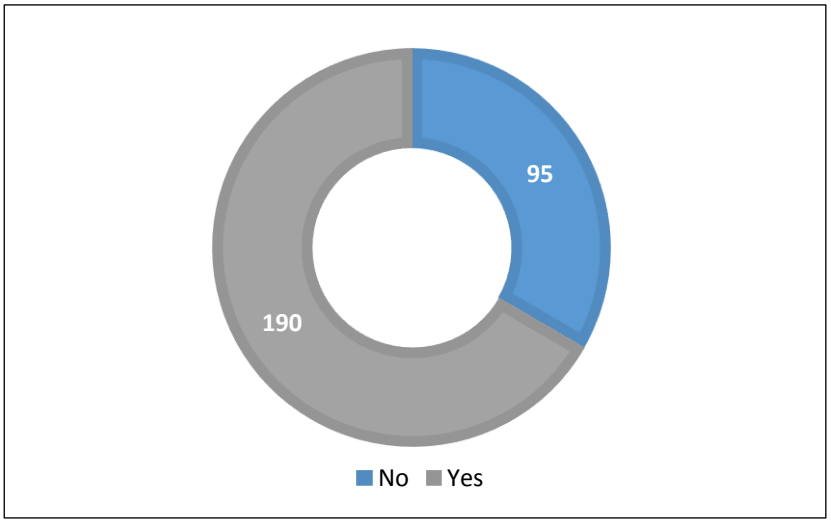
[164] The Energy Efficiency First Principle includes giving priority to demand-side solutions whenever they are more cost effective than investments in energy supply infrastructure in meeting policy objectives, but also properly factoring in energy efficiency in generation adequacy assessments.

though, to remove the barriers hampering a wider application of this strategy and facilitating the application of the energy efficiency first principle across energy system.

The Renovation Wave Strategy acknowledges that public (and privately-owned) social infrastructure, public administrative buildings, social housing, cultural institutions, schools, hospitals and healthcare serves as a role model that can trigger renovations of residential and commercial buildings. The objective of the exemplary role of public bodies (Article 5 and 6), therefore remains even more relevant in this context. The requirements for purchasing and renovation of existing public buildings currently cover only central governments, which is limited in scope given the estimated potential of extending the obligation to all public administration levels (would allow achieving about 2.6 Mtoe by 2030)[165].

Participants in the open public consultation also agreed that EED should be strengthened in the context of a higher energy efficiency ambition for 2030 (see Figure 21).

Figure 21 - Do you agree that the EED should be strengthened by introducing new measures and stricter requirements in the context of a higher energy efficiency ambition for 2030?

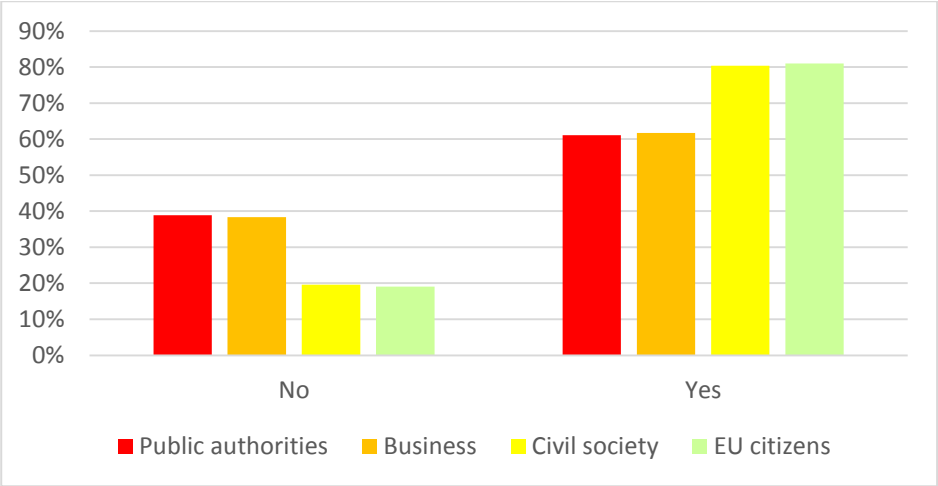


Source: Feedback from the public consultation

This agreement is more substantial amongst EU citizens and the civil society according to the public consultation (see Figure 22).

[165] Interim Report of technical assistance study to develop a tool for assessing energy efficiency policies and measures, Fraunhofer, 2020

Figure 22 - Do you agree that the EED should be strengthened by introducing new measures and stricter requirements in the context of a higher energy efficiency ambition for 2030?



Source: Feedback from the public consultation (results per stakeholder group)

Specifically for Article 5, the results of the stakeholder questionnaire support this finding indicating that the majority of stakeholders that responded to the questionnaire considered the level of obligation (3%) to be adequate. However, stakeholders pointed to several shortcomings in Article 5 and proposed the strengthening of the Article.

The energy efficiency obligation schemes and alternative policy measures under Article 7 are expected to contribute by half of the energy savings expected from the EED, if implemented in full compliance with the requirements. In the 2018 review of Article 7 of the EED[166] the original objectives of Article 7 were assessed to remain appropriate and relevant in light of ongoing needs related to the achievement of the EU energy and climate objectives of 2030.

The European Green Deal stressed energy efficiency in industrial sectors as a priority and hence the objectives of the intervention for Article 8 on energy audits and management systems still correspond to the decarbonisation needs in the EU. The intervention is still relevant as an energy saving potential remains untapped in all sectors given the

[166] SWD (2016) 402 final

technological developments and innovative solutions for energy efficiency (e.g. thanks also to digitalisation).

Heating and cooling technologies have become increasingly important over the recent years, and any system installed today, in buildings and utility systems, will last for a long period and thus can result in a lock-in for the 2030 ambitions. Therefore, apart from the efficient heating and cooling, Article 14 should also reflect these techno-economic innovations as well as explore new areas, such as improved system integration promoting the use of waste heat (from data centres), electrical and thermal efficiencies, as confirmed by stakeholders in the consultation.

Article 16 does not state any specific level of technical competences needed apart from ensuring a sufficient level of technical competences at national level, objectivity and reliability. The higher climate ambition and the Renovation Wave Initiative call for updated competences and boosting the skills to increase the renovation rates by 2030. Therefore, it is important to ensure the continuation of updating the qualifications of energy efficiency related professions and ensuring the their certification (or part of a specific scheme) will allow ensuring the effective implementation of energy efficiency improvements.

Provision of information to market actors on energy efficiency mechanisms (Article 17), on financial and legal frameworks, on benefits, practicalities and possibilities concerning financing of energy efficiency improvement measures, remains also relevant. Stakeholders have confirmed the relevance of this Article, during the consultation.

The development of the energy service market (Article 18) has been and remains relevant in tapping the energy efficiency potentials across the building sector and the public sector.

Article 19 is still relevant, as only a fraction of the Member States acknowledged the existence of barriers, let alone take and/or report relevant measures. Both issues it tackles still exist and are considered among the most important obstacles for the energy renovation of buildings, and public procurement and investments in energy efficiency. The Renovation Wave Strategy puts a strong emphasis on addressing the issue of split incentives and identifies possible solutions. Stakeholders' feedback confirm this and call for strengthening the Article 19.

Cross-border initiatives and forums in Member States have (and will have) a significant impact on the mobilising financing for energy efficiency (such as Sustainable Investment Forums). Several financing initiatives have evolved (partly because of Article 20) since the entry into force in 2012. Furthermore, in order to close the investment gap to achieve the higher 2030 energy efficiency targets, there is a clear need to mobilise additional private capital. Therefore, provisions on the establishment and use of financing mechanisms for promoting energy efficiency investments are even more relevant.

5.1.10. Evaluation question 10: How relevant is the EU intervention to EU citizens?

The results from recent Eurobarometer surveys[167,168,169] illustrate that the EED addresses key concerns relevant to EU citizens, such as climate change mitigation, energy security and energy poverty. These surveys also show a high support for EU intervention in these areas.

The EED contains several provisions that are relevant to the empowerment of citizens and consumers through the establishment of more frequent and transparent billing regimes based on the actual consumption patterns at the end use level (Articles 9-11), information and empowerment programmes (Article 12), and the exchange and dissemination of information and awareness raising (Article 17). In addition, it contains provisions that aim to tackle long-standing socio-economic challenges like energy poverty (in Article 7) and the split of incentives between tenants and owners or among owners (in Article 19).

During the targeted stakeholder consultation, stakeholders confirmed the relevance of the EED and asked for strengthening of Articles 12 and 17 as a means to further empower citizens, and consumers but also their associations and energy cooperatives. They also suggested the further strengthening Article 7 and Article 19 to help citizens better tackle energy poverty.

Articles 9-11 were revised in 2018 with a view in becoming even more relevant to citizens and consumers through the clarification of several provisions[170] and the addition of technical and regulatory options that will give to citizens access to more frequent, transparent and empowering energy billing information[171].

The Renovation Wave Strategy[172] has also put the focus on citizens, especially on how bottom-up initiatives and projects can play an active role in delivering the renovation targets and on how vulnerable citizens are not be left behind.

<u>Conclusions on relevance:</u>

---

[167] Eurobarometer (2020) Attitudes of European citizens towards the environment. https://ec.europa.eu/commission/presscorner/detail/en/ip_20_331

[168] Eurobarometer (2019) Europeans' attitudes on EU energy policy. https://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/survey/getsurveydetail/instruments/special/surveyky/2212

[169] Eurobarometer (2019) Climate change. https://ec.europa.eu/clima/sites/clima/files/support/docs/report_2019_en.pdf

[170] SWD(2016) 399 final

[171] Directive (EU) 2018/2002 amending Directive 2012/27/EU on energy efficiency and more specifically the inclusion of an obligation for the installation of remotely readable meters for thermal energy, the definition of transparent rules for heat cost allocation, etc.

[172] https://ec.europa.eu/energy/topics/energy-efficiency/energy-efficient-buildings/renovation-wave_en

- The EED remains relevant in delivering increased energy efficiency in EU and contributing to an increased climate target of 55%, and reap other benefits such as decreasing dependence on energy imports and spur innovation and competitiveness.
- Nevertheless, there is a scope for strengthening and streamlining certain provisions of the EED so that they better reflect the policy context and Green Deal objectives (e.g. in relation to exemplary role of public sector and heating and cooling).
- The EED remains relevant to EU citizens and their efforts to become well-informed and empowered energy consumers especially in the context of the European Green Deal objectives. There is a potential for better tackling socio-economic challenges like energy poverty.
- There is a need to ensure that the energy efficiency targets and instruments consider wider benefits and barriers to energy savings.

5.4. Coherence

The evaluation looks at how well the intervention works internally within the EED provisions, as well as with other interventions with similar objectives. External coherence focus on synergies and/or potential overlaps between the EED and other energy and climate policy initiatives at EU level. It is important for the evaluation to consider external coherence as it is expected that energy efficiency could contribute to other EU-wide energy and climate policies. This is illustrated in the intervention logic in Annex 4).

5.1.11. Evaluation question 11: To what extent is the EED internally coherent? To what extent are the different articles and provisions of the EED working together coherently to achieve the overarching objective if the EED?

The EED is overall internally coherent and consistent, as articles of the EED cover different issues and measures and are to a large extent independent from one another, while all of them contribute to the achievement of the objectives of the EED.

A strong complementarity and coherence can be observed among the objectives of the specific provisions, as they aim for implementing a broad range of measures that lead to specific energy efficiency improvements and address a wide range of market and regulatory barriers. For example, Article 6 has strong synergies with Article 5 (provisions on the exemplary role of public buildings). Article 5 sets the target for achieving energy savings from renovating central government buildings, while Article 6 sets the specific energy efficiency requirements for products, services, and buildings, including renovation projects procured by public authorities. Savings achieved from central government renovations and alternative measures under Article 5 can, since the adoption of the 2018 revised EED, be counted under Article 7 for the energy savings obligation. Where Member States will do so, Article 5 will not generate further savings on top of the savings accounted under Article 7, however Article 7 strong obligation and detailed monitoring and verification requirements is expected to increase the effectiveness of Article 5 measures.

In addition, strong internal coherence is observed between the provisions on energy services and qualification and certification/ accreditation schemes (Article 16 and Article 18). Article 16 requires that Member States ensure the availability of certification schemes for providers of energy services, energy audits and installers of energy-related buildings elements to secure a sufficient level of technical competences, while Article 18 on energy services requires that energy services providers are certified in line with the requirements of Article 16 of the EED.

Moreover, Article 18 contains requirements for Member States to support the public sector in promoting the uptake of energy performance contracting through providing model contracts, information on available financing schemes and instruments and best practices, while Article 5 and Article 6 contain provisions on encouraging public bodies to conclude energy performance contracts under certain conditions. Article 20 on financing mechanisms in this regard aims at facilitating the energy efficiency investments including promoting functioning of energy services markets.

The energy savings obligation in (Article 7) is an important driver of energy services markets and energy services companies thanks to the requirement to carry out energy efficiency improvement measures notably in the buildings sector, and specifically in the heating and cooling sector. Despite its overall positive impact on energy efficiency in heating and cooling supply, the overall impact on primary energy efficiency in heating and cooling and thus the coherence with Article 14 on promotion of efficiency in heating and cooling has been limited by the strict focus on end-use energy savings. The energy savings obligation has led in some instances to higher uptake of recommendations identified energy audits carried out in line with Article 8, strengthening the overall impact of the energy audit obligation.

The review in 2018, reinforced the internal coherence between Article 8 on energy audits and Article 20 on financing mechanisms. Article 20 was amended with provisions requiring Member States to consider ways to make better use of energy audits under Article 8 to influence decision-making for the purpose of mobilising private financing of energy efficiency improvement measures notably renovation of buildings.

Stakeholders confirm that the EED is overall internally coherent; however, some provisions could be further clarified and streamlined to increase the effectiveness of the Directive. This is the case, for example in relation to provisions on energy performance contracting between Article 5 and Article 18 which could better clarify conditions for use of energy performance contracting in the central government buildings. Also links between Article 8 and 18 could be reinforced through obligations to implement certain measures identified in the energy audits, which would in turn promote the energy services market.

5.1.12. Evaluation question 12: To what extent is the EED coherent with other EU interventions on energy efficiency?

The evaluation shows that overall the EED is coherent with other energy efficiency legislation, i.e. the EPBD, Ecodesign Directive, Energy and Tyre Labelling Regulations, given that each instrument is addressing different energy efficiency aspects, while ultimately leading to the same goal i.e. improving energy efficiency.

- ***The Energy Performance of Buildings Directive***

The Energy Performance of Buildings Directive (EPBD), together with the building-related provisions of the EED, promotes policies that aim to achieve a highly energy efficient and decarbonised building stock by 2050, create a favourable environment for energy efficiency investments, and enable consumers and businesses to make more informed choices to save energy and money.

The EPBD evaluation[173] in 2016 already recognised that the building-related provisions in the EED support the implementation of the EPBD by aiming to provide and optimise financial support for the renovation of the building stock and triggering increased renovation rates. For example, Article 7 of the EED plays a key role in this regard through the requirement to achieve annual energy savings of 1.5% with the final customers[174]. Energy efficiency obligation schemes (or alternative policy measures) are an effective way to aggregate small-scale investments, thus stimulating higher renovation rates.

The existing EPBD sets minimum energy requirements for new or renovated buildings, but contains no requirements as to how many buildings must be renovated, or by when. By contrast, Article 7 requires actual energy savings, and therefore encourages building renovations to take place in practice. The EBPD can therefore be seen as driving an increase in the *depth* of renovation of existing buildings, complemented by Article 7 which helps to increase their *rate*. Almost half of the savings notified under Article 7 are reported to be generated in the buildings sector[175] thus contributing to accelerated rate of renovation thanks to the specific measures (i.e. financing schemes and programmes) introduced by Member States to target renovation of residential and tertiary buildings.

The revised EED[176] clarified the application of the 'additionality' principle in relation to measures targeting existing buildings, thereby improving consistency and better links with the EPBD.

---

173 SWD(2016) 408 final

174 0.8% for the next obligation period 2021-2030

175 Technical Assistance study on assessing progress in implementing Article 7 of the EED and preparing the policy implementation in view of the new obligation period 2021-2030, Fraunhofer, 2020

176 Annex V(2)b) of the amending Directive EU/2018/2002

There is some overlap between the provisions under Article 8 of the EED (scope and the target groups) and the provisions of Articles 11, 14 and 15 of the EPBD regarding energy performance certificates and inspections for technical building installations.

The long-term renovation strategies (Article 2a of the revised EPBD) bring together different elements and measures of the EED and of the EPBD – e.g. measures implemented under Article 7 of the EED and financing mechanisms linked to Article 20 of the EED. In addition, the comprehensive assessments of the potential for efficient heating and cooling carried out under Article 14 of the EED provide important input into the building decarbonisation planning outlined in the long-term renovation strategies, taking into consideration that heating and cooling supply plays an important role in both of these documents. However, this link has not been sufficiently exploited due to the inconsistency in notification obligations (The Long Term Renovation strategy under Article 2a of the EPBD had to be submitted by 10 March 2020, while the updated compressive assessments under Article 14 of the EED had to be submitted by December 2020).

Stakeholders acknowledged numerous interlinkages between the EED and the EPBD. In total, twelve respondents out of 20 (that participated in the targeted survey) referred to the complementary interlinkages between the EPBD and the EED, specifically as regards the EED Articles 5, 6, 7, 8, and 14.

- ***Ecodesign Directive / Energy Labelling Regulation***

The Ecodesign Directive and the Energy and Tyre Labelling Regulations have been instrumental for the development of higher energy efficiency standards for energy-related products. While the Ecodesign Directive allows for the setting of minimum energy performance requirements that products have to fulfil before being placed on the EU market, energy and tyre labelling provide information to consumers allowing them to choose more energy efficient products. The EED complements this framework by focusing on public procurement. Together they drive product energy efficiency by addressing different actors.

The strongest link with the product-related energy efficiency framework is through Article 6 of the EED (and Annex III), which specifies that central governments may only purchase products that belong to the highest energy efficiency class on the energy label and, for those products not covered by an energy label, only procure products that comply with energy efficiency benchmarks specified in the relevant Ecodesign implementing measure. However, some of the references in Annex III are outdated (e.g. on Energy star) and would require a review in light of the latest development in Ecodesign and in the Energy Labelling Framework. In addition, Article 7 of EED creates positive synergies with the Ecodesign and Energy labelling thanks to its 'additionality'[177] principle. This requires that Member States count towards the Article 7 savings

[177] Additionality is referred to in Annex V (2), (3), and in Article 7(9)(d) and (e)

requirement only those end-use energy savings that exceed the minimum requirements originating from the implementing regulations under the Ecodesign Directive and the Energy Labelling Regulation. In this regard, Article 7 reinforces the uptake of more efficient products in the Member States.

The findings match with the stakeholder feedback (obtained in the survey as part of the targeted workshops). Six[178] respondents out of 20 confirmed that the EED is coherent with the Ecodesign Directive and the Energy Labelling Regulation.

5.1.13. Evaluation question 13: To what extent is the EED coherent with other EU interventions in a wider energy and climate domain?

The EED is largely coherent with other EU energy and climate-related interventions with similar objectives – e.g. the Renewable Energy Directive, the Effort Sharing Regulation and Internal Market Legislation. It is also coherent with the energy saving aspects of the Industrial Emissions Directive. The dedicated sections below examine the coherence criterion in relation to each policy instrument.

- ***Renewable Energy Directive (REDII)***

There are important interlinkages between increasing renewable energy and improving energy efficiency. Significant deployment of renewable energy results in a reduction in primary energy consumption through the replacement of fossil fuel plants with lower primary energy efficiency. The Renewable Energy Directive therefore has also contributed to the reduced primary energy consumption, which in turn has contributed to the achievement of the EU energy efficiency target for 2020. Vice versa, decrease in energy consumptions positively influences the overall share of renewables as a results of a progressively larger displacement of non-renewable energy sources[179].

In a paper by Reuter et al. (2017)[180], index decomposition analysis was used to assess the contribution of different drivers of changes in primary energy consumption. Overall, changes in the structure and efficiency of the transformation sector and its electricity generation drove down the EU's primary energy consumption, contributing towards the 2020 energy efficiency target. These dynamics were mainly linked to the penetration of renewable energy sources and the substitution of other technologies, although there were substantial differences among EU Member States. This implies that the decrease in primary energy consumption in the EU may be closely related to policies encouraging renewable energy and CHP. This interaction between the Renewable Energy Directive

178 National representatives of Portugal, Cyprus and Malta, CAN Europe, the Coalition for Energy Savings, Solar Heat Europe/ESTIF

179 SWD(2016) 416

180 Reuter, M., Patel, M.K., Eichhammer, W. (2017), Applying ex-post index decomposition analysis to primary energy consumption for evaluating progress towards European energy efficiency targets. Energy Efficiency 10:1381-1400

and the EED led Strambo et al.[181] to the conclusion there is also a risk that it could draw attention away from demand-side energy-saving measures in sectors such as transport, industry and buildings.

The strong coherence between the EED and the REDII is particularly evident in the heating and cooling policy area, in which the two directives are strongly interlinked and complementary. Article 14 of the EED sets the framework of the heating and cooling planning in terms of identifying the energy efficiency and renewable energy potential in heating and cooling, and requires the Members States to implement policies and measures to exploit this potential. These policies and measures directly support the achievement of the renewable energy target in heating cooling laid out in Article 23 of REDII. Vice versa, these targets contribute to the achievement of the energy efficiency objectives laid out in Article 14 of the EED and the whole EED. In addition, the REDII refers to specific provisions of the EED, most notably links multiple requirements to the definition of efficient district heating and cooling (Article 2(41) of the EED) and at the same time this definition directly promotes the deployment of renewable energy in district heating and cooling.

Stakeholders confirm the coherence between the EED and the REDII. The majority of respondents highlighted the mutually reinforcing nature of the EED and the REDII, noting that the reduction of energy demand facilitates the integration of renewables in the energy mix, while renewable energy in turn improves the energy efficiency of the energy system.

- ***Internal market legislation for gas and electricity***

Provisions under Articles 9-11 (for electricity) of the EED have been transferred to the Electricity Directive[182] as part of the Clean Energy for all Europeans Package in 2018, which allowed to address the existing overlaps in relation to metering and billing rules between the two Directives. The amended EED[183] requires assessing the need to do the same by end 2021 where appropriate for the provisions related to gas. This will be examined under the revision of the Gas Directive[184].

In addition, some provisions under Article 15 on energy transformation, transmission and distributions have been transferred to the Electricity Directive (notably 1st and 2nd sub-paragraphs of Article 15(5) and also paragraph (8). The provisions under the Electricity Regulation already allow for energy efficiency improvements, although they may not be compatible with the economic efficiency of the grids. The impact of those provisions

[181] Strambo, C., Nilsson, M., Mansson, A. (2015) Coherent or inconsistent? Assessing energy security and climate policy interaction within the European Union. Energy Research & Social Science 8: 1–12.

[182] Directive (EU) 2019/944

[183] Article 24(14) of Directive (EU)2018/2002

[184] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12766-Revision-of-EU-rules-on-Gas-

cannot be assessed for the time being as the transposition deadline of the Electricity Directive is end 2021. However, the synergies of the remaining provisions under Article 15 are could be enhanced.

A number of stakeholders that took part in the targeted stakeholder survey noted that articles 9-11 would be better placed in the legislation on the internal market in natural gas (given that the provisions on electricity have been repealed by the revised Electricity Directive)[185]. Further harmonisation was deemed necessary in relation to Article 15 to ensure that the national regulatory authorities are mandated to make the energy savings happen in these regulated assets.

Several respondents noted that the internal market legislation on gas and electricity does not fully capture the energy efficiency first principle and is therefore not coherent with the revised EED. In addition, respondents pointed out some important inconsistencies of the Electricity Regulation with the overall objectives of the EED.

- ***Energy Taxation Directive***

Energy or CO2 taxation is potentially effective and efficient instrument to reduce energy consumption via price signals, which in turn contribute to the achievement of the energy efficiency targets. The closest interlinkages between the EED and the Energy Taxation Directive (ETD) are related to the implementation of energy efficiency measures to achieve the energy savings obligation under Article 7 (in line with Article 7b). The ETD lays down the minimum levels of taxation of electricity and energy products used for heating and transport, while Article 7 allows counting energy savings from these taxation measures if the levels introduced by the Member State are exceeding the minimum EU level. In that respect, the EED allows complementarity with the ETD thanks to the additionality principle embedded in the Article 7[186]. On the other hand, the energy efficiency effect is limited as the EU minimum taxation levels are low and Member States claim savings from the existing taxation measures which in reality do not induce a substantial reduction of energy use[187].

[185] Directive (EU) 2019/944

[186] Annex V point (2)(a) EED. Additionality concept in the meaning of Article 7 refers to the need for savings only to be counted beyond those that would have occurred in absence of the policy measure in question. This means taking account of how energy use would have evolved in the absence of the policy measure, taking into account trends in consumption, behaviour, technological progress and other policy measures. This would need to take into account effects of other policy measures at the EU and national level. Regarding existing Union law which entered into force, the additionality principle assumes that these results would have been achieved in any case, since Member States are obliged by the *acquis* to transpose and implement what is required under EU law (e.g. energy performance requirements for buildings under the EPBD), and thus, may not count towards national energy savings requirements under Article 7.

[187] https://www.stefanscheuer.eu/wp-content/uploads/2019/10/201914-EED-Article-7-and-energy-taxes-RAP-STS-study.pdf

The Commission evaluation on the Energy Taxation Directive[188] points out that in general, the ETD could play a role as an environmental instrument that enhances energy efficiency, due to the fact that taxes have an impact on consumer behaviour and they can incentivise a more efficient use of energy. However, there is a room for further aligning the two Directives to ensure the greater impact from energy taxation. In addition, findings of the study by the Technical University of Delft suggest that the current ETD sends wrong price signals, discouraging users from choosing greener and more efficient energy sources.

- ***The Effort Sharing Regulation and the Emissions Trading System***

In general, the Emissions Trading System (ETS) and energy efficiency measures are not competing but mutually reinforcing instruments. One of the effects of a carbon price created by the ETS is that it opens up new markets and applications for energy efficient products and technologies. Energy efficiency policy is also aimed at overcoming non-price barriers/market failures.

The EED other than Article 8(4) does not primarily affect EU ETS installations and therefore the additionality with the EU ETS could be considered high. The EED is mainly achieving GHG emission reductions that are complementary to the emission savings from the ETS. However, similar to the Renewable Energy Directive, increasing the share of renewable energy sources and fuel switching in the transformation sector are incentivized by the EU ETS as well, and therefore the EU ETS also overlaps and contributes to the achievement of the EED targets.

The evaluation of the Effort Sharing Decision[189] concluded that it was coherent with energy policies. Feedback received from stakeholders (as part of the dedicated workshops) indicate high level of agreement that the EED is coherent with the Effort Sharing Regulation. Stakeholders however also expressed the view that better incentives or stricter rules are required to support the Effort Sharing in delivering additional emissions reductions to reach the 2030 climate objectives (for example, prohibit counting savings from measures incentivising fossil fuel boilers, which is not fully compatible with the climate targets).

- ***Other EU legislation***

Other legislation having interactions with the EED are the legislation on CO_2 standards for light vehicles and vans[190], CO_2 standards for heavy duty vehicles, Clean Vehicles Directive[191], the Industrial Emissions Directive (IED)[192], the legislation on waste

[188] SWD(2019) 329 final

[189] Ricardo, Trinomics, VITO (2016) Supporting study for the Evaluation of Decision No 406/2009/EC (Effort Sharing Decision)

[190] (EU) 2019/631

[191] (EU) 2019/1161

management and legislation on water management and other environmental legislation such as on air pollution .

The findings of the evaluation of the Industrial Emissions Directive[193] suggest that the IED requires certain abatement measures and/or process changes, which can increase energy consumption, which go against the objectives of energy efficiency policies. For example, compliance with Best Available Technologies may contradict with technologies which are more energy efficiency friendly. This aspect between energy efficiency and improving environmental protection, increasing material and resource efficiency, and recycling was also reflected in the responses from the stakeholders as part of the targeted consultation. Some stakeholders pointed to increasing complexity of the need for recycling raw materials and the energy intensity of some production processes.

Regarding other environmental legislation, in general reducing energy consumption has positive co-benefits in terms of reducing pollutant emissions due to less combustion of fuels and reducing the need for additional energy supply or transmission infrastructure with consequently lower environmental impacts such as on biodiversity.

It should be noted that there are also important linkages with the Public Procurement Directive[194]. The Public Procurement Directive sets the framework for how procurement should be undertaken with the aim of ensuring the principles such as fair competition and getting best value for taxpayers' money. It leaves to the EED to define more specific requirements in relation to energy efficiency for purchasing products, buildings and services with high energy efficiency performance. The principles of 'acting fairly' and 'getting value for money' are ensured by the fact that the minimum requirements of the procured items must be openly available/non-proprietary and common and they aim at minimising the life-cycle cost of these items. In this regard, the requirements of Article 6 of the EED are in line with and complement the general provisions (notably Articles 67 and 68) laid down in the Public Procurement Directive.

Stakeholders pointed out that there is room for enhancing synergies with the public procurement legislation including on encouraging Member States to develop and use Green Public Procurement (GPP) criteria as part of the EED taking into account circular economy aspects. Stakeholders also stressed that Member States authorities need more support tools in their public purchasing practices such as common methodologies and information on the cost evaluation of a product over its life cycle.

Summary of findings on coherence

---

[192] 2010/75/EU

[193] Grebot, B. et al. (2019) Support to the evaluation of the Industrial Emissions Directive (Directive 2010/75/EU). See: https://circabc.europa.eu/ui/group/06f33a94-9829-4eee-b187-21bb783a0fbf/library/df5b7d87-2bd9-47f3-b3d3-de41d402476d?p=1&n=10&sort=modified_DESC

[194] Directive 2014/24/EU

- The EED is overall internally coherent; however, there is a room for further improvement. Those areas for improvement do not point to fundamental contradictions or inconsistencies.

- The EED is overall coherent with broader energy and climate policies.

- The increasing interlinkages with the RED and the ETS require proper streamlining and closer look at reducing administrative burden.

- The EED provisions need to be adapted to support the decarbonisation objectives in the context of the initiatives under the European Green Deal.

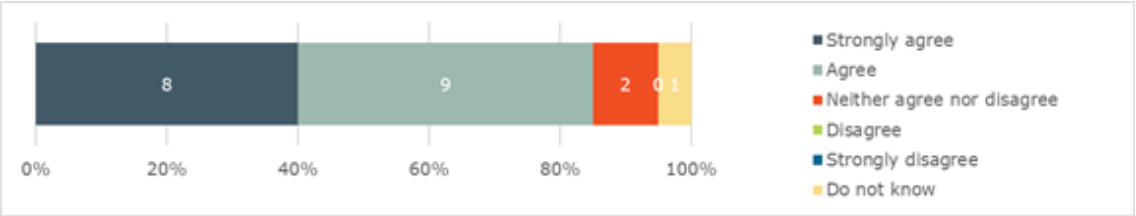
5.5. EU added value

5.1.14. Evaluation question 14: What is the additional value resulting from the EU intervention(s) having an EU level target and EU measures, compared to what would be achieved by Member States acting at national level without EU intervention?

As assessed under the effectiveness criterion, the Member States have taken national action stemming from the requirements and measures of the EED that would not have been taken without the EED and the EU targets.

The majority of stakeholders (obtained as part of the targeted workshops) have affirmed that the EED served as an important driver in promoting energy efficiency in the EU (see Figure 23).

Figure 23 – To what extent the EED contributed to more actions being taken in the field of energy efficiency, than what would have been the case if the EED did not exist



Source: Technical Assistance study on evaluating the EED (2020)

Even though policies and actions were implemented by Member States prior to the EED, this was certainly not the case throughout the EU and the EED helped to secure EU-wide action by increasing the ambition and national commitment towards energy efficiency. This is due to both EU level and national energy efficiency targets (Articles 1 and 3), and EED measures, while leaving sufficient flexibility to Member States to choose the national measures in line with specific national circumstances, thus respecting the subsidiarity principle.

For Article 7 alone, Member States have notified (as part of the dedicated notifications and the NEEAPs) more than 400 policy measures aimed at achieving the national savings requirements for the first period 2014-2020. Most of those national measures have been

implemented because of the binding requirement to achieve new 1.5% energy savings each year amongst final customers. In fact, thanks to Article 7, ten Member States have established an energy efficiency obligation scheme that contributed with a significant share of energy savings under Article 7 (amount to 35% energy savings in 2018).

Similarly, Member States had to take action to achieve the annual 3% target for renovating central government buildings under Article 5, while having a possibility to achieve the target via alternative approach (choosing other measures that allow achieving the same amount of savings). Member States that have chosen the alternative approach were more likely to fulfil the target of Article 5, as they were able to use a wider range of measures, including the renovation of central government buildings as in the default approach. Nevertheless, this flexibility has its limits decarbonising the public bodies' buildings, as it allows to renovate less buildings to the cost optimal level. It was also identified by a stakeholders as a shortcoming of Article 5, as it proved hard to monitor and led in many cases to short term energy savings.

In addition, analysis revealed that Article 8 on energy audits and energy management systems supported the uptake of energy audits amongst large enterprises, while there are shortcomings in relation to applying the SME definition in Article 8(4). The findings of the study assessing the effectiveness of the implementation of the definition of SMEs indicate that the scope and subsequent implementation of Article 8(4) on implementation of the SME definition varies across Member States[195].

Overall, thanks to the EED-specific monitoring and reporting obligations, Member States have to report on national measures and progress on the achievement of national energy efficiency targets and the implementation of certain measures. This in turn increased the awareness amongst stakeholders and citizens of the efforts taken at national level. This is in particular relevant for Articles 5 and 7, which contain specific annual reporting requirements on the energy savings achieved[196].

Article 14 on energy efficiency in heating and cooling made Member States more aware on the potential for energy efficiency in the heating and cooling sector. Even though the regulation and specific implementation of heating and cooling systems are mostly done at local or regional level, the requirements under the EED allowed to increase awareness and exchange best practices on promoting energy efficiency in this area.

The EED will remain central as regards the heating and cooling sector which is expected to develop further in the near future thanks to the increased penetration of renewable

[195] CEPS (2020), Technical assistance on assessing the effectiveness of the implementation of the definition of small and medium-sized enterprises for the purposes of Article 8(4) of the Energy Efficiency Directive

[196] In line with Article 24(1); the annual reporting requirements as of 2021 are part of the Governance Regulation.

energy sources and the importance of energy system integration in achieving the clean energy transition[197]. The forthcoming comprehensive assessments on high-efficiency cogeneration and district heating required under Article 14, to be submitted by Member States by end 2020 would help identify the necessary measures that could reap the remaining energy savings potential and lead on new, more efficient energy uses and innovative technologies and processes, for example reuse of waste heat.

In addition, the EED measures are key to contributing to the implementation of the recently published Renovation Wave initiative through the greater focus put on renovation of public and private buildings.

Moreover, the comprehensive impact assessment accompanying the Climate Target Plan[198] estimates the required level of reduction of energy consumption of 36-37% for final energy and 39-41% for primary energy consumption to achieve the GHG emissions reductions target of at least 55% by 2030, with the EED expected to play a key role to contribute to this higher ambition level.

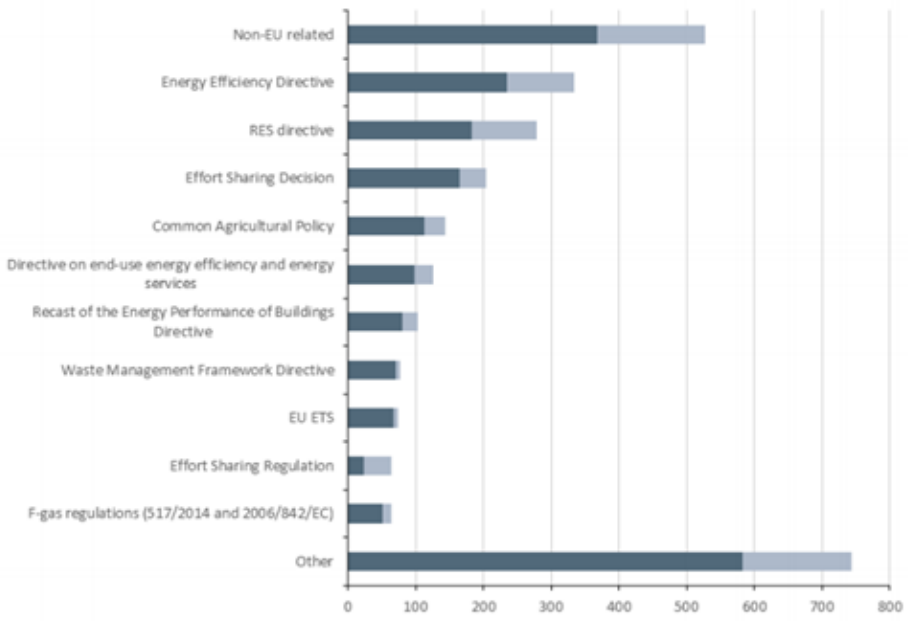
Overall, the information received from Member States in line with the reporting requirements illustrates that the Energy Efficiency Directive is one of the key Union policy driving the implementation of national climate policies and measures as can be seen in Figure 24 below (ETC/CME, 2019)[199].

Figure 24 - Number of policies and measures reported to be implemented in response to EU policies with start year up to 2017 (dark) and after 2017 (light blue)

[197] COM(2020) 299 final

[198] COM(2020) 562 final

[199] Dauwe, T., Young, K., Mandl, N., Jozwicka, M. (2019) Overview of reported national policies and measures on climate change mitigation in Europe in 2019. European Topic Centre on Climate change Mitigation and Energy Eionet report 5/2019 https://www.eionet.europa.eu/etcs/etc-cme/products/etc-cme-reports/etc-cme-report-5-2019-overview-of-reported-national-policies-and-measures-on-climate-change-mitigation-in-europe-in-2019

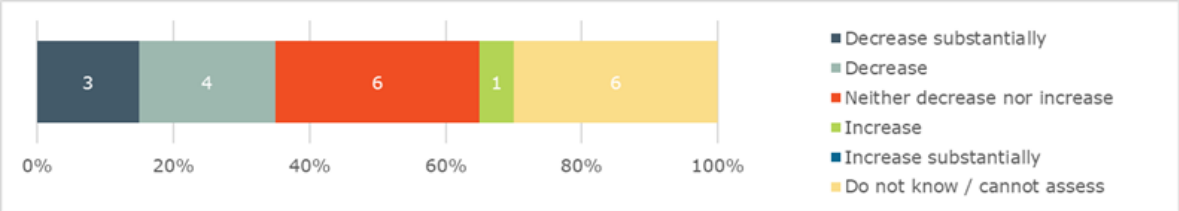


Note: Only EU-28 countries, data from Austria and Romania from 2017.
Source: ETC/CME, 2019.

5.1.15. Evaluation question 15: What would be the most likely consequences of stopping or withdrawing the EED?

The evaluation also assessed the added-value of EU action as compared to Member State action alone. This topic was explored in the context of the targeted stakeholder consultation (general questions on the EED). Many stakeholders indicated that it would have a negative effect and would decrease the level of engagement, while some stakeholders did not think it would have an effect (see Figure 25 below).

Figure 25 - If the EED were to be repealed, what would the effect be on your country's level of engagement to increase energy efficiency? (N=20)



Source: Technical assistance study on evaluating the EED (2020)

5.1.16. Evaluation question 16: Are there any parts of the EED that are obsolete?

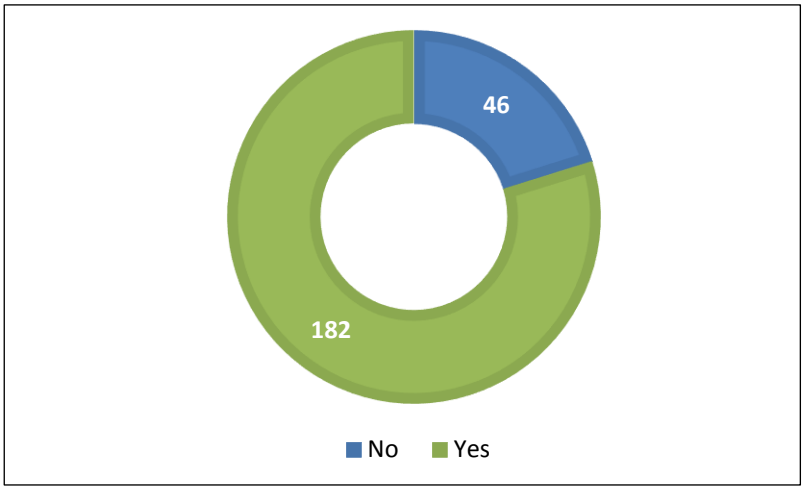
Overall, the feedback received from stakeholders in the targeted consultation suggests that certain provisions have become obsolete (e.g. requirement under Article 8 on energy audits for households and Article 14 on certificates of origin) need to be integrated in

other Directives), and that certain provisions need to be streamlined and aligned with the policy context of the increased climate ambition (notably as regards the following articles 1&3, 5, 7, 16, 17, and 20. Specific suggestions for such types of revisions are described in sections above (on questions examining relevance).

Article 8 on energy audits and energy management systems can be seen as an instrument that does not really apply for households due to not being cost-effective, if comparing the costs of an audit with the relatively small level of energy consumption and thereby the energy saving opportunities. However, measuring the energy performance of buildings through an Energy Performance Certificate could be considered as a kind of energy review or audit. According to Article 12 of the EPBD, it is mandatory to have an EPC when a house or building is put up for sale or lease. As this is handled in the EPBD, the Article 8 provisions as regards households might be obsolete. Multiple stakeholders responding to the Article 8 questionnaire (as part of the targeted consultation) indicated that programmes and schemes to raise awareness among households of the benefits of energy audits are more linked to the EPBD implementation, instead to the EED.

Article 14 on promotion of efficiency in heating and cooling: the initial desk study did not bring any evidence on the impact gained from Article 14(10) and 14(11) on the guarantee of origin of High-Efficiency CHP (HECHP). Also some stakeholders acknowledged this during the workshop on heating and cooling. These provisions might therefore not bring added value to the EED and might be obsolete.

Figure 26 - Are there any parts / specific provisions of the EED that are obsolete or have proven inappropriate?



Source: Feedback from the public consultation

<u>Summary of the findings on EU added value:</u>

- EU intervention was key to achieve energy efficiency improvements across the EU. It is clear that without the EU level target and binding measures it would not have been achieved to the scale observed.

- Member States have put in place national measures to implement the EED (notably Article 7) targeting different actors and sectors that contributed to the achievement of the EU targets for 2020.
- There is scope for strengthening and streamlining some provisions to ensure that the EED delivers the required efforts in view of the higher climate target and closing the gap of the existing EU target of 32.5%.

6. CONCLUSIONS

The Directive 2012/27/EU on energy efficiency (EED) was evaluated to assess whether the framework is fit to contribute to the higher climate target of at least 55% for 2030 and whether there are any weaknesses in the legislation which would need to be improved. The evaluation was carried out in line with the Commission better regulation guidelines and examined the evaluation criteria: effectiveness, efficiency, relevance, coherence, EU added value.

The Directive covers a wide range of measures and targets different sectors both in supply and end use, applicable to a wide range of actors – public authorities, enterprises and consumers. The evaluation showed that the EED has been implemented in all Member States albeit at a varying degree and success. Overall, the EED has contributed to promoting energy efficiency in the EU and to the achievement of the EU 2020 and EU 2030 energy efficiency targets. The Directive remains a central policy instrument of energy efficiency policy; however, there are a number of weaknesses and limitations that impede reaping the energy savings potential to its maximum. Those are related to many flexibilities and conditionalities allowing Member States to choose alternatives that result in the lower amount of energy savings (e.g. Art. 5 and 6). In fact, a number of provisions do not contain specific obligations but rather encourages Member States to take action voluntarily. There is also a lack of monitoring and measuring requirements established for most of the provisions except for Articles 5 and 7, making it challenging or impossible to assess the impacts of energy saving measures.

The EED requires that Member States put in place national measures and set the national targets for 2020 and national energy efficiency contributions for 2030 in view of achieving the objectives of the EED (promoting energy efficiency and reaching the EU energy efficiency targets).

The EED obligations were central to national action as shown in the evaluation. Member States had to create the policy framework and develop support mechanisms for the implementation of the national measures. This allowed to increase expertise and awareness, and also increase commitment towards energy efficiency and its overall role towards reaching the climate objectives, as it is also reflected in the stakeholder feedback that the EED remains a central policy to achieve the EU energy efficiency targets.

The overview of the findings per evaluation criteria are provided below.

Effectiviness

The EED led to energy efficiency improvements across the EU thanks to its targets and binding measures (notably Article 7). However, the analysis (2018 data) shows that energy consumption both for final & primary are falling short of the EU targets for 2020 (1483 Mtoe – PEC, 1086 Mtoe – FEC). In 2018, progress towards the indicative national targets was insufficient in 12 Member States for PEC and in 15 Member States for FEC.

As regards EU 2030 targets, the assessment of the national energy and climate plans (NECPs) identified a collective ambition gap of national contributions of 2.8 percentage points for primary and 3.1 percentage points for final energy consumption.

Energy efficiency delivers a multiple benefits in addition to improvements in energy efficiency and energy savings. The EED has contributed to the reduction of GHG emissions, both in terms of direct emissions from fossil fuel combustion or consumption and indirect emissions reduction from electricity generation.

Evaluation shows that different factors drive energy consumption in different sectors. The EED targets both the supply and end use sectors, through a set of measures and obligations. It should be noted that there is no exact data available on what impact specific measures of the EED had on the different sectors, except for Article 5 (exemplary role of public buildings) and Article 7 (energy savings obligations) which show that most of the energy savings have been achieved in the buildings sector.

Article 7 (energy savings obligations), a key instrument of the EED to achieve energy savings in end use, remains an effective measure. Despite the sufficient progress achieved at aggregate level EU level according to 2018 data), 14 Member States risk not to reach their requirements by end 2020.

The obligations for the public sector (Articles 5 & 6) proved key to demonstrate the exemplary role of central government in promoting energy efficiency via renovations and public procurement; however, the measures had overall a narrow scope and were implemented at a limited scale, and there are still a number of limitations that prevent reaping energy savings potential in the public sector.

The EED was key to promoting the use of energy audits across the EU; however, important limitations remain such as lack of monitoring requirements for energy audits and the follow up, difficulties related to application of the SMEs definition (Art. 8(4)), lack of requirements/ incentives for implementing energy management systems amongst others.

Article 14 on heating and cooling in particular the comprehensive assessments helped increase the overall importance and awareness of heating and cooling in Member States; however, the overall impact of Article 14 is rather low due to the several factors such as lack of follow-up policies and measures for implementing the potential identified in the comprehensive assessments, waste heat reuse not being sufficiently addressed, lack of focus on local aspects of planning and development of heating and cooling.

Some provisions with a view to improve efficiency of energy transformation, transmission and distribution (Article 15) have been effectively implemented in the Member States, such as treating energy losses and incentivising demand-side resources. However, the use of common methodologies and reporting is still not in place and therefore their impact cannot be assessed. There is no uniform definition of energy losses across the EU which results into a sub-optimal data quality.

The EED contributed to setting up the certification and qualification schemes (Article 16) to some extent, and the majority of Member States have established the schemes

covering professions for energy services, energy audits, energy managers and installers. However, effectiveness of the national schemes varies across the countries (the level of technical competence varies across the category of specialists).

The EED largely contributed to the development of energy services markets and energy performance contracting (Article 18); however, important barriers still remain which impede the uptake of energy performance contracting, such as ambiguities in the legislative framework, complex procurement procedures, lack of facilitators and technical capacity and lack of certified energy services providers, and often grants competing with private funding.

The evaluation shows that the EED had a moderate effect to empower consumers as well as to tackle societal challenges like energy poverty given that a lot of measures have been taken at national level to raise the awareness and provide information to general public, however it is difficult to assess their effectiveness. Analysis shows that the EED contributed to some extent to address the issue of split incentives (Article 19), but their impact is strongly determined by the national context and the legal framework of Member States.

The findings show that Article 20 on financing mechanisms has partially contributed to establishing financing facilities across the Member States. The lack of available data on the level of energy efficiency investments and financing does not allow fully assessing the impact of the financing measures put in place in the Member States. On the other hand, action taken by the Commission to assist the Member States in setting up financing facilities and technical support has been effective.

- **Efficiency**

Overall, the EED had contributed to achieving energy savings in the EU in a cost-effective manner.

Energy Efficiency Obligation Schemes under Article 7 have been a cost-efficient instrument in countries that have chosen to implement it.

The implementation of several obligations in the EED is subject to "conditionalities" (e.g. Articles 5, 6, 9-11, 14), so that Member States are only required to act if it is cost-effective/ economically feasible/ technically possible. This allows Member States significant flexibility and allows them to adopt cost-effective measures (however Member States have not always demonstrated how the feasibility was established).

In terms of efficiency, there are no indications for significant differences in the magnitude of costs amongst the Member States for most of the provisions of the EED, except for Article 7 (the costs depend on the design and scope of the policy measure).

- **Relevance:**

The EED remains relevant in delivering an increased ambition level for energy efficiency and contributing to the increased climate target of at least 55% for 2030, and reap other

benefits such as decreasing dependence on energy imports, creating jobs and growth, and spur innovation and competitiveness.

Nevertheless, there is a scope for strengthening and streamlining certain provisions of the EED so that they better reflect the current policy context and the European Green Deal objectives (notably in relation to increasing the renovation rate and energy efficiency of the heating and cooling sector).

The EED remains relevant to EU citizens and their efforts to become well-informed and empowered energy consumers especially in the context of the European Green Deal objectives. There is a potential for better tackling socio-economic challenges like energy poverty.

There is a need to ensure that the energy efficiency targets and instruments consider wider benefits and barriers to energy efficiency investments.

- **Coherence**

The EED is overall internally coherent; however, there is a room for improvement. Those areas for improvement do not point to fundamental contradictions or inconsistencies.

The EED also is overall coherent with broader energy and climate policies.

The increasing interlinkages with renewable energy and the ETS require proper streamlining and closer look at reducing administrative burden. The EED provisions need to be adapted to support the decarbonisation objectives in the context of the initiatives under the European Green Deal.

- **EU added value**

EU intervention was key to achieve energy efficiency improvements across the EU. It is clear that without the EU level target and binding measures it would not have been achieved to the scale observed.

Member States have put in place national measures to implement the EED (notably Article 7) targeting different actors and sectors that contributed to the achievement of the EU targets for 2020.

There is a scope for strengthening and streamlining some provisions to ensure that the EED delivers the required efforts in view of the higher climate target for 2030.

Annex 1: Procedural information

1. LEAD DG, DECIDE PLANNING/CWP REFERENCES

The evaluation has been led by the European Commission's Directorate-General (DG) for Energy, DG ENER Unit B2: Energy Efficiency.

Decide entry: PLAN/2020/6834

2. ORGANISATION AND TIMING

The Evaluation roadmap was published on 3 August 2020 together with the Inception impact assessment, with a seven-week period until 21 September 2020 for stakeholders and general public to provide feedback.

3. Consultation of the RSB

A meeting with the Regulatory Scrutiny Board took place on 14 April 2021. The Evaluation SWD was a constituting element of the impact assessment in the context of the back-to-back process carried out in line with the Commission better regulation guidelines. The comments made by the Board were raised on the impact assessment and thus are summarised in Annex I of the impact assessment SWD.

3. EXCEPTIONS TO THE BETTER REGULATION GUIDELINES

n/a

4. EVIDENCE, SOURCES AND QUALITY

The Member States' annual reports, Eurostat data, technical support study and stakeholder consultations, Commission progress reports and analysis.

Annex 2: Stakeholder consultation

The evaluation of the EED was supported by an extensive series of stakeholder consultations. The targeted stakeholders were identified in the Consultation strategy. The stakeholders include:

- **European public actors:** European Parliament, Committee of the Regions, Economic and Social Committee (high interest);
- **National authorities** responsible for the implementation of the EED in Member States (e.g. ministries of energy or economy and other competent authorities, including potentially at regional and local level) (high interest);
- **Interest groups** affected by the implementation of the EED such as companies, including small and medium-sized enterprises, regional and local public bodies, private organisations and industry associations, NGOs (high interest);
- **Wider interest groups** who may have an interest in implementation of the EED including civil society and academia (moderate interest).

Several **tools for engaging stakeholders** were used to ensure a successful consultation on both ex-post evaluation and identification of further policy options for the Impact Assessment. They included:

- **Consultation on the evaluation roadmap**/inception impact assessment;
- **Nine stakeholder workshops** on specific topics and articles; the EED Expert group meeting;
- Targeted stakeholder consultations including **evaluation questionnaires and interviews** and
- the **Open Public Consultation (OPC)**.

Due to the comprehensive communication strategy, all stakeholder groups could be reached. Consultation activities were tailored to deliver analytically separate insights into the evaluation of the existing acquis and the impact assessment.The received feedback was analysed based on a mixed-method design, applying qualitative and quantitative analysis. This comprised qualitative content analysis, delivering read-outs of stakeholder positions. Computer-aided text analysis (CATA) based on MaxQda software allowed for an additional coding of feedback to track salience of the topics. Quantitative data gathered in the consultations on the Roadmap/Inception Impact Assessment and the Open Public Consultation were analysed with MS Excel and IBM SPSS statistical software.

The following section presents a detailed description of these consultation activities and their return.

1. Consultation on the evaluation roadmap

The evaluation roadmap (Roadmap)[200] was published on 3 August 2020 and was available for feedback until 21 September 2020. It received 189 replies. 99 stakeholders annexed supplementary statements and information to their replies. The largest number of replies (67) were received from Belgium, followed by France (20 replies) and Germany (19 replies). 15 replies were anonymous which did not allow to track the geographic location of contributors. The group of Business Associations was the largest to reply (80 replies), followed by Companies (36 replies) and NGOs (26 replies). Section II presents the detailed read-out of the consultation results.

The consultation on the Roadmap allowed stakeholders to comment on the Roadmap/Inception Impact Assessment in an open format. The majority of stakeholders used this opportunity to comment on possibilities to reinforce the EED (see section 4.1). Few comments were received regarding the evaluation on the present EED provisions. However, the feedback retrieved allows drawing conclusions on the following points:

- The present provisions of the EED are seen as workable and overall effective. However, they are not sufficiently ambitious in view of a stepped up overall energy and climate objectives. Reinforcing the EED's provisions could effectively contribute to achieving further energy savings.
- Synergies and interrelations between the existing energy acquis, notably the Energy Performance of Buildings Directive (EPBD) and the Renewable Energy Directive (RED II) are not sufficiently established.
- No stakeholder argued for the baseline scenario (option 1 – no policy change), indicating that a revision of the EED's provisions is overall accepted by respondents.

2. Stakeholder workshops and the EED Expert group

Nine dedicated stakeholder meetings were organised virtually in the period from September to October 2020 with targeted stakeholder groups on specific topics to ensure focussed discussion (see Table 1**Error! Reference source not found.**). The outcome of discussions contributed to both processes – evaluation and the impact assessment for revising the EED. On average 52 participants attended each workshop.

Table 1 - Overview of the stakeholder workshops

No.	Topic	Number of participants	Date
1	Heating and Cooling and Article 14	97	10.09.2020
2	Energy Efficiency in Networks and Article 15	78	16.09.2020

[200] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12552-EU-energy-efficiency-directive-EED-evaluation-and-review

3	Financing and Article 20	61	17.09.2020
4	Energy Efficiency in the Public Sector and Articles 5, 6 and 18	61	06.10.2020
5	General Issues and Energy Efficiency Targets	71	07.10.2020
6	Energy Audits and Article 8	59	08.10.2020
7	Energy Efficiency in Specific Sectors	65	19.10.2020
8	Energy Consumers and Articles 12 and 19	44	21.10.2020
9	Energy Services and Skills Articles 16 and 18	50	22.10.2020

Workshops were split in two parts to cover ex-post evaluation aspects and possible solutions for improvements of the EED and were guided by questions sent in advance to participants.

An overview of the main findings of evaluation of the EED is provided in Table 2.

Table 2 - Summary of key workshop findings

Article/ Workshop topic	Findings regarding evaluation
14 (Heating and cooling)	• Especially Art. 14(1)-(4) on identifying efficient heating and cooling potential via comprehensive assessments have contributed to the relative success of this article. Still huge potential on waste heat exists. • Many participants see EED leaving out relevant areas in heating and cooling such as data centres, supply side efficiency, system integration. • Participants gave mixed views on effectiveness to boost efficiency in heating and cooling. Some participants argued that especially the potential on cooling is presently not sufficiently taken into account. • Several participants underscored that there is a clear overlap with renewable energies and RED II (article 23: Need to consider fossil heating versus renewable sources) and to further analyse system efficiency.
15 (Grid efficiency)	• Participants argued that in contrast to the EED's focus on in-grid efficiency also efficiency of the wider system should be looked at. • In some countries, no specific incentives for decreasing grid losses in DSO regulations exist, which has so far not been addressed by the EED.
20 (Energy efficiency finance)	• Regarding energy efficiency finance, several stakeholders saw the main barriers in (i) the return on investments in energy efficiency measures is not large enough or the payback time is too long; and (ii) lack of evidence on the performance of EE investments makes the benefits and the financial risk harder to assess. • Many participants argued that article 20 EED has contributed partially to developing finance for energy efficiency. Subsidies, blending facilities and tax incentives were seen as most promising measures. • However, they stated that the impact of the EED in this field is hard to assess, as many provisions are not binding. • Participants stated that further leverage of private capital is possible. Several potentially interesting schemes exist in the Member States and deserve further looking into.
5, 6, 18 (Public sector)	• Article 5 is perceived as a crucial article in the EED because the public sector should lead by example. Some participants expressed the view that it does not deliver according to the need. This is due to the issues that (i) the scope is too limited, (ii) there are some limitations in the alternative approach, (iii) there is limited information on success cases under Article 5. Furthermore, (iv) there is no clear link between the regulatory provisions and the funds

Article/ Workshop topic	Findings regarding evaluation
	available. One barrier related to Article 5 is that the decentralised structure of some countries could impede the implementation of Art. 5. • Some participants argued that Article 6 requires a revision of the scope, possibly extension. It is important to raise awareness and raise capacity at local and regional level for applying EE criteria in public procurement. • In the view of some stakeholders, Article 18 would require more links to Article 5 – on how to use EnPC in the public buildings. Some Member States have established targets to assign renovation rates to buildings using energy performance contracting. • Financing is still an issue, but participants mentioned that with the recovery package more buildings will be renovated – especially schools and hospitals.
12, 19 (Consumer information and empowering)	• Participants argued that the present provisions are not enough to address behavioural changes through consumer feedback, notably in rented buildings. • Several H2020 projects address this issue and should be looked into. • Participants agreed that Article 12 is a soft article but has a lot of potential if used appropriately – not only for empowerment but also to help the energy poor / lower income households. Some stakeholders suggested that a further linking to Article 11 could be useful.
16, 18 (Energy services and qualification)	• Many participants saw the EED provisions as relevant for contributing to setting up certification and/or accreditation schemes and/or equivalent qualification schemes and developing energy service markets. • However, the present provisions do not sufficiently consider quality checks, and the regular continuation and update of training activities.
8 (Energy saudits)	• Feedback on Article 8 was mixed. While participants assessed it to contributing to the uptake of energy audits, many argued that the full potential of this instrument is not reaped. • Shortcomings were seen in the linking to the definition of non-SMEs and missing control of implementation.

Two dedicated workshops addressed the role of the overall energy efficiency target framework and general issues related to the EED (7 October 2020, 90 participants), and specific sectors (20 October 2020, 90 participants). The summary findings of the two workshops are presented in Table below.

Table 3 - Summary of key workshop findings on overall EED framework and specific sectors

Article/ Workshop topic	Findings regarding evaluation
1&3 (Targets)	• Some participants expressed support for a higher ambition in the EED, but discussions were less conclusive on the technical modalities of setting the targets. Participants stressed the need to have targets for final and primary energy consumption , with a greater focus on final energy. • The overall framework of the EED is complex. While some issues were clarified in the 2018 revision of the EED, some participants argued for further simplifications. Administrative burden needs to be also taken into account.
Sectors (transport, ICT, agriculture and waste)	• Regarding transport, responses were inconclusive regarding whether or not the present EED is addressing transport energy consumption in an adequate manner. Whereas some participants argued that Article 7 addressed this matter sufficiently, others saw room for further action in this field. • The responses were also inconclusive in relation to agriculture sector. • When discussing the impact on ICT energy consumption, a clear majority of respondents argued that the EED has not sufficiently contributed towards increasing energy efficiency in the ICT sector.

Overview of the main findings of the targeted workshops are the following:

- Overall, the views gathered in the workshops confirmed the feedback to the Roadmap consultation: The **EED is seen as a cornerstone to support the overall European decarbonisation objective.** Apart from setting targets, this is clearly seen throughout all sectoral provisions contained in the Directive.

- Furthermore, the feedback also highlights that the energy savings potential of the existing EED is currently not fully exploited.

- Feedback to the individual articles showed that although a majority of participants agreed that the present provisions are effective to a certain extent, **strengthening of the EED is possible in many cases**.

- This **in particular concerns** addressing the potential for heating and cooling under Article 14 EED and strengthening the exemplary role of the public sector in Articles 5 and 6 EED.

A dedicated **EED expert group meeting** was held on 10 November 2020. The meeting was aimed to seek feedback on the preliminary findings of the evaluation of the EED framework and to discuss identified policy options for amending the EED. Over 100 participants attended the expert group.

At the meeting of the EED expert group of 10 November, preliminary results of the evaluation of the overall EED were presented. The results suggest that participants overall agreed with the assessment presented largely confirming the conclusions received in the dedicated workshops on different topics of the EED. Article 7 EED was singled out as being of central importance for the effectiveness of the Directive.

Overall, the feedback from the participants aligned with the findings from the targeted stakeholder workshops and the feedback to the Roadmap/Inception Impact Assessment.

3. Evaluation questionnaires and interviews

The consultation activities included also **direct interviews** as a follow up on dedicated issues. Stakeholders were proposed to decide whether they would like to participate in interviews to illustrate their contributions through the questionnaire and the workshops. In total eight interviews were conducted. The purpose of the interviews was to validate and clarify matters, and to gather additional information and details where necessary. Summary of the interviews were prepared for the reporting exercise.

articles, general issues and four sector specific sectors - agriculture, water, ICT, transport. Table 4 below presents an overview of the number of responses and feedback received from stakeholders.

Table 4: Feedback response overview to evaluation questionnaires

Article /topic	Questionnaire responses	Additional feedback*

Targeted articles of the EED		
Article 1&3	21	-
Article 5	19	-
Article 6	15	-
Article 8	25	4
Article 12	11	2
Article 14	12	16
Article 15	5	2
Article 16	9	1
Article 18	21	-
Article 19	10	2
Sector-specific issues		
General issues	30	8
Agriculture and water	5	1
ICT	5	-
Transport	8	-

* This includes position papers and other notes received via email from stakeholders that were not presented in the questionnaire format.

Main findings from the evaluation questionnaires and direct interviews regarding the evaluation of the EED concerned the following points:

- The questionnaire and interviews confirmed findings from the other consultation tools: Overall, the EED and its specific provisions are effectively working to some extent. However, the Directive in its present form fails to address the full existing potential for energy efficiency.
- Implementation of the EED and the provisions under review vary considerably among Member States. However, many good practices for implementation exist which need further looking into.
- Public buildings: The EED contributed to making central government buildings more efficient, but major barriers against a broader effect of this article continue to exist. These barriers are seen in: (i) the limited scope (only central government buildings); uncertainties about the alternative approach; (ii) the level of renovation required, missing framing for setting up inventories of buildings; and (iii) missing requirement to report on energy savings delivered through renovation of public buildings for Member States that apply the default approach.

- Central governments widely use energy efficiency criteria in public procurement. However, key barriers (lack of capacity, lack of supporting assessment tools, higher upfront investment costs) still persist and need to be addressed.
- The EED has strongly promoted energy audits. However, in many cases, a follow-up in terms of monitoring (energy management) and implementation is not sufficiently safeguarded.
- The provisions on heating and cooling as well as supply-side efficiency are seen as important and relevant, but not sufficient to address the remaining energy saving potentials, e.g. by addressing cooling or waste heat. In addition, synergies and potential inconsistencies with other Directives (EPBD, RED II, Eco-design and labelling, ETS) exist that should be better addressed.
- The EED has played a major part in setting up certification, accreditation, and qualification schemes, including training programmes. However, more systematic use of the existing offers is needed.
- A large number of stakeholders shared the opinion that the EED positively affected the development of energy service markets, notably by ensuring the availability of model contracts, information about providers and services offered. However, especially energy performance contracting still faces considerable barriers (public procurement rules, uncertainty about minimum quality criteria, quality assurance and accreditation, further model contracts).
- Respondents' feedback suggests that Article 20 and the EED had partially contributed to the establishment of both public and private financing facilities. However, additional factors not addressed in this article are also hindering the ability to raise capital for financing energy efficiency (lack of equity and low consumer demand).

4. The Open Public Consultation

An internet based public consultation targeted a broad stakeholder audience. The consultation was launched on 17 November 2020 and lasted until 9 February 2021. The questions of the consultation addressed aspects concerning the ex-post evaluation and option for the revision of the EED and specific modification of individual articles. The questions were formulated on basis of the Commission Better Regulation guidelines[201].

To ensure that the results of this consultation informed the two parallel processes of ex-post evaluation and impact assessment at both general and expert level, the survey contained two parts:

- Part I with questions of a general nature covering both the evaluation and impact assessment. The first sub-section contained questions assessing whether the EED

[201] https://ec.europa.eu/info/sites/info/files/better-regulation-guidelines-evaluation-fitness-checks.pdf

framework and relevant provisions are efficient, effective, and coherent with the broader EU legislative framework covering energy efficiency policy. The second sub-section investigated the most appropriate policy options to be considered for the EED revision as part of the impact assessment, which could allow addressing the insufficient level of ambition in the National Energy and Climate Plans and also delivering on the higher energy efficiency contribution for 2030 to reach the GHG emissions reductions target of at least 55%.

- Part II was of a technical nature on specific articles dedicated to experts.

The consultation received 344 replies, often accompanied by additional position papers. Replies came from 26 Member States and three non-EU countries (Norway, Switzerland, and the UK). Replies were submitted in 17 languages. The largest group of respondents covered business associations (132 replies), individual businesses and companies (92 replies), followed by NGOs (34 submissions). 21 respondents submitted replies as individual citizen. 24 public authorities replied, including 13 national authorities from 12 Member States (Cyprus, Czechia, Estonia, Finland, France, Italy, Lithuania, Luxembourg, Netherlands, Norway, Spain, and Sweden).

The following points have been raised by respondents in relation to the evaluation of the EED:

- 152 (out of 318) respondents estimated that the EED had attained its objectives to some extent, further 114 estimated it had achieved its object to a moderate extent, for 34 further respondents only to a little extent. This suggests that a revision of the provisions seems adequate.
- When surveying the factors that helped the most to achieve the objectives of the EED, 57% of the 281 respondents named the "requirement for planning policies and measures at national level", 53% the existence of targets at EU level. This was followed by the wide scope of the EED (49%), binding measures (47%), and the requirement to set national targets (41%). Multiple answers were possible.
- Participants were asked to rate the extent of positive effects on a 1 (very little extent) -5 (very large extent) Likert scale. 161 respondents out of 344 replies estimated that the EED created greater awareness about energy efficiency and its role for the climate objectives (ratings 5 and 6). 117 estimated that their country is more committed to energy efficiency owing to the EED (rating 5 and 6).
- 58% of the 344 respondents saw the introduction of subsidy and support schemes at national level as most successful impact of the EED. This is followed up by 41% assessing that the obligation for non-SMEs to carry out energy audits has been successful (multiple answers possible).
- Regarding sectorial impacts, respondents rated the impact in the building and heating and cooling sectors as highest (118 and 109 out of 344 replies, respectively).

- 11 common barriers that impede energy efficiency were surveyed. Results show that all these barriers, ranging from missing information to lack of financial support are still seen as being very important.
- 162 out of 223 respondents clearly see positive synergies of the EED with the Effort Sharing Regulation and the Emission Trading System. This view was shared among all stakeholder groups with the notable exception of Trade Unions (n=2). Similar positive synergies were noted with the Renewable Energy Directive (197 out of 267 stakeholders agreeing) and the EPBD (222 out of 253 stakeholders agreeing).
- Regarding target setting, stakeholder groups agreed overall that the 2020 energy efficiency target was appropriately set. However, 115 out of 159 respondents replied that the EED has not provided the right monitoring and enforcement mechanisms to achieve national energy efficiency targets.
- Regarding government buildings 76 out of 108 replies stated that the EED had not made central government buildings in their country more energy efficient. 67% of 174 respondents attributed this to insufficient national budget earmarked for renovation.

5. Summary on the evaluation of the EED

All categories of stakeholders identified in the stakeholder mapping participated in various consultation activities, which allowed validating and cross-checking findings retrieved in the individual stages of the consultation process. The outcomes of the consultation process proved to be of substantial help in the evaluation of the provisions of the present EED, highlighting both successes and shortcomings.

Stakeholders' opinions regarding the provisions of the Energy Efficiency Directive under evaluation can be summarized as follows:

- In principle, the EED is a workable Directive and the provisions under review deliver to the Directive's objectives in a comprehensive manner.
- The EED has strong potential to support the overall European decarbonisation objective, but its potential is currently not exploited to the fullest.
- The evaluation of the articles that were not revised under the Clean Energy Package have delivered on their objectives at least in a moderate manner, if not successfully.
- Concerning almost all articles under review, stakeholder feedback highlighted remaining barriers and options for improvement. As such, the EED is a necessary policy instrument to support the European decarbonisation objective; however, it is not sufficient in its present form to attain this objective.
- In consequence, an overwhelming majority of stakeholders favour an update and strengthening of these provisions.

Annex 3: Methods and analytical models

The evaluation followed the Commission better regulation guidelines and examined the following five evaluation criteria in line with better regulation guidelines: effectiveness, efficiency, relevance, coherence and EU added value. The examination of the criteria was based on the set of established questions (listed in Table 1Table 1 below).

In addition, as part of the evaluation methodology, a counterfactual scenario was developed under the technical assistance study to quantify energy savings achieved from the measures implemented under the EED. The purpose of the counterfactual scenario is to evaluate how much less energy efficiency would have occurred in the EU if the Energy Efficiency Directive was not implemented across Member States. The EUROSTAT Energy Balances and other Eurostat structural data were used as basis for the dataset. For the quantification the following sources were used: (a) outcomes of stakeholders' surveys and interviews; (b) expert judgement; (c) literature review. The methodology is elaborated in detail in Appendix C of the technical assistance study.

Table 6 - Evaluation criteria and evaluation questions[202]

EFFECTIVENESS
• EQ 1: To what extent has the EED objective to promote energy efficiency in the EU in view of reaching the Union's headline targets on energy efficiency for 2020 and 2030 been achieved? What have been impacts in different sectors achieved with the intervention? • EQ 2: To what extent can the observed effects be credited to the EED? In what areas was the intervention more / less successful and what were the drivers/ impeding factors behind successes / failures? • EQ 3: What external factors have affected / continue to affect reaching the objectives of the Directive?
EFFICIENCY
• EQ 4: To what extent the costs involved in the implementation of the EED have been justified given the changes/effects that have been achieved (including wider benefits)? • EQ 5: To what extent were the costs borne by different stakeholder groups proportionate to the benefits it has generated? • EQ 5: What were the factors that influenced the efficiency of policy intervention and the implementation of the EED? • EQ 7: Are there are significant differences in costs (or benefits) between Member States, and if yes, what are causing them? How do these differences link to the intervention?
RELEVANCE
• EQ 8: Did the Directive provide the right framework to reach the 20% energy efficiency

[202] An overview of evaluation matrix is presented in appendix B of the technical assistance study.

target? To what extent is the EED framework to promote energy efficiency in the EU still relevant?

- EQ 9: To what extent have the objectives of the EED have been appropriate? Did the Directive provide the right framework to reach the 20% energy efficiency target?
- EQ 10: How well do the original objectives for promoting energy efficiency (including its role in achieving GHG emission reduction objectives) to ensure the achievement of the EU headline 2020 and 2030 targets still corresponds to the needs and the latest technological or environmental developments in the EU, in particular in the context of the European Green Deal
- EQ 11: How relevant is the EU intervention to EU citizens?

COHERENCE

- EQ 12: To what extent is the EED internally coherent?
- EQ 13: o what extent is the EED coherent with other interventions with similar objectives?

EU ADDED VALUE

- EQ 14: What is the additional value resulting from the EU intervention(s) having an EU level target and EU measures, compared to what would be achieved by Member States acting at national or regional levels without EU intervention?
- EQ 15: What would be the most likely consequences of stopping or withdrawing the EED?
- EQ 16: Are there any parts of the EED which are obsolete?

EFFECTIVENESS

- EQ 1: To what extent the EED objectives promoting energy efficiency in the EU in view of achieving the Union's headline targets on energy efficiency (of 20%) for 2020 were achieved?
- EQ 2: To what extent can factors influencing the observed achievements be linked to the EU intervention (i.e. barriers removed including in which areas)?
- EQ 3: What external factors have affected / continue to affect reaching the objectives of the directive?

EFFICIENCY

- EQ 4: To what extent the costs involved in the implementation of the EED have been justified given the changes/effects that have been achieved (including wider benefits)?
- EQ 5: To what extent were the costs borne by different stakeholder groups proportionate to the benefits it has generated?
- EQ 5: What were the factors that influenced the efficiency of policy intervention and the implementation of the EED?
- EQ 7: Are there are significant differences in costs (or benefits) between Member States, and if yes, what are causing them? How do these differences link to the intervention?

RELEVANCE

- EQ 8: To what extent is the EED framework to promote energy efficiency in the EU still relevant?
- EQ 9: To what extent have the objectives of the EED have been appropriate? Did the Directive provide the right framework to reach the 20% energy efficiency target?
- EQ 10: How well do the original objectives for promoting energy efficiency (including its

role in achieving GHG emission reduction objectives) to ensure the achievement of the EU headline 2020 and 2030 targets still correspond to the needs and the latest technological or environmental developments in the EU?

- EQ 11: Is the amended EED still relevant to achieve the overall energy and climate targets for 2030, in particular given in the context of the Green Deal? How relevant is the EU intervention to EU citizens?

COHERENCE

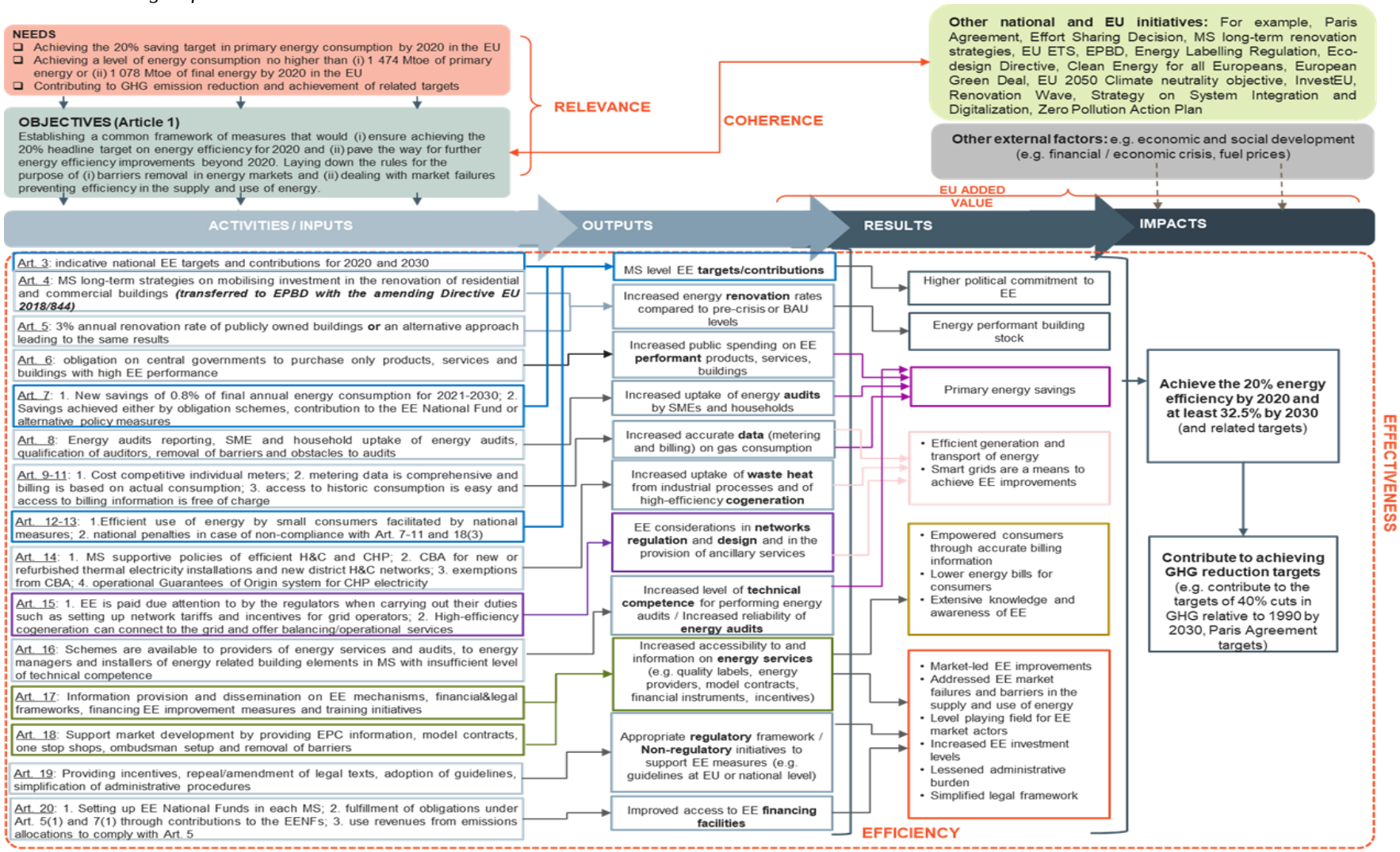
- EQ 12: To what extent is the EED internally coherent?
- EQ 13: To what extent is the EED coherent with other interventions with similar objectives?

EU ADDED VALUE

- EQ 14: What is the additional value resulting from the EU intervention(s) having an EU level target and EU measures, compared to what would be achieved by Member States acting at national or regional levels without EU intervention?
- EQ 15: What would be the most likely consequences of stopping or withdrawing the EED?
- EQ 16: Are there any parts of the EED that are obsolete?

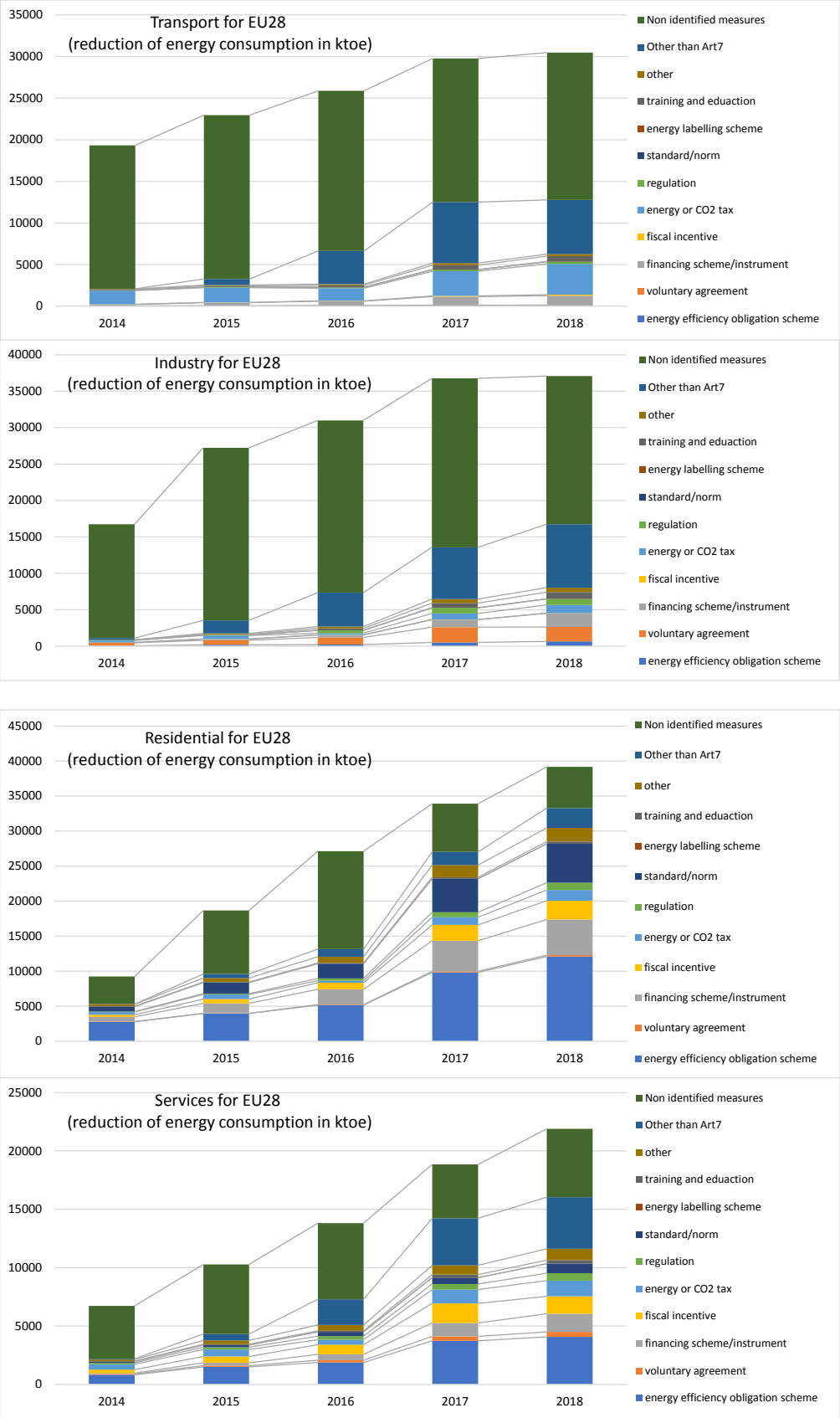
Annex 4: Figures and Tables

Figure 27 - Intervention logic of the EED[203]



[203] More detailed overview and description of the intervention logic could be found in the accompanying technical assistance study, appendix A.

Figure 28 - Energy consumption reduction calculated via the counterfactual scenario and decomposed by type of measures and sector, in Mtoe for EU 28



Source: Technical Assistance study on the evaluation and the impact assessment of the EED

Table 7 - Overview of the articles of the EED

Articles 1 & 3	Articles 1 & 3 sets the EU headline energy efficiency targets for 2020 (of 20%) and for 2030 (of 32.5%) and Member States have to set their national indicative targets and indicative contributions in view of achieving those headline targets for 2020 and 2030 respectively. Member States had to report annually on the progress towards their national indicative energy efficiency targets and submit National Energy Efficiency Action Plans every three years, starting from 2014. For the headline EU 2030 target, Member States shall fulfil the planning and reporting obligations under the new Governance regulation (set their national contributions towards the EU 2030 target and define the national measures to fulfil those contributions in the National energy and Climate Plans which had to be submitted to the Commission by end 2018 (as part of the draft Plans) and by 2019 in the final Plans. Member States shall report every two years on progress towards the achievement of the deadline EU target under the Governance Regulation (the first progress report required by 15 March 2023) .
Article 4	Article 4 required that Member States establish long term renovation strategies for mobilising investment in the renovation of national building stock which had to encompass certain elements such as an overview of the national building stock, identification of cost-effective approaches to renovation, policies and measures and a forward looking perspective for renovation. A first long-term renovation strategy had to be notified by 30 April as part of the National Energy Efficiency Action Plan and thereafter every third year (until this article was moved to the Directive 2010/31/EU in 2018 by the amending Directive EU/2018/844).
Article 5	Article 5 requires that Member States renovate 3% of their central government buildings of over 500 m² which do not meet the cost-optimal energy efficient standards. This threshold dropped to 250 m² as of 9 July 2015.
Article 6	Under Article 6 central governments have the obligation to purchase energy efficient products, buildings and vehicles, and Member States should encourage public bodies of local and regional government do so as well. This Article was evaluated in 2016204, however the findings were not conclusive given that the implementation had just started and it was too early to assess the impact (evaluation report: https://ec.europa.eu/energy/sites/ener/files/documents/3_en_autre_document_travail_service_part1_v3.pdf).
Article 7	Article 7 sets an obligation on Member States to achieve new energy savings each year (of 1.5% of the annual energy sales for the period 2014-2020 and of 0.8% of the final energy consumption for the period 2021-2030) by putting in place an energy efficiency obligations scheme or other policy measures. Article 7 is responsible for about half of the energy savings the EED is expected to deliver.205 As mentioned above, this Article was amended as part of the focused

[204] SWD(2016) 402 final

[205] Based on the internal estimates carried out by the Commission services during the negotiations of the EED (in 2012), it was estimated in the impact assessment of the EED that the energy savings

	EED review in 2016 and amendments adopted in December 2018 (amending Directive EU/2018/2002).
Article 8	Under Article 8 Member States must ensure that large companies have their first energy audit by 5 December 2015 and then every four years. The review of the implementation of the definition of small and medium size enterprises for the purposes of Article 8(4) is included in this evaluation (in line with the amended Article 24(12)).
Articles 9 to 11	Articles 9 to 11 provide requirements for metering and billing of energy use. As mentioned above those Articles were already amended as part of the focussed EED review in 2016 (amending Directive EU/2018/2002) by adding new, more precise and specific provisions applicable for thermal energy (heating and cooling)206. For an overview and a detailed discussion of the changes made please refer to Commission Recommendation (EU) 2019/1660 of 25 September 2019 on the implementation of the new metering and billing provisions of the Energy Efficiency Directive 2012/27/EU207
Article 12	Article 12 contains general requirements for Member States to take appropriate measures to promote and facilitate the behavioural change towards energy efficiency.
Article 13	Under Article 13 Member States must ensure effective, proportionate and dissuasive penalties for breaches of the national provisions that transpose the Directive.
Article 14	Article 14 requires that Member States promote efficiency in district heating and cooling systems and carry out comprehensive territory-wide assessments of the potential for efficient heating and cooling by 31 December 2015 which should be updated and resubmitted every five years (on the basis of the updated methodology and the amended Annex VIII)208. It also requires individual cost-benefit analyses to be made in the context of the planning and permitting of certain types of installation (cf. Art 14(5) and 14(7)).
Article 15	Article 15 requires that Member States ensure that energy efficiency is taken into account in energy transformation, transmission and distribution and contains specific provisions to this end. Certain of these (parts of Article 15(5) and Article 15(8)) were removed in 2018 as part of the Clean Energy for All Europeans and replaced with consolidated provisions in the new Electricity Market legislation.
Article 16	Article 16 on qualifications and accreditation schemes for providers of energy

obligation is responsible for more than a half (85 Mtoe of primary energy consumption in 2020) of the energy savings the Member States should achieve under the EED.

206 While removing thermal energy from the original provisions thereby restricting their scope to electricity and gas. Subsequently also electricity has been removed from their scope and instead regulated under the provisions of the recast Electricity Directive: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2019.158.01.0125.01.ENG&toc=OJ:L:2019:158:TOC

207 See e.g. section 1.1. and 1.3 of the annex: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1574946822907&uri=CELEX:32019H1660

208 C(2019) 6625 final

	services and energy audits had a later transposition deadline than the rest of the Directive (31 December 2014) and it is also closely linked to the implementation of Article 17 and Article 18.
Article 17	Under Article 17 Member States shall ensure that information on available energy efficiency mechanisms and financial and legal frameworks is widely disseminated to all relevant market actors. The effectiveness of the implementation of this Article was assessed in 2017[209]. The findings of the assessment showed that while most of the Member States have put in place information and awareness raising measures, it is hard to assess their impact on the uptake of energy efficiency improvements and investments due to lack of robust monitoring results and ex-post evaluations.
Article 18	Member States are required to promote the energy services market under Article 18 with a particular focus put on supporting the public sector including through the use energy performance contracting. A number of reports to assess progress of energy service markets in the EU including the uptake of the energy performance contracting have been carried out by the JRC in the framework of an administrative arrangement with DG ENER.
Article 19	Article 19 requires the Member States to take action to remove regulatory and non-regulatory barriers to energy efficiency and to report on this to the Commission as part of their first National Energy Efficiency Action Plan (NEEAP). Article 19(1) was assessed on basis of the notified NEEAPs 2014 and 2017 and a report was published in 2019[210].
Article 20	Article 20 provides that the Member States shall facilitate the establishment of financing facilities and that they may set up an Energy Efficiency National Fund. This Article was amended in the focussed EED review by adding additional requirements for the Member States and the Commission (providing guidance on how to unlock private investments).
Article 21	Article 21 on the conversion factors set out in Annex IV was amended for the purposes of reviewing the default coefficient - primary energy factor - for electricity generation (in footnote 3) and which should be again reviewed by 25 December 2022 (as required by amending Directive EU/2018/2002).
Article 24	Article 24 contains reporting obligations for the Commission (while the reporting obligations for the Member States have been transferred to the new Governance Regulation, (EU)2018/1999). This Article thus has been partially amended to ensure the coherence with the new Governance framework and the amendments of Articles 3 and 7, and concerns the reporting in the context of the 2030 framework.

[209] https://ec.europa.eu/energy/sites/ener/files/final_report_of_assessment_of_the_implementation_status_and_effectivenes.pdf

[210] https://publications.jrc.ec.europa.eu/repository/bitstream/JRC115314/assessement_of_progress_made_by_member_states_in_relation_to_article_19_final.pdf

Table 8 - Indicative national energy efficiency targets for 2020

MS	PEC Target [Mtoe]		FEC Target [Mtoe]	
	Up to 2016	Latest value (from NEEAP 2017 or latest value)	Up to 2016	Latest value (from NEEAP 2017 or latest value)
BE	43.70	43.70	32.50	32.50
BG	16.87	16.87	8.64	8.64
CZ	39.60	44.31	25.32	25.32
DK	17.40	17.52	14.43	15.17
DE	276.60	276.60	194.30	194.30
EE	6.50	6.50	2.80	2.80
IE	13.90	13.90	11.70	11.70
EL	24.70	24.70	18.40	18.40
ES	119.80	122.6	80.10	87.24
FR[211]	219.90	219.90	131.40	131.40
HR	11.15	10.71	7.00	6.96
IT	158.00	158.00	124.00	124.00
CY	2.20	2.23	1.85	1.92
LV	5.37	5.37	4.47	4.47
LT	6.49	6.49	4.28	4.28
LU	4.48	4.48	4.20	4.24
HU	24.10	26.6	14.40	18.2
MT	0.70	0.82	0.50	0.63
NL	60.70	60.70	52.20	52.20
AT	31.50	31.53	25.07	25.08
PL	96.40	96.40	71.60	71.60
PT	22.50	22.50	17.40	17.40
RO	43.00	43.00	30.30	30.32
SI	7.30	7.13	5.10	5.12
SK	16.38	16.38	9.24	10.38
FI	35.86	35.86	26.66	26.66
SE	43.40	43.40	30.30	30.30
UK	177.60	177.60	129.20	129.20
Sum of indicative targets EU28	**1526.09**	**1536.80**	**1077.36**	**1090.43**
EU28 target 2020	1483		1086	

Source: Member States Annual Reports

[211] FR excludes international aviation in the target reported in AR2020.

Table 9 - Indicative national energy efficiency targets for 2020

MS	Art. 5 annual requirement	Renovated floor area (m²)	Obligation achieved in terms of floor area (%)	Sum of savings 2014-2018	Total renovated floor area over the 2014-2018	Total obligation achieved in 2014-2018 in terms of floor area [%]
BG	55,572	121,531	219.1%	NA	NA	NA
EE	27,604	22,549	81.7%	NA	NA	NA
EL	NA	0	0%	0.15	NA	NA
HU	NA	NA	NA	NA	42,070	NA
IT	414,193	339,001	82%	NA	3,018,432	111.2%
LT	64,624	64,336	100%	NA	411,251	108%
LU	1,955	4,128	211%	0.17	23,013	168.9%
LV	NA	NA	NA	NA	NA	NA
RO	NA	NA	NA	5,52	NA	NA
SI	21,387	17,733	83%	0,34	NA	NA
ES	279,902	173,608	62%	NA	1,589,361	91.5%

Table 10 - GHG emissions reduction (based on total final energy consumption, excluding agriculture)

	CO2 Emissions, ktCO2: Counterfactual minus Observation					Counterfactual over Observation in %				
	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018
AT	2,237	2,545	2,537	2,762	3,979	4.9%	5.4%	5.2%	5.6%	8.2%
BE	1,110	944	2,217	2,589	1,496	1.6%	1.3%	2.9%	3.5%	2.0%
FR	8,900	10,832	12,360	16,306	20,361	3.4%	4.1%	4.7%	6.2%	7.9%
BG	841	1,060	1,690	2,122	2,767	6.4%	7.4%	11.5%	13.7%	17.5%

	CO2 Emissions, ktCO2: Counterfactual minus Observation					Counterfactual over Observation in %				
	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018
CY	154	300	248	174	269	4.3%	8.3%	6.5%	4.4%	6.9%
CZ	2,569	2,996	3,321	3,325	4,463	6.3%	7.1%	7.7%	7.5%	10.1%
DE	12,246	25,514	29,574	37,002	41,578	3.0%	6.2%	7.0%	8.7%	10.1%
DK	626	1,183	1,973	2,404	2,244	3.1%	5.7%	9.1%	10.9%	10.0%
EE	284	317	445	512	394	8.2%	9.3%	12.6%	14.4%	10.8%
EL	3,531	3,471	3,000	4,236	3,912	11.8%	10.8%	9.2%	13.4%	12.5%
ES	18,167	23,257	25,328	29,636	25,314	11.9%	14.9%	15.8%	17.9%	14.9%
FI	752	1,175	1,381	1,579	1,300	3.1%	4.9%	5.4%	6.4%	5.1%
HR	596	477	829	572	948	5.9%	4.6%	7.7%	5.0%	8.4%
IE	1,362	2,295	2,357	3,836	4,463	5.5%	9.0%	8.9%	14.5%	16.1%
IT	4,866	12,373	17,311	23,589	23,652	2.3%	5.8%	8.1%	11.4%	11.2%
LT	257	698	1,060	1,220	1,315	3.4%	9.3%	13.2%	14.5%	14.7%
LU	815	1,186	1,137	766	747	8.4%	12.3%	11.7%	7.6%	7.1%
LV	319	414	556	597	582	6.7%	8.6%	11.5%	11.7%	11.2%
MT	95	129	157	134	63	8.6%	11.0%	13.2%	10.7%	4.7%
NL	7,161	8,719	8,836	9,910	10,470	7.9%	9.2%	9.2%	10.1%	10.8%
PL	9,576	17,131	21,759	21,545	23,818	8.1%	14.4%	16.8%	15.4%	17.0%
PT	2,381	2,199	3,019	2,422	1,865	8.9%	8.0%	10.8%	8.4%	6.4%
RO	2,908	4,635	6,204	5,964	6,505	8.0%	12.6%	16.6%	15.1%	16.4%
SE	1,497	1,729	2,130	2,573	2,571	4.8%	5.5%	7.0%	8.6%	8.7%
SI	668	1,115	1,175	1,535	1,715	8.4%	14.0%	14.0%	18.1%	20.2%
SK	797	2,046	1,709	1,763	1,974	3.9%	10.2%	8.1%	7.7%	8.6%
UK	18,252	16,880	20,871	27,314	29,590	6.5%	5.9%	7.3%	9.5%	10.3%
EU27	85,883	129,418	153,217	180,829	192,556	5.1%	7.5%	8.7%	10.1%	10.8%
EU28	103,843	146,738	174,416	208,384	222,250	5.2%	7.3%	8.5%	10.0%	10.7%

Source: Technical Assistance study on the evaluating the EED (2020)

Table 11 - Achievement of obligations under alternative approach (Article 5(6))

MS	Article 5 Annual energy savings obligation [ktoe]	Savings achieved [ktoe]	Annual obligation achieved in terms of energy savings [%]	Sum of savings in for respective period (2014-2019)	Total renovated floor area over the 2014-2018	Annual obligation achieved in 2014-2018 in terms of energy savings [%]
AT	0.15	0.89	608.9%	4.01	NA	356.5%
BE	0.11	NA	0	3.99 (2014-18)	NA	742.9%
HR	0.12	0.78 (2018)	616.7%	3.96 (2014-18)	NA	677.5%
CY	0.29	0.25	89.3%	1.61	NA	94.1%
CZ	0.49	0.29	58.5%	1.67	NA	56.4%
DK	NA	2.4 (2018)	NA	33.3 (2014-18)	NA	NA
FI	0.10	0.08	79.3%	1.22	NA	233.79%
FR	35.55	99.74 (2018)	281%	588.13 (2014-18)	5.583.574 (2014-18)	331%
DE	0.61	0.23	38%	3.52	NA	89.2%
IE	0.11	0.01	7.2%	1.09	NA	163.2%
MT	NA	0.02	NA	NA	NA	NA
NL	4.18	2.4 (2018)	57%	33.3 (2014-18)	NA	159%
PL	0.37	0.40	106%	2.63	NA	117.1%
PT	NA	54.80	NA	55.02	NA	NA

MS	Article 5 Annual energy savings obligation [ktoe]	Savings achieved [ktoe]	Annual obligation achieved in terms of energy savings [%]	Sum of savings in for respective period (2014-2019)	Total renovated floor area over the 2014-2018	Annual obligation achieved in 2014-2018 in terms of energy savings [%]
SE	0.24	NA	NA	NA	NA	NA
SK	4.49	7.89	176%	34.72	NA	129%
UK	3.52	2.86	81%	40.88	NA	193.7%

Source: based on JRC (2020, forthcoming), Analysis of the annual reports (2020) under the EED

Table 12 - Estimates by stakeholders on the share of public buildings that have adopted energy efficiency plans, put in place energy management systems, use of EnPC

Country	Estimates share of total stock of public buildings that		
	Have adopted an energy efficiency plan	Put in place energy management systems, including audits	Use energy service companies or energy performance contracting
Austria	100% (required by NEKP)	25% (energy management)	16.5% (EPC)
Bulgaria	More than 75% (required by law)	25-50% (energy management) More than 75% (energy audits)	Less than 10%
Cyprus	Less than 10%	Less than 10%	Less than 10%
Estonia	10-25%	10-25% (energy management)	Not used by central governments, used only by 2 local governments (EPCs) Less than 10% (ESCO)
Finland	More than 75%	50-75%	10-25%
Greece*	Less than 10%	Less than 10%	Less than 10%
Ireland	Not available	All central governments above 1000 m² (audits)	Not available
Portugal	Not available	Not available	Not available

Country	Estimates share of total stock of public buildings that		
	Have adopted an energy efficiency plan	Put in place energy management systems, including audits	Use energy service companies or energy performance contracting
Malta*	10-25%	10-25%	Not used
Slovakia	Not available	All large public companies	Not available
Spain	More than 75% (central and regional gov.)	More than 75% (central and regional gov.)	Less than 10% (central and regional gov.)

Source: Technical Assistance study on evaluating the EED (2020)

Table 13 - 2018 reported energy savings overview under Article 7 (ktoe)

	2018			Progress towards the target			
	New savings	Total annual savings	Cumulative savings in 2014-2018	Total cumulative savings required by 2020 (target)	Progress towards total cumulative savings required by 2020	Estimated annual savings required for 2014-2018	2014-2018 compared to estimated annual savings
Austria	372	1307	4032	5200	78%	2786	145%
Belgium	234	1176	3879	6911	56%	3702	105%
Bulgaria	32	175	496	1942	26%	1040	48%
Croatia*	3	73	248	1296	19%	694	36%
Cyprus	77	83	162	242	67%	130	125%
Czechia	176	577	1634	4565	36%	2446	67%
Denmark	173	1045	3187	3841	83%	2058	155%
Estonia	88	99	370	610	61%	327	113%
Finland	543	1377	4701	4213	112%	2257	208%
France	1413	5698	17429	31384	56%	16813	104%
Germany	2950	13695	28953	41989	69%	22494	129%
Greece	211	474	1355	3333	41%	1786	76%
Hungary	131	1731	1731	3680	47%	1971	88%
Ireland	87	466	1408	2164	65%	1159	121%
Italy	3998	3998	12729	25502	50%	13662	93%
Latvia*			436	851	51%	456	96%
Lithuania	79	152	511	1004	51%	538	95%
Luxembourg	9	44	113	515	22%	276	41%
Malta	5	17	47	67	71%	36	132%
Netherlands	611	2274	7777	11512	68%	6167	126%
Poland	331	2977	8891	14818	60%	7938	112%
Portugal*			453	2532	18%	1356	33%
Romania	59	366	1343	5817	23%	3116	43%
Slovakia	106	466	1420	2284	62%	1224	116%
Slovenia	38	133	447	945	47%	506	88%
Spain	539	2296	6958	15979	44%	8560	81%
Sweden	1436	1436	4654	9114	51%	4883	95%
UK	1032	5056	18469	27859	66%	14924	124%
Total	**14634**	**80692**	**134068**	**230169**	**58%**	**123305**	**109%**

* Data on energy savings achieved in 2018 are not yet available for Croatia, Latvia and Portugal. Cumulative savings over 2014-2018 are based on energy savings achieved in previous years up to 2017, but do not include new savings for 2018.

Source: Information reported by Member States and complemented by the Commission's calculations and estimates where necessary.

Table 14 - Measures taken by Member States to promote efficient heating and cooling and waste heat utilisation at national, regional, and local level

Measures and instruments addressing different sectors in the energy efficiency dimension (Green colour indicates existing measures which are spelled out in a good detail; red colour indicates existing measures which lacks detailed information; diagonal down border indicates planned measures, white colour means that there was no measure found)

Country	**Measures on Energy Efficiency**								
	Economic			**Regulatory**			**Other**		
	Building renovation	Boiler modern./replacement	Central. Syst. modern./instal.	New building (NZEB)	Building renovation	Centralized system ren.	Industry	Waste heat	Other
Belgium									
Bulgaria									
Czech R.									
Denmark									
Germany									
Estonia									
Ireland									
Greece									
Spain									
France									
Croatia									
Italy									
Cyprus									
Latvia									
Lithuania									
Luxembourg									

Country	Measures on Energy Efficiency								
	Economic			Regulatory			Other		
	Building renovation	Boiler modern./replacement	Central. Syst. modern./instal.	New building (NZEB)	Building renovation	Centralized system ren.	Industry	Waste heat	Other
Hungary									
Malta									
Netherlands									
Austria									
Poland									
Portugal									
Romania									
Slovenia									
Slovakia									
Finland									
Sweden									

Source: JRC analysis of the Member States' measures notified in the final NECP, WEM: With existing measures (projection)

Table 15 - Implementation and success of Article 18 EED provisions across Member States

	Art.18.1(a)i	Art.18.1(a)ii	Art.18.1(b)	Art.18.1(d)i	Art.18.1(d)ii	Art.18.1(e)	Art.18.2(b)	Art.18.2(d)
Austria	◉	○	◉	◉	◉	○	○	○
Belgium	●	○	◎	○	◉	◎	◉	◉
Bulgaria	○	◉	○	◉	○	◎	○	○
Cyprus	◎	◎	○	◎	n/a	◉	◎	○
Croatia	◎	◉	○	○	○	◎	○	○
Czech Rep.	◉	●	◎	◎	◉	◎	○	◉
Denmark	○	○	○	○	○	○	○	○
Estonia	○	○	○	○	○	◎	○	○
Finland	●	●	●	●	◉	◉	◉	◉
France	●	●	○	◎	◎	○	○	○
Germany	◉	◉	○	◉	◎	◉	○	◎
Greece	◉	○	○	◉	○	○	○	○
Hungary	○	○	○	◎	○	○	○	○
Ireland	◎	◎	◉	○	◎	◉	○	○
Italy	●	●	◎	◉	◉	○	◎	◉
Latvia	○	◎	◎	○	○	◎	○	○
Lithuania	○	◉	○	○	○	○	○	○
Luxembourg	○	◎	○	◎	○	◉	◎	○
Malta	○	○	○	○	○	○	○	○
Netherlands	●	●	○	◎	◉	○	n/a	◉
Poland	◎	○	○	○	○	◉	○	○
Portugal	○	○	○	○	○	○	○	○
Romania	◉	○	○	○	○	○	○	○
Slovakia	●	●	◉	●	●	◎	◉	●
Slovenia	●	●	◎	●	●	◎	●	◎
Sweden	◎	○	◎	◎	◎	◎	◎	◎
Spain	◉	○	●	●	◉	○	◎	○
UK	◎	○	○	◎	○	◉	○	◉

Range of 5 levels: ○ = not implemented according to all survey respondents, ○ = partially implemented (answers vary), with no or limited success, ◎ = implemented, but success is either not reported, or limited success is reported, ◉ = implemented, and most respondents evaluate it as successful, ● = successfully implemented. Source: own data and assessment (JRC survey 2018).

Table 16 - Main barriers limiting ESCO implementation in the Member States

Austria	Inexperience of actors; mistrust from the (potential) clients	**Italy**	Lack of appropriate forms of finance; mistrust from the (potential) clients
Belgium	Mistrust from the (potential) clients; unclarity on application of new Eurostat rules	**Latvia**	Lack of appropriate forms of finance; ambiguities in the legislative framework
Bulgaria	Ambiguities of the legislative framework; lack of appropriate forms of finance	**Lithuania**	Ambiguities of the legislative framework; mistrust from the (potential) clients; inexperience of actors
Croatia	Lack of standardisation; lack of co-financing or financial instruments aimed at ESCO projects	**Luxembourg**	n/a
Cyprus	Lack of supply side and experience	**Malta**	Political reluctance, and focus on other energy sector solutions; availability of alternative sources of finance.
Czech Rep.	Concerns about the Eurostat rules, ambiguities of the legislative framework	**Netherlands**	Small size of projects and high transaction costs; ambiguities in the legislative framework
Denmark	Relatively long lifetime of projects, saturation of the public sector	**Poland**	Insufficient promotion of energy services, mistrust, incompatibility of ESCOs with other financial schemes
Estonia	Small size of projects and high transaction costs; regulative/administrative problems	**Portugal**	Small size of projects and high transaction costs; mistrust from the (potential) clients
Finland	Small size of projects and high transaction costs; mistrust from the (potential) clients	**Romania**	Ambiguities in the legislative framework; banking system and their ignorance of the ESCO activities
France	Mistrust from the (potential) client; small size of projects and high transaction costs	**Slovakia**	Low awareness about guaranteed energy services, Mistrust towards providers of guaranteed energy services, and insufficient regulatory framework
Germany	Mistrust from the (potential) client; small size of projects and high transaction costs	**Slovenia**	Lack of trust in ESCOs, complex book-keeping rules and administrative barriers (in public sector)
Greece	Lack of appropriate forms of finance; existence of in-house technical expertise	**Spain**	Small size of projects and high transaction costs; mistrust from the (potential) clients
Hungary	Legal and regulatory instability, lack of trust and low reputation of the sector, financing sources (in residential and public)	**Sweden**	Mistrust from the (potential) clients; collaboration and cultural issues; perceived business and technical risk
Ireland	Lack of experience of actors; lack of appropriate forms of finance	**United Kingdom**	Mistrust from the (potential) clients; lack of trust from the ESCO industry

Source: JRC report on Energy Service Market in the EU (2019)

Table 17 - Main barriers to the development of EnPCs in the public sector (2020)

	Main barriers to the development of EnPCs in the public sector
Austria	Procurement procedures; Financial issues; Regulatory uncertainty; low push; reluctance to develop skills
Belgium	Lack of understanding; complexity of the model; lack of knowledge; lack of trust between ESCO and authorities; lack of long-term vision; need contract model (in use)
Bulgaria	Limited awareness; Availability of investment grants and, previously, incompatibility with EnPC projects; most buildings already renovated through grants, legal framework (contracts limited to 10 years, limits in EnPC size for municipalities), bad experiences

	Main barriers to the development of EnPCs in the public sector
Croatia	Time and cost demanding project preparation; building projects need support and standardization; disruption by Eurostat and EIB Guide: Need new contract for buildings; Lack clarity on M&V rules for off-balance sheet treatment; lack of public financing
Cyprus	Climate; market size (small project size); (Existing contracts only for street lighting); Lack of standardization; experience and trust; high transaction costs; procurement barriers (rigid budgeting and long procurement processes); Need exemplary role
Czech Republic	Lack of trust and state example; need better information & stronger technical assistance; Slow decisions; Eurostat rules.
Denmark	Low interest from municipalities (public financing & in-house capacity); perceived burden and risk; Need locally adapted and updated information; "Annual Investment Ceiling"
Estonia	(Insufficient information to assess current barriers: potential disinterest. Although there is a first project at municipal level taking off ground)
Finland	Laws of public procurement
France	Lack of off-balance contracting; Bundling energy supply (>15 years: procurement, installation, FM is complex, time consuming). Limits competition since not many companies can compete in such RFPs
Germany	Cheap financing; Complexity of the product & the procurement process, Not legally aligned with climate goals; unclear refinancing mechanisms depending on carbon and renewable energy taxes (fossil supply lobby); disregard towards LCA
Greece	Lack of capacity and experience, SRSS; unclear procurement law, inertial preference for procurement.
Hungary	EU investment grants; mistrust in ESCO models (experiences of corruption) and problematic adoption (transparency needs); legal uncertainties for long term contracts & accounting issues for municipalities; unknown EU mechanisms; complexity of procurement; lack of commitment to energy efficiency; Need expertise, examples.
Ireland	Limited supply & facilitation; legal and bureaucratic problems; lack of top-down commitment (providing examples, building trust & awareness, producing guidelines, registering actors; model contracts, tendering procedures, financial assessments); no list of providers recognized by government
Italy	Frequent litigation; Lack of standards for small projects, complexity and cost of contracts, lack of knowledge; market fragmentation; settled heating system; Need quality standards; targets, incentives and public guarantees
Latvia	Strong resistance at various levels and energy sector interest (blocks renewables); contradictory legislation (service procurement limit contracts to 5 years, and energy efficiency law to 20 year); funding vetoed by treasury (wrong transposition EED)
Lithuania	Low energy prices; need standardization (EnPCs are considered PPPs, making lengthy the approval process); lack of competencies in public buildings (piloting and assistance from ELENA TA, and external competent teams)
Luxembourg	Expectations are put on the development of the private sector first

	Main barriers to the development of EnPCs in the public sector
Malta	No EnPC market; size, climate, and EU policy exceptions
Netherlands	Lack of real estate strategy plans (push); preference for in-house solutions, perceived as more cost-effective; preference for shorter, more flexible contracts, and DB(F)MO in central government
Poland	Decrease of EU Funds in previous period; need a single model contract (instead of many); insufficient use of technical advice (unfavourable contracts for clients); changing legal context
Portugal	Size and climate; lack of expertise in municipalities; legal constrains of public tenders for buildings (ECO.AP); buildings perceived as risky; Unclear off-balance treatment; Complex, burdensome tendering, restrictive for providers and for quality of project, technical capacity of clients; excessive financial guarantees and penalties (small and medium contracts); complex M&V; lack of insurance system for guarantees
Romania	Regulatory and political barriers (transparency); restrictive and complex public procurement procedures (Variable value contracts not allowed for councils) ; lack of understanding; Part of the performance guarantee needs to be returned to the contractor at the end of works - making impossible to execute guarantees)
Slovakia	First movers, were disrupted by Eurostat Guide (limited by rigidity of model contract required by Eurostat)
Slovenia	Central government underperforming, long project preparation phase
Spain	Poor regulatory framework until recently; many public lighting projects are already done; relevance of in-house capacity, preference for shorter, maintenance contracts; fragmented market; Lack of exemplary role; Insufficient information (e.g. off-balance treatment); Short term management culture; interest for highly visible hi-tech.
Sweden	Lack of trust in model, potential "partnering" model; preference for in-house solutions, perceived as more cost-effective; bad experiences; priority to cost
United Kingdom	- N/A

Source: JRC report on Energy Performance Contracting in the Public Sector of the EU (2020)

Table 18 - Overview of costs – benefits identified in the evaluation

			Citizens/Consumers		Businesses		Administrations	
			Qualitative	Quantitative / monetary	Qualitative	Quantitative / monetary	Qualitative	Quantitative / monetary
Article 5	Benefit	Expected direct benefits	Medium benefits	Citizens that use rent publicly owned houses benefit from the lower energy bills			High benefits	Administrations receive the economic benefits resulting from lower energy bills
	Benefit	Expected indirect benefits	Medium benefits	Consumers and citizens that use public buildings benefit in the form better conditions from using and working in renovated buildings	High benefits	Companies that operate in the related materials, constructions and services markets benefit from the public investment and promotion of new solutions.	Medium benefits	Administrations receive the social and environmental benefits (better working environment, reduced emissions, better services to public, etc.)
	Cost	Expected direct costs					High costs	Administrations bear the main direct costs of the Article including the cost to implement the renovation of public buildings
Article 6	Benefit	Expected direct benefits					Medium benefits	Administrations receive the main economic benefits of the Article resulting from the energy cost savings over the lifetime
	Benefit	Expected direct benefits			Medium benefits	Economic benefits from tackling barriers that hinder the market of "energy efficiency" related products and services		
	Cost	Expected direct costs					Medium costs	Administrations bear the main costs including the potentially higher initial purchase costs

	Cost	Expected enforcement costs					Small costs	Smaller additional costs from implementing the regulation such changing procurement procedures, training, using internal or external advisors, etc.
Article 7	Benefit	Expected direct benefits	High benefits	EEOS costs are outweighed by the lower energy bills due to increased energy efficiency				
	Cost	Expected direct costs	High costs	In total, the programme beneficiaries cover between 50-75% of the programme costs. EEOS costs that are passed on consumers typically account for 1-5% of the average energy bills	Medium costs	In total, the obligated parties (energy companies) cover between 25-50% of the programme costs. Energy company costs vary between 6 EUR per capita annually (France) to 16 EUR per capita annually (UK)	Low costs	Administrative costs associated with setting-up, and running the monitoring and verification systems. On average, the administrative costs are less than 1% of the total program costs
Articles 9-11	Benefit	Expected direct benefits	Medium benefits	Direct benefits from lower energy bills	Low benefits	Cost saving from less frequent if at all reading meters		
	Cost	Expected direct costs	Low costs	Consumers eventually pay the costs for individual/ smart meters or cost allocation services				
	Cost	Expected enforcement costs	Low costs				Low costs	Administrations bear low costs to define and publicise relevant rules and guidance
Article 12	Benefit	Expected indirect benefits	Medium benefits	Empowerment and technical or economical help to realise energy savings			Medium benefits	All measures taken under this Article lead to the unlocking of energy savings potential

	Cost	Expected direct costs					Low/ medium/ high costs	Administrations bear the main costs of Article. The costs depend on the nature and size of the measure (ranging from a targeted informational campaign to a large programme of grants)
Article 14(1) and (3)	Benefit	Expected indirect benefits					Medium benefits	Benefits represent mainly increased awareness and data about the existing energy savings potential in heating and cooling that can be further targeted by policies and measures.
	Benefit	Expected direct benefits			Medium benefits	Economic benefits from tackling barriers that hinder the market of "energy efficiency" related products and services		
	Benefit	Expected indirect benefits			Medium benefits	Companies benefit from the increased visibility of heating and cooling, and most notably the identified energy savings potential can be utilized by the companies		
	Cost	Expected enforcement costs					Low costs	Administrations bear the costs of carrying out the comprehensive assessments.
Article 15	Benefit	Expected direct benefits			Medium benefits	Economic benefits from the increased efficiency of the energy system		
	Cost	Expected direct costs			Medium costs	Investments to increase the efficiency of the energy system		

Article 16	Benefit	Expected direct benefits			Medium benefits	Economic benefits from performing audits and implementing results		
	Benefit	Expected indirect benefits					Medium benefits	Benefits from the provision of proper quality services to the market
	Cost	Expected direct costs			Low costs	Reasonable costs to follow training, accreditation and certification schemes		
	Cost	Expected enforcement costs					Low costs	Administrations bear low costs to define and publicise relevant rules and guidance
Article 18	Benefit	Expected direct benefits			Medium benefits	Economic benefits from tackling barriers that hinder the market of "energy efficiency" related products and services		
Article 19	Benefit	Expected direct benefits					Medium benefits	Benefits to the economic results of the administration due to increase in efficiency and lower energy costs
	Benefit	Expected direct benefits	Medium benefits	Citizens benefit from the lower energy bills				
	Benefit	Expected indirect benefits	Medium benefits	Owners benefit from the increased value and quality of their assets				
	Benefit	Expected direct benefits			Medium benefits	Economic benefits from tackling barriers that hinder the market of "energy efficiency" related products and services		

	Cost	Expected enforcement costs					Low costs	Administrative costs for identifying and overcoming barriers of Article 19.
	Cost	Expected direct costs					Medium costs	Medium costs for financial schemes to overcome split of incentives.

EUROPEAN
COMMISSION

Brussels, 14.7.2021
SWD(2021) 626 final

COMMISSION STAFF WORKING DOCUMENT

EXECUTIVE SUMMARY OF THE EVALUATION

Accompanying the

Proposal for a Directive of the European Parliament and of the Council

on energy efficiency (recast)

{COM(2021) 558 final} - {SEC(2021) 558 final} - {SWD(2021) 623 final} - {SWD(2021) 624 final} - {SWD(2021) 625 final} - {SWD(2021) 627 final}

A. Need for action
What is the problem and why is it a problem at EU level?
The EU currently has an energy savings target of at least 32.5% in 2030, compatible with a 40% greenhouse gas reduction (GHG) reduction. The Climate Target Plan proposes an EU target for 2030 of at least 55% net GHG reduction compared to 1990 levels in a cost-optimal way. To achieve this, EU final and primary energy consumption should decrease by at least 36-37% and 39-41% respectively compared to projected energy use. Given that combustion of fuels for energy is responsible for 75% of current EU GHG emissions, reducing energy use is a vital element, along with decarbonising energy supply, in achieving the EU's target. The broad measures to achieve a 55% GHG reduction in 2030 were explored in the Climate Target Plan. At present, EU energy saving efforts are insufficient to achieve the 2030 GHG target in an optimal way and therefore the problem is how they can be boosted. It is important for the EU to show it is feasible and desirable to take action to reduce its GHG emissions as part of the European Green Deal in the most cost-effective way.
What should be achieved?
The increased energy savings needed mean that the Energy Efficiency Directive should be reinforced. This will ensure, along with other EU legislation, that there are sufficient energy savings to achieve the EU's 2030 climate goal cost-effectively. The energy savings should be achieved in the sectors where this makes most sense from an economic, social and environmental point of view. Co-benefits such as from reduced environmental impacts and avoid exacerbating inequality should be optimised.
What is the value added of action at the EU level (subsidiarity)?
The Treaty on the Functioning of the EU identifies an aim of EU energy policy as promoting energy efficiency and energy saving. The underlying problems causing a shortfall in energy savings are the same across the EU. Action at the EU level can enable and enhance efforts by Member States and ensure a more coordinated and harmonised approach avoiding distortion of the single market. It will help to create greater markets for materials and products that help improve energy efficiency. Experience indicates that having a common EU framework reduces costs, increases benefits from the internal market and allows national policy-makers to learn from each other. The EU measures effectively complement and catalyse national measures.
B. Solutions
What are the options to achieve the objectives? Is there a preferred option or not? If not, why?
The main mechanism to achieve the objectives is through increasing the overall EU energy savings target and increasing its binding effect. This can be supplemented by specific requirements that lead to energy savings, for example by expanding the measures relating to public sector procurement and building renovations and increasing the ambition of energy saving obligations. There is a need for strengthening and enhancing the wide range of enabling and supporting measures to create an environment where it is easier to promote energy efficiency and achieve energy savings. The options need to be assessed to ensure their coherence with other measures being proposed as part of the Fit for 55 package.
What are different stakeholders' views? Who supports which option?
A large majority of stakeholders agree that energy efficiency policies play a key role in delivering higher climate ambition for 2030, while allowing for a sustainable growth that does not leave anyone behind. Their views somehow differ on the appropriate measures to achieve that, but there is no striking difference on the ultimate objectives. Almost half favour a higher EU target and more than half support it being binding. Around half

support binding national targets. There are quite varied views on the range of options identified. In general, civil society is more positive about what the proposed measures could be. In many cases, business is quite supportive. Public authorities appear to have a more cautious approach.

C. Impacts of the preferred option

What are the benefits of the preferred option (if any, otherwise of main ones)?

The preferred option consists of a package that achieves a high level of energy savings in an effective way, while avoiding the most burdensome options considered.

What are the costs of the preferred option (if any, otherwise of main ones)?

The main costs are the investments needed so that energy efficiency will be increased. Financial support from NextGenerationEU and other public sources are expected to play a pivotal role in uptake of energy efficiency investments. Capital costs for more energy efficient equipment and retrofitting of buildings are considered.

What are the impacts on SMEs and competitiveness?

There are not expected to be significant impacts on SMEs. There is a considerable scope for cost-effective energy savings in services and industry that will not lead to any overall increase in costs. Implementing these should reduce business exposure to energy price fluctuations and along with the reduced operating costs enhance its competitiveness.

Will there be significant impacts on national budgets and administrations?

There are implementation costs associated with the preferred option for public administrations, even if those build on already existing measures. Nevertheless, these additional costs are expected to be small compared to the substantial cost savings that will be realised through energy saving investments. Money not spent on energy will be used for other purposes and lead to a boost in employment and economic activity.

These costs may vary, depending on the manner in which Member States choose to implement the requirements. The EED Concerted Action provides a forum for Member States to share best practice and identify effective ways to achieve the desired objectives. The Commission is ready to support Member States further with technical assistance.

Will there be other significant impacts?

Reducing energy use will bring significant environmental benefits, in particular from reduced air pollution. It will also lead to other environmental benefits such as reduced emissions to water from power stations and reduced environmental damage due to the lower need for infrastructure and less resource extraction. It reduces resource consumption and positively contributes to the circular economy.

Reduced energy needs will also decrease the EU's dependence on energy imports and geopolitical volatility, thus helping to insulate the economy from external energy price shocks.

Through well designed measures, it will also lead to important social benefits. For example, the energy upgrading of housing will lead to better living conditions and health as well as lower expenditure on energy. Energy saving measures lead to a high level of job creation.

Proportionality?

The proportionality principle is fully respected. The measures proposed are the minimum needed to achieve the goals that are crucial to achieving the EU's climate ambition for 2030.

D. Follow up

When will the policy be reviewed?

The Commission intends to review the implementation of the legislation to assess the extent to which the policy objectives have been achieved every 5 years.

EUROPEAN
COMMISSION

Brussels, 14.7.2021
SWD(2021) 624 final

COMMISSION STAFF WORKING DOCUMENT

EXECUTIVE SUMMARY OF THE IMPACT ASSESSMENT REPORT

Accompanying the

Proposal for a Directive of the European Parliament and of the Council

on energy efficiency (recast)

{COM(2021) 558 final} - {SEC(2021) 558 final} - {SWD(2021) 623 final} - {SWD(2021) 625 final} - {SWD(2021) 626 final} - {SWD(2021) 627 final}

A. Need for action
What is the problem and why is it a problem at EU level?
The EU currently has an energy savings target of at least 32.5% in 2030, compatible with a 40% greenhouse gas reduction (GHG) reduction. The Climate Target Plan proposes an EU target for 2030 of at least 55% net GHG reduction compared to 1990 levels in a cost-optimal way. To achieve this, EU final and primary energy consumption should decrease by at least 36-37% and 39-41% respectively compared to projected energy use. Given that combustion of fuels for energy is responsible for 75% of current EU GHG emissions, reducing energy use is a vital element, along with decarbonising energy supply, in achieving the EU's target. The broad measures to achieve a 55% GHG reduction in 2030 were explored in the Climate Target Plan. At present, EU energy saving efforts are insufficient to achieve the 2030 GHG target in an optimal way and therefore the problem is how they can be boosted. It is important for the EU to show it is feasible and desirable to take action to reduce its GHG emissions as part of the European Green Deal in the most cost-effective way.
What should be achieved?
The increased energy savings needed mean that the Energy Efficiency Directive should be reinforced. This will ensure, along with other EU legislation, that there are sufficient energy savings to achieve the EU's 2030 climate goal cost-effectively. The energy savings should be achieved in the sectors where this makes most sense from an economic, social and environmental point of view. Co-benefits such as from reduced environmental impacts and avoid exacerbating inequality should be optimised.
What is the value added of action at the EU level (subsidiarity)?
The Treaty on the Functioning of the EU identifies an aim of EU energy policy as promoting energy efficiency and energy saving. The underlying problems causing a shortfall in energy savings are the same across the EU. Action at the EU level can enable and enhance efforts by Member States and ensure a more coordinated and harmonised approach avoiding distortion of the single market. It will help to create greater markets for materials and products that help improve energy efficiency. Experience indicates that having a common EU framework reduces costs, increases benefits from the internal market and allows national policy-makers to learn from each other. The EU measures effectively complement and catalyse national measures.
B. Solutions
What are the options to achieve the objectives? Is there a preferred option or not? If not, why?
The main mechanism to achieve the objectives is through increasing the overall EU energy savings target and increasing its binding effect. This can be supplemented by specific requirements that lead to energy savings, for example by expanding the measures relating to public sector procurement and building renovations and increasing the ambition of energy saving obligations. There is a need for strengthening and enhancing the wide range of enabling and supporting measures to create an environment where it is easier to promote energy efficiency and achieve energy savings. The options need to be assessed to ensure their coherence with other measures being proposed as part of the Fit for 55 package.
What are different stakeholders' views? Who supports which option?
A large majority of stakeholders agree that energy efficiency policies play a key role in delivering higher climate ambition for 2030, while allowing for a sustainable growth that does not leave anyone behind. Their views somehow differ on the appropriate measures to achieve that, but there is no striking difference on the ultimate objectives. Almost half favour a higher EU target and more than half support it being binding. Around half

support binding national targets. There are quite varied views on the range of options identified. In general, civil society is more positive about what the proposed measures could be. In many cases, business is quite supportive. Public authorities appear to have a more cautious approach.

C. Impacts of the preferred option

What are the benefits of the preferred option (if any, otherwise of main ones)?

The preferred option consists of a package that achieves a high level of energy savings in an effective way, while avoiding the most burdensome options considered.

What are the costs of the preferred option (if any, otherwise of main ones)?

The main costs are the investments needed so that energy efficiency will be increased. Financial support from NextGenerationEU and other public sources are expected to play a pivotal role in uptake of energy efficiency investments. Capital costs for more energy efficient equipment and retrofitting of buildings are considered.

What are the impacts on SMEs and competitiveness?

There are not expected to be significant impacts on SMEs. There is a considerable scope for cost-effective energy savings in services and industry that will not lead to any overall increase in costs. Implementing these should reduce business exposure to energy price fluctuations and along with the reduced operating costs enhance its competitiveness.

Will there be significant impacts on national budgets and administrations?

There are implementation costs associated with the preferred option for public administrations, even if those build on already existing measures. Nevertheless, these additional costs are expected to be small compared to the substantial cost savings that will be realised through energy saving investments. Money not spent on energy will be used for other purposes and lead to a boost in employment and economic activity.

These costs may vary, depending on the manner in which Member States choose to implement the requirements. The EED Concerted Action provides a forum for Member States to share best practice and identify effective ways to achieve the desired objectives. The Commission is ready to support Member States further with technical assistance.

Will there be other significant impacts?

Reducing energy use will bring significant environmental benefits, in particular from reduced air pollution. It will also lead to other environmental benefits such as reduced emissions to water from power stations and reduced environmental damage due to the lower need for infrastructure and less resource extraction. It reduces resource consumption and positively contributes to the circular economy.

Reduced energy needs will also decrease the EU's dependence on energy imports and geopolitical volatility, thus helping to insulate the economy from external energy price shocks.

Through well designed measures, it will also lead to important social benefits. For example, the energy upgrading of housing will lead to better living conditions and health as well as lower expenditure on energy. Energy saving measures lead to a high level of job creation.

Proportionality?

The proportionality principle is fully respected. The measures proposed are the minimum needed to achieve the goals that are crucial to achieving the EU's climate ambition for 2030.

D. Follow up

When will the policy be reviewed?

The Commission intends to review the implementation of the legislation to assess the extent to which the policy objectives have been achieved every 5 years.

EUROPEAN
COMMISSION

Brussels, 14.7.2021
SWD(2021) 623 final

PART 1/2

COMMISSION STAFF WORKING DOCUMENT

IMPACT ASSESSMENT REPORT

Accompanying the

Proposal for a Directive of the European Parliament and of the Council

on energy efficiency (recast)

{COM(2021) 558 final} - {SEC(2021) 558 final} - {SWD(2021) 624 final} - {SWD(2021) 625 final} - {SWD(2021) 626 final} - {SWD(2021) 627 final}

CONTENTS

Glossary

Acronym	*Meaning or definition*
BPIE	Buildings Performance Institute Europe
BSL	Baseline scenario
CBA	Cost Benefit Assessment
CEER	Council of European Energy Regulators
CHP	Combined Heat and Power (generation)
CTP	Climate Target Plan
DSO	Distribution System Operator
EE	Energy Efficiency
EED	Energy Efficiency Directive
EE1st	Energy Efficiency First
EEOS	Energy Efficiency Obligation Schemes
EPBD	Energy Performance of Buildings Directive
EPC	Energy Performance Contract
ESO	Energy Savings Obligation
ESR	Effort Sharing Regulation
EUCO	European Council
EU	European Union
ETS	Emissions Trading System
FEC	Final Energy Consumption
FF55	Fit for 55 package
FTE	Full Time Equivalent
GDP	Gross Domestic Product
GEM-E3	An applied General Equilibrium Model
GHG	Greenhouse Gas
GPP	Green Public Procurement
IA	Impact Assessment
ICT	Information and Communications Technology
IEA	International Energy Agency
JRC	Joint Research Centre of the European Commission
LTRS	Long-Term Renovation Strategies
LULUCF	Land use, land use change and forestry
MS	Member States

Mtoe	Million Tonnes of Oil Equivalent
NECP	National Energy and Climate Plan
NZEB	Nearly Zero Energy Building
PC	Public Consultation
PEC	Primary Energy Consumption
PEF	Primary Energy Factor
PRIMES	An energy system model (Price-Induced Market Equilibrium System)
REDII	Renewable Energy Directive
RSB	Regulatory Scrutiny Board
SME	Small and medium sized enterprise
TFEU	Treaty on the Functioning of the European Union
TSO	Transmission System Operator

Term	***Meaning or definition***
Additionality	Energy savings under EED Article 7 must be in addition to those that would have occurred in any event without the activity of the obligated, participating or entrusted parties, or implementing public authorities. Savings resulting from the implementation of mandatory Union law are considered savings that would have occurred in any event and thus cannot be claimed as energy savings for the purpose of Article 7(1).
Cogeneration	Cogeneration, also called combined heat and power (CHP) is the simultaneous production of electricity and useful heat.
District heating	District heating is a system for distributing heat generated in a centralised location through a system of insulated pipes for residential and commercial heating requirements such as space and water heating.
Energy Performance Contract	An Energy Performance Contract (EPC) is a mechanism for an external organisation to finance energy saving capital investments from future energy savings.
Energy service	Energy service means the physical benefit, utility or good derived from a combination of energy with energy-efficient technology or with action, which may include the operations, maintenance and control necessary to deliver the service, which is delivered on the basis of a contract and in normal circumstances has proven to result in verifiable and measurable or estimable energy efficiency improvement or primary energy savings
Final Energy Consumption	Final energy consumption is the total energy consumed by end users, such as households, industry and agriculture. It is the energy which reaches the final consumer's door and excludes that which is used by the energy sector itself.
Primary Energy Consumption	Primary energy consumption measures the total energy demand of a country. It covers consumption of the energy sector itself, losses during transformation and distribution of energy. It excludes energy carriers used for non-energy purposes (such as petroleum not used not for combustion but for producing plastics).
Rebound effects	The rebound effect is the reduction in expected gains from new technologies that increase the efficiency of resource use, because of behavioural or other systemic responses. These responses diminish the beneficial effects of the new technology or other measures taken.

1. INTRODUCTION

1.1. The political context

With the adoption of the European Green Deal in December 2019[1], the Commission set out *"a new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use. It also aims to protect, conserve and enhance the EU's natural capital, and protect the health and well-being of citizens from environment-related risks and impacts"*. To reach these objectives, "*energy efficiency must be prioritised*".

At that occasion, the Commission also announced that it would present an impact-assessed plan to increase the EU's greenhouse gas (GHG) emissions reduction target for 2030 in a responsible way, and committed to "*review and propose to revise, where necessary, the relevant energy legislation by June 2021*"[2].

In March 2020, the Commission made a proposal for a European Climate Law[3], and in September 2020, it presented a Climate Target Plan (CTP) for 2030[4], emphasising the need for a higher contribution of energy efficiency and renewable energy to enable achievement of a net 55% GHG emission reduction most cost-effectively. This is also in line with the Paris Agreement objective to keep the global temperature increase to well below 2°C and pursue efforts to keep it to 1.5°C. The accompanying Impact Assessment (CTP IA) explored the achievability of the higher targets and the contributions of different instruments, including for energy efficiency, to achieve them.

In December 2020, the European Council's conclusions[5] noted that "*To meet the objective of a climate-neutral EU by 2050 in line with the objectives of the Paris Agreement, the EU needs to increase its ambition for the coming decade and update its climate and energy policy framework. (...) To that end, the European Council endorses a binding EU target of a net domestic reduction of at least 55% in greenhouse gas emissions by 2030 compared to 1990."* Moreover, it is noted that: *"climate ambition will be raised in a manner that will spur sustainable economic growth, create jobs, deliver health and environmental benefits for EU citizens, and contribute to the long-term global competitiveness of the EU economy by promoting innovation in green technologies".*

On 22 April 2021, the European Parliament and the Council came to a provisional political agreement to achieve at least a 55% reduction in GHG emissions by 2030. This sets the framework for action to reduce GHG emissions over the coming decades, but needs to be implemented through specific legislation to ensure those reductions occur.

For that purpose, in its 2021 Work Programme[6] the Commission announced the preparation of a 'Fit for 55' package for the second quarter of 2021. This package covers

---

1 The European Green Deal (COM(2019) 640 final)

2 Annex to the Green Deal Communication, page 2

3 Proposal for a regulation of the European Parliament and of the Council establishing the framework for achieving climate neutrality and amending Regulation (EU) 2018/1999

4 Stepping up Europe's 2030 climate ambition. Investing in a climate-neutral future for the benefit of our people (COM/2020/562 final)

5 https://www.consilium.europa.eu/media/47296/1011-12-20-euco-conclusions-en.pdf

6 COM(2020) 690 final

a wide range of policy areas, including the revision of the Energy Efficiency Directive (EED[7]).

This impact assessment examines the options for revising the EED taking into account the other relevant elements of the package (see section 1.5).

1.2. The importance of energy efficiency

The importance of energy efficiency is illustrated by the EU's long-standing policy for saving energy and promoting energy efficiency[8], and has also come to the fore as a key element for achieving the EU's climate objectives and a cost-effective clean energy transition. This is because combustion of fuel for energy contributes about 75% of EU GHG[9] emissions, coming from energy industries, energy users in the residential sector and transport (see Figure 1). Reducing those emissions is necessary for achieving EU climate goals for 2030 and 2050, as examined in the CTP IA, a view which is supported by 85% of respondents from all stakeholder groups that responded to the Public Consultation (PC) for the revision of the EED[10]. A majority of respondents also support a revision of the EED to achieve this.

Reducing energy use is also important for many other reasons[11]; it reduces the EU's energy import dependence and improves energy security; it contributes to improved air quality, reduced environmental damage from materials extraction, resource efficiency and a circular economy; it supports energy system integration, has positive effects on social issues, including the alleviation of energy poverty and the creation of jobs, ; and encourages innovation and supports and facilitates economic growth[12]. Most of these co-benefits are difficult to quantify, but its positive effects are well known to Member States, stakeholders and experts in general and they are perceived to the society at large. Efforts have been made to also come to the quantification of these benefits[13].

Figure 1: Greenhouse gas emissions by main activity (2017)[14]

---

7 Directive (EU) 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency

8 In its 1995 White Paper on an Energy Policy for the European Union (COM(95)682), the Commission recognised the importance of promoting energy efficiency as well as the environmental and climate problems due to energy use.

9 https://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer. This does not include greenhouse gas emissions and removals from land use, land use change and forestry (LULUCF).

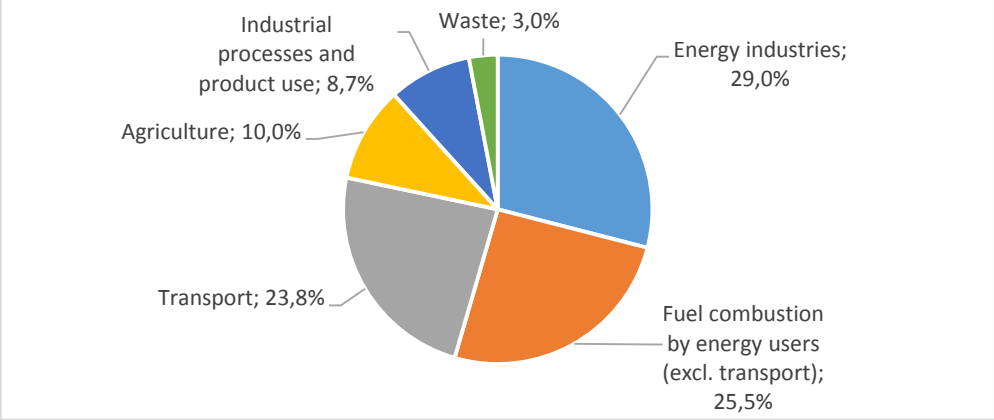
10 https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12552-EU-energy-efficiency-directive-EED-evaluation-and-review

11 https://www.odyssee-mure.eu/data-tools/multiple-benefits-energy-efficiency.html

12 IEA analysis shows that energy efficiency investments in buildings create around 15 jobs for every million dollars - the most jobs for the options assessed. Energy efficiency in industry is close behind at 10 jobs per million dollars investment. IEA World Energy Outlook Special Report: Sustainable recovery; June 2020

13 https://combi-project.eu/2018/06/22/combi-results-overview-policy-conclusions/

14 https://ec.europa.eu/eurostat/cache/infographs/energy/bloc-4a.html



As illustrated in Figure 2, energy-related GHG emissions can be reduced by a combination of **using less energy** and shifting towards the supply of **less GHG-intense energy**.

Figure 2: The contribution of energy efficiency to GHG emissions reduction.

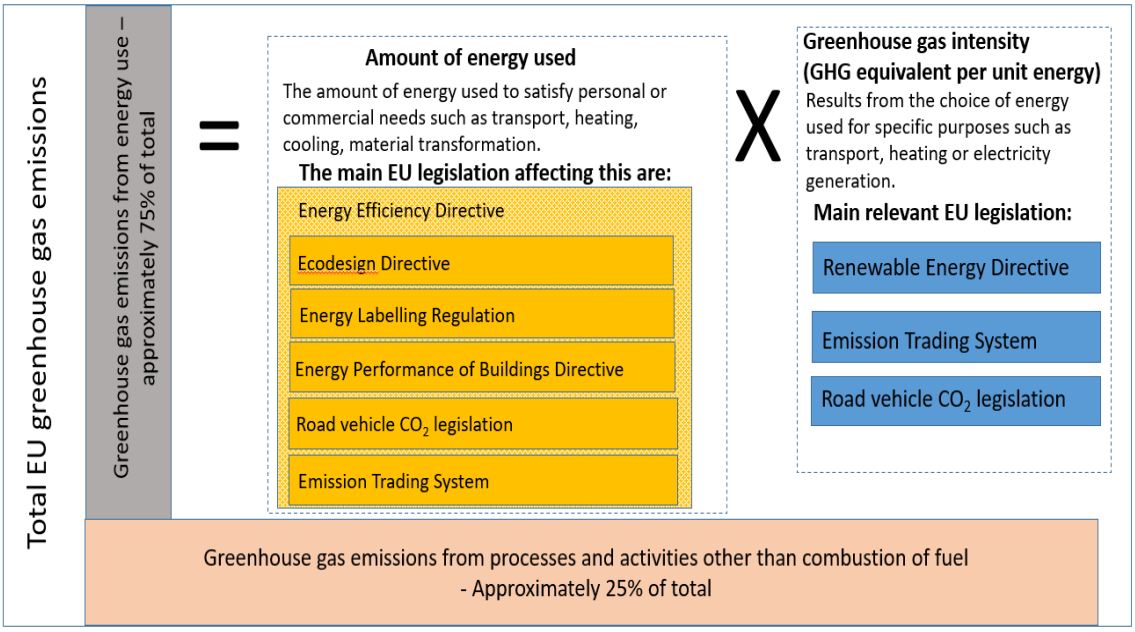


Figure 2: The contribution of energy efficiency to GHG emissions reduction.Figure 2 also indicates the main EU legislation that is driving changes in these two areas. GHG intensity is reduced by influencing energy supply through promoting renewable energy (e.g. through the Renewable Energy Directive[15]), and influencing demand through GHG-differentiated pricing measures (e.g. the Emission Trading System[16] (ETS) or the Energy

[15] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources

[16] Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC, as amended.

Taxation Directive (ETD)[17]) and regulations (e.g. of light vehicles encouraging electrification).

The main ways that EU legislation is driving less energy use are by more energy efficient products (e.g. through the ecodesign framework), more energy efficient buildings (e.g. through the building-related provisions and legislation), more energy efficient vehicles (e.g. through road vehicle CO_2 regulation), pricing measures (e.g. through the ETS) and better information on energy saving opportunities (e.g. through energy performance certificates and energy labelling and actions for energy efficiency financing).

The role of this legislation – as well as that of the main other EU policies and legislation that can have an impact on energy use and may contribute to the EED's overall energy efficiency target – is described in more detail in ***Error! Reference source not found.***.

As the key legislation impacting the level of GHG emissions from energy, most of these instruments are being revised as part of the 'Fit for 55' package in a coherent and consistent way. The next section looks in more detail at this legislation and how it interacts with, complements and is complemented by, the EED.

1.3. The role of the EED and interlinkages with key related legislation

Reducing energy use and the role of the EED

Society's use of energy is largely driven by the size of its population and the level of economic activity and has tended to grow over time. This growth in energy use is offset by technical improvements leading to higher energy efficiency. The natural rate at which energy efficiency improves has been speeded up by the implementation of minimum performance standards that eliminate the worst performers from the market. This primarily relates to new goods (i.e. products[18], vehicles[19], buildings[20]) and services. Innovation is further stimulated by providing information such as labels[21] to show the differing performance and encourage economic actors to compete with increasingly more energy efficient offerings.

The impact of these standards and labels is determined by the rate of replacement (or upgrade) of the products they apply to. These rates vary enormously (e.g. 1% per year energy renovation of buildings[22], 6% per year for cars[23], every 21 months for smartphones[24]). Provided the rate of improvement of energy efficiency of new products is sufficiently high (and the energy needed for their production is low enough), overall energy use can be reduced by **accelerating the replacement rate**. In addition, **incentivising consumers to choose more energy efficient products** when they make a purchase also accelerates the rate of reduction of energy use. Moreover, the way of using

---

17 Council Directive 2003/96/EC of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity

18 E.g. Eco-design legislation

19 E.g. CO_2 emissions standards for road vehicles

20 E.g. The energy performance of buildings Directive

21 E.g. Energy and car labelling legislation, Energy Performance Certificates for buildings

22 Renovation wave

23 Improvements to the definition of lifetime mileage of light duty vehicles: https://ec.europa.eu/clima/sites/default/files/transport/vehicles/docs/ldv_mileage_improvement_en.pdf

24 Average smartphone replacement cycle worldwide 2017 - Statista: https://www.statista.com/statistics/781708/global-average-smartphone-replacement-cycle/

energy can be influenced through pricing measures[25] as well as behavioural aspects (e.g. fuel-efficient driving and turning off devices not in use). Nevertheless, the existence of market barriers means that pricing is not overly effective as a mechanism to stimulate higher energy efficiency.

The EED aims to enhance energy efficiency by using these mechanisms, through the action of the Member States, to deliver increased energy savings above what would be achieved through minimum performance standards and pricing measures alone. Member States achieve the changes in the market through a range of measures at their disposal including removing barriers, offering subsidies, undertaking information campaigns and setting obligations on energy suppliers. The EED also requires a set of enabling measures to facilitate the delivery of higher levels of energy efficiency across the economy.

It is estimated that the impact of EU level action on minimum standards and pricing alone will achieve around half of the additional energy savings needed to meet the increased 2030 ambition, while the remainder will need to be achieved through measures enacted as a result of the EED.

The main elements of the EED

It can be seen that most of the relevant EU legislation is aimed at improving the energy efficiency of new energy using processes, actions and devices. In addition, the ETS and Energy Tax Directive (ETD) affect prices, which will have an effect on both activity and energy efficiency choices. There are a number of mechanisms by which the EED operates that are complemented by and complement the mechanisms and EU legislation referred to above.

One of the main roles the EED plays is to set the obligation on Member States to reduce their energy use. This triggers Member States to use the available mechanisms (making industrial processes more efficient, speeding up replacements, developing skills, investing in higher energy efficiency class devices, altering behaviour, providing good and detailed information, etc.) which lead to the actions and investments that deliver energy savings in use.

Energy efficiency faces barriers stemming notably from the involvement of large numbers of actors, the small scale of a very large number of actions to be taken and the remaining perceived uncertainty over benefits. Another important role of the EED is thus to address these and other remaining barriers.

Moreover, it is for the EED to ensure that Member States adequately undertake actions in the areas where there are or particular importance (for example district heating, cogeneration and energy services). The main mechanisms through which the EED operates are by:

- Setting an overall energy efficiency target for Member States;
- Creating specific energy saving obligations, which Member States are required to achieve (primarily in Article 7);
- Ensuring an exemplary role for the renovation of public buildings;
- Requiring Member States to support energy savings where these may be too complex, face too many frictions or lack appropriate incentives (e.g. public

[25] E.g. the Energy Tax Directive, the Emission Trading System

procurement, heating & cooling, energy transmission and distribution, energy performance contracts.[26]);

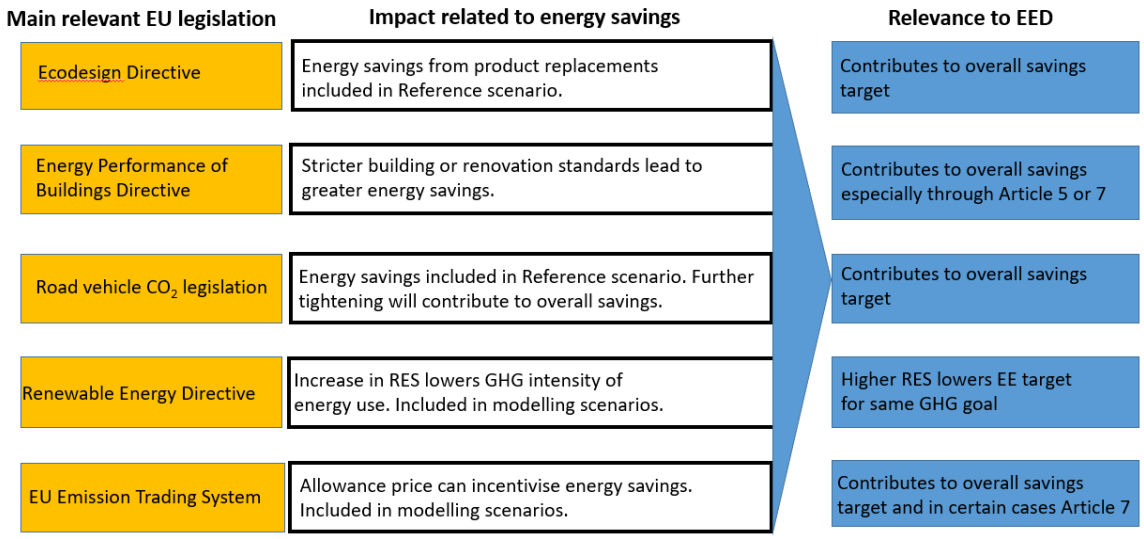
- Setting an obligation on Member States to implement enabling measures for example access to energy audits and ensuring adequate qualifications and certifications relevant to energy savings;
- Setting an obligation on Member States to ensure appropriate information is available for energy end users;
- Promoting the provision of finance for energy efficiency investments.

These are the broad elements of the EED as it was created in 2012. In December 2018, it was amended[27] as part of the 'Clean Energy for All Europeans package', in particular to include a new headline 2030 EU energy efficiency target of at least 32.5% (compared to projected energy use in 2030). The intervention logic of the EED is explained in more detail in **Error! Reference source not found.**.

Contribution of other EU legislation to the EED objectives

While these many other pieces of legislation have an impact in their own right on energy efficiency, they also contribute to achieving the objectives of the EED, in particular as regards the energy efficiency target. Figure 3 provides an overview of these main impacts and how they are relevant to the EED. In general, any changes to this other legislation, which increase the energy savings from them, will contribute to achieving the overall energy efficiency target set by the EED.

Figure 3: How other energy efficiency legislation interacts with the EED



The areas where the EED acts

Certain elements of the EED are addressed at specific energy consuming areas. Table 1 shows the main energy consumption in key areas of the economy addressed by the EED (with the relevant EED Article shown in brackets). Given that significant savings

[26] In this context, it has to be noted that in transposing the EED, Member States must give local and regional authorities a leading role in designing the measures laid down, in order to address the specific features of their climate, culture and society.

[27] Directive 2018/2002. The main changes were to introduce a 2030 target, amend the Energy Savings Obligations and change the metering requirements.

potential still exist in these areas, further promotion of energy efficiency actions are necessary in all of them.

Table 1 Estimated EU Final Energy Consumption (FEC) in economic sectors in the scope of the EED

Area	Activity level	% EU FEC
Businesses (Article 8) (of which industry)	368 Mtoe 240 Mtoe	40% 26%
Households / consumers (Article 12)	245 Mtoe	27%
Heating and cooling (Article 14)	≈450 Mtoe	≈50%
(of which district heating and cooling)	12-14% of EU heat demand	6-7%
(of which cogeneration)	40 Mtoe heat	4.4%
Public sector buildings (Article 5)	15 Mtoe	2%
Public procurement (Article 6)	45-90 Mtoe	5-10%
Energy transmission and distribution losses (Article 15)	5-10% of electricity (CEER) Transmission and distribution losses – 23 Mtoe	1.3-2.7% 2.5%
Energy services (Article 18)	Estimated to be in the order of 25 Mtoe (41 billion Euro turnover)	≈2.5%

The transport sector which consumes around 32% of FEC is the sole main energy using sector that is currently not specifically addressed in the EED.

1.4. Governance of the Energy Union and Climate Action

Under the Regulation on the Governance of the Energy Union and Climate Action[28], each Member State is required to establish a 10-year integrated national energy and climate plan (NECP) for 2021-2030, outlining how it intends to contribute – *inter alia* – to the 2030 target for energy efficiency.

Member States submitted final National Energy and Climate Plans in December 2019 and proposed their contributions towards the EU 2030 energy and climate targets (40% GHG emission reduction, 32% renewable energy production in final energy and a 32.5% energy efficiency target). The assessment of these plans showed the existence of an 'ambition gap' as regards the existing 2030 EU energy efficiency target, meaning that the sum of Member States contributions fall short of the EU 32.5% actual headline target.

Therefore, and in line with Article 31 of the Governance Regulation, relevant policies and measures need to be strengthened, and the Commission must propose measures and exercise its powers at Union level to ensure the achievement of the Union's energy efficiency target. Also to that end, the revision of the Energy Efficiency Directive will

[28] Regulation 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action

play a crucial role, but it obviously needs to go further as the GHG reduction ambition level and the role played by energy efficiency therein are being changed.

1.5. The revision of the EED as part of the 'Fit for 55' package

The European Commission 2021 Work Programme announced a 'Fit for 55' package to reduce GHG emissions by at least 55% by 2030 and achieve a climate-neutral Europe by 2050.

Energy efficiency is a key area of action to enable the cost-effective decarbonisation of the EU economy[29], must be prioritised and, according to the conclusions of the IA CTP, needs to be decreased by 36-37% as regards final energy consumption.

The 'Fit for 55' package brings together the relevant policy instruments that can contribute to the 55% GHG reduction target and aims to do so in a coherent and proportional manner among other relevant regulations and directives. This is notably the case for the Energy Efficiency Directive (EED), the Renewable Energy Directive (REDII), the EU Emissions Trading System (ETS), Effort Sharing (ESR), Land use, Land Use Change and Forestry policies (LULUCF), energy taxation and CO_2 emission standards for vehicles.

With this objective in mind, the CTP IA assessed the interaction and expected contribution of the different measures to the overall carbon GHG emissions objective for 2030, showing that contributions from all relevant policies are needed to reach the 55% increased ambition and, ultimately, the carbon neutrality target set for 2050.

In particular, with energy supply and use responsible for 75% of emissions, the CTP underlines the need for higher ranges for renewables and energy efficiency targets, to contribute in a cost-efficient manner to the increased emissions reduction target. Given the key role of the EED in EU energy efficiency policy, the CTP IA also stressed the need for its revision alongside that of the other elements of the EU climate and energy framework.

All the CTP policy scenarios include a combination of a pricing mechanism as well as sector specific measures to ensure the required uptake of energy efficiency measures and the deployment of renewable energy. This approach aims to avoid the risk of incoherence or regulatory overshoot among the initiatives under the 'Fit for 55' package.

More generally, the optimal policy mix is shown to be based on a combination of strengthened economic incentives (in particular carbon pricing) with updated regulatory policies, notably in the field of renewables and energy efficiency. It should also update the enabling framework (R&D policies, financial support, etc.).

Regulatory policies, such as renewables, energy efficiency, and CO_2 standards for vehicles aim at addressing market failures and other barriers to decarbonisation. At the same time, they also create an enabling framework for investment, which supports cost-effective achievement of the climate targets by reducing perceived risks, increasing the

[29] Amongst various sources, see the Communication A Clean Planet for all – A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy (COM/2018/773 final), where the role of energy efficiency as *a condition sine qua non* for all decarbonisation scenarios is assessed.

efficient use of public funding and helping to mobilise and leverage private capital. These regulatory policies also pave the way for the future transition needed to achieve the EU objective of the climate-neutrality.

Since the CTP IA already explored the balance of combinations of instruments to identify the most cost-effective package, this is outside the scope of this impact assessment.

Of the other elements of the 'Fit for 55' package, how the approach taken to pricing in the CTP IA is taken over for this impact assessment has the most significant impact. This is because higher energy prices can lead to both a reduction in energy using activity and increase the attractiveness of energy efficient investments. The role energy efficiency can play to reduce the distributional effects from higher energy prices is also important. In view of this the 'Fit for 55' package impact assessments retain three different pricing scenarios without any decision on a preference. This assessment checks that the measures assessed are compatible with these scenarios.

The CTP IA shows that, depending on the approach taken to pricing instruments, the overall EU energy saving target for Final Energy Consumption should lie in the range of 36-37%, while that for Primary Energy Consumption should be in the 39-41% range. Therefore, this is assumed as the target level to be set in the EED, which the measures explored in this impact assessment need to achieve in concert with the other legislation.

Based on the estimated impact of the other legislation, in particular for products and buildings, a consequence of the overall energy efficiency target is the level of the Energy Saving Obligations required. This needs to increase to ensure that Member States take sufficient measures to accelerate energy efficient investments. Depending on the choice of pricing instruments, the range of the obligation needs to increase to between 1.4 and 1.6% per year.

It analyses policy options to inform a decision on how the revision of the EED could, in combination with the other planned policy changes, ensure the necessary energy savings are achieved. It draws upon an ex-post evaluation of the Directive[30], the CTP IA, the PC results (see **Error! Reference source not found.**), several studies, targeted stakeholder workshops and the findings of a Taskforce of Member States experts[31].

2. PROBLEM DEFINITION

2.1. The problem

Various studies carried out by the Commission, as well as evidence from stakeholders[32], show that, even with existing technologies, there is still significant scope for energy efficiency investments and cost-effective savings in Member States' economic sectors and in society at large (see **Error! Reference source not found.** for further details).

---

30 Evaluation SWD (reference to be added once available)

31 In the course of 2018, it became increasingly clear that the EU was not on track to achieve its 2020 energy efficiency target. In response to the growing energy consumption trends, the Commission set up a dedicated task force of Member States' experts to examine the underlying reasons and to mobilise efforts to reach the EU energy efficiency targets for 2020.

32 See e.g. https://www.eiif.org/sites/default/files/2020-12/EiiF_White%20paper_2020_REV.15.pdf

However, under business-as-usual, and even more so as a result of the COVID19 crisis, a large share of this energy efficiency and energy saving potential would remain unexploited, largely due to market and regulatory failures, which prevent cost-effective energy efficiency investments and actions from taking place.

As a result, unless higher levels of energy efficiency are achieved, GHG emissions would be higher for a given unit of output, important co-benefits would not be realised[33] and the EU would not meet its 55% GHG emission reduction target in a cost-effective manner as shown by the CTP IA.

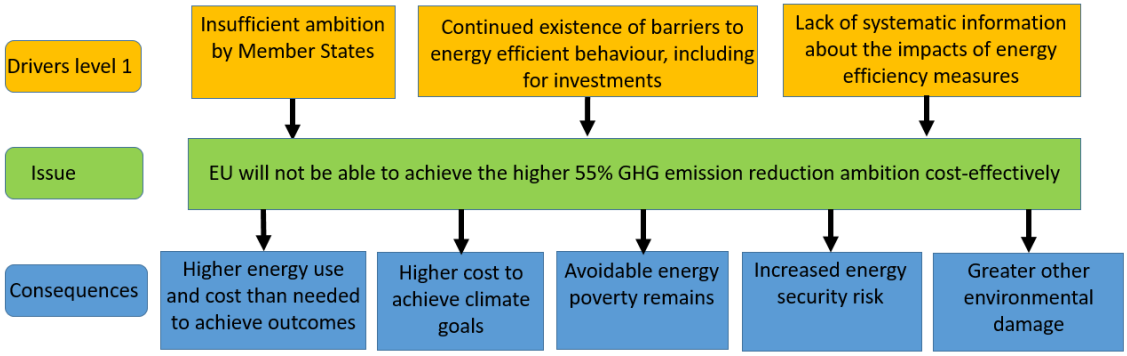
This is driven by three main factors:

1. Insufficient ambition and efforts by Member States;
2. Continued existence of barriers to energy efficient behaviour, including for investments;
3. Lack of systematic information about the impact of energy efficiency measures.

The consequences of these three negative drivers, if not addressed, would be higher energy use and the related higher costs, a substantially more expensive path to the EU full decarbonisation by 2050, at best no solution for avoidable energy poverty, more dependence on energy imports, with all the consequences linked to an ever developing complex geopolitical situation, and a worsening of the already depleted environment.

The problem tree in Figure 4 shows in a synthetic way the overall issue and its main drivers and consequences and the next section sets out these drivers in more detail.

Figure 4: Problem tree



The changing climate itself can also impact energy use. The PESETA III report[34] indicates that EU heating and cooling demand could decrease by 5% in the 2020-2050 period. This trend is not consistent across all Member States, and in some cooling needs may increase substantially accompanied by lower heating demand. Other potential implications may be restrictions on the availability of cooling water for industry leading to the use of alternative cooling technologies and changes in the efficiency of energy transformation installations."

[33] For example monetary savings, better societal acceptance, more effective use of resources, improved health, reduced energy poverty, etc. See also www.combi-project.eu

[34] Assessment of the impact of climate change on residential energy demand for heating and cooling; Joint Research Centre; 2018

2.2. The drivers

2.2.1. Driver 1 – Insufficient incentives to drive ambition and efforts by Member States

Achieving the necessary level of energy savings relies largely on Member States' ambition when setting objectives, and their efforts when developing and implementing energy efficiency measures at national level.

One key measure of this ambition is the indicative national contributions to the EU energy efficiency target that Member States had to set out in their National Energy and Climate Plans (NECPs) under the Governance framework. These national contributions do not add up to the necessary energy savings in line with the existing 2030 target[35], showing an ambition 'gap' in this area. While these national contributions were designed to meet a lower target in a different political context than today[36], it still points to the need to look at the incentives Member States have when developing their energy efficiency policies. The Member States' Taskforce recognised delayed implementation of energy efficiency policies as one of the causes of increased energy consumption.

A possible reason for this lack of ambition may be the fact that there are no binding national energy efficiency targets. This is in contrast with the situation for renewables where until recently Member States were obliged to meet national targets, with the result that the overall EU target was indeed met. It also provided scope for the Commission to effectively enforce compliance with these targets, where appropriate through infringement action.

Also the nature of the EU-level target plays an important role. Contrary to the situation for renewables and GHG emissions, the overall energy efficiency target is not explicitly binding at EU level. Although the EED sets final and primary energy consumption limits for the EU as a whole, and the Governance Regulation provides for further EU measures if the targets are not met, the indicative nature of the target does not support its achievement.

There are also a number of structural reasons for why Member States struggle to be more ambitious, including the fact that energy efficiency policies are difficult to design, implement and monitor. In fact, such policies typically must combine mutually reinforcing information-based instruments, regulatory instruments, monitoring and reporting mechanisms and economic and financial programmes. At the same time, these policies have to sufficiently reach and incentivise a range of relevant decision makers, be they individual consumers, businesses or investors. This also requires coordinated policy development at national, regional and local levels. While it is important for Member States to make efforts in all the main energy-using sectors, there is no "one size fits all" approach, as the barriers, challenges and actors are different (see driver 2). Therefore, an additional challenge is that the measures will need to differ depending on the sector.

---

[35] An EU-wide assessment of national energy and climate plans driving forward the green transition and promoting economic recovery through integrated energy and climate planning (COM/2020/564 final)

[36] Further details about this 'ambition gap' are provided in **Error! Reference source not found.**.

Implementing such diversified policies requires a consistent and continuous implementation effort, and the appropriate level of knowledge, skills and tools to be able to reach the target groups and stimulate change. Evidence, for example from the ELENA programme[37] and the Covenant of Mayors[38], shows that these skills are not equally developed at all levels of government, and this constitutes a barrier to Member States more successfully driving greater energy savings.

Given the difficulty of policy-making in this area, Member States tend to prefer acting on the other variables of the fundamental equation highlighted in section 1.3 such as renewables or ETS. However, the CTP IA has shown that this is not cost-effective and would result in achieving the 55% GHG target at much higher cost.

Another important element is the fact that, the EED provides for many flexibilities and conditionalities (e.g. in Articles 5 and 6). While originally included to provide for national specificities, these have allowed Member States to choose alternatives that often result in a lower amount of energy savings than would be cost-optimal[39]. This was identified as a shortcoming by stakeholders in the dedicated workshops and through their PC responses where a majority indicated that existing flexibilities does not allow the EED to fully achieve its objectives.

In summary, to achieve their contributions Member States must create the appropriate frameworks, provide finance and implement a range of other measures targeting individual decision makers (e.g. consumers and businesses) in a range of sectors, who ultimately need to decide to implement energy efficiency measures. This driver therefore has strong interlinkages with the other drivers.

2.2.2. Driver 2: Continued existence of barriers to energy efficient behaviour, including for investments

A key reason for energy efficiency policies is the need to address the behavioural and market failures and barriers that lead, from the point of view of society, to unrealised economically viable energy savings. Behavioural failures refer to the cognitive limitations and biases that prevent consumers and investors to appreciate rationally the benefits of energy efficiency[40]. Market failures arise from the fact that many impacts and aspects of energy supply and use are not priced into the cost of energy[41]. Market barriers such as lack of information and awareness, lack of finance or lack of information about financial opportunities, legal complications of ownership of dwellings and management structures[42], and split incentives for example between owners and tenants of rented dwellings result in economically rational energy savings not being realised.

These factors prevent consumers, businesses and investors from adopting cost-effective energy efficiency measures, and can be categorised into economic, behavioural and organisational barriers or, alternatively, into market and non-market failures. The

---

37 ELENA – European Local ENergy Assistance https://www.eib.org/en/products/advising/elena/index.htm

38 https://www.covenantofmayors.eu/en/

39 For example, the flexibility given to Member States in view of the renovation target in Article 5 limits its effectiveness, as it allows to renovate less buildings to the cost optimal level.

40 DellaValle N., Bertoldi P. (2021) “Toward a more situated energy efficiency policy agenda”.

41 E.g. impacts on air pollution, biodiversity, resource use, climate change and energy security

42 Economidou M et al., Energy efficiency upgrades in multi-owner residential buildings - Review of governance and legal issues in 7 EU Member States

previous impact assessments[43] extensively detailed these aspects and they have not changed since then.

The main consequence of these barriers and failures is that EU energy consumption is higher than it would be with perfectly economically rational behaviour that takes into account long-term benefits. This diverts financial resources from other uses to pay for energy consumption and leads to excessive consumption of natural resources, higher energy dependence, less competitive businesses and higher energy poverty.

Although the evaluation shows the EED has made a clear contribution to addressing such failures and barriers, this has been uneven and in some areas unsuccessful, partly due to weaknesses in the provisions of the Directive itself.

The following sections provide more details for each of the main intervention areas of the EED linked to this driver – and which should therefore be addressed:

Public sector

The public sector is an important economic actor in its own right (see Table 1 Estimated EU Final Energy Consumption (FEC) in economic sectors in the scope of the EEDTable 1) and is responsible for around 5 to 10% of total EU FEC[44]. Overall, the EU-share of public procurement contracts attributed to central government bodies is estimated to be approximately 16%. At Member State level this varies between 5% and 86%[45]. Public buildings are estimated to use around 2% of EU FEC. Cost effective savings potentials still exist in the entire public sector both in the renovation and energy management of existing buildings as well as the future procurement of energy efficient buildings, products and services.

The EED recognises the exemplary role of public authorities through the obligation to renovate annually 3% of central government buildings (Article 5), and procuring buildings, products and services with high energy efficiency performance (Article 6).

As regards buildings, the existing obligations only target cost-effective savings in the central government sector, which represents a small part of public authorities. Information from the evaluation, from analysis in the EED Concerted Action framework and from the PC replies shows that measures only at national level are not considered sufficient. Moreover, the Renovation Wave initiative[46] highlighted the need to step up renovation rates and depth[47], including for public buildings.

---

43 SEC(2011) 779 final; SWD(2016) 405 final

44 Moles-Grueso, S., Bertoldi, P. and Boza-Kiss, B., Energy Performance Contracting in the Public Sector of the EU – 2020, EUR 30614 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-30877-5, doi:10.2760/171970, JRC123985.

45 Evaluation of Articles 6 and 7 of the Energy Efficiency Directive (2012/27/EU) (SWD(2016)403 final; https://ec.europa.eu/energy/sites/ener/files/documents/3_en_autre_document_travail_service_part1_v3.pdf).

46 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – A Renovation Wave for Europe – Greening our buildings, creating jobs, improving lives" (COM(2020)662)

47 It also announced a targeted revision of the EPBD, which is planned for adoption at the end of 2021

Similarly, the current obligations for public procurement only target cost effective savings in the central government sector, which represent some 15-17% of all public procurement[48] by public authorities.

With regard to public procurement and renovation practices, the evaluation showed that there are limited resources and lack of expertise or tools to adequately consider energy efficiency. Moreover, there seems to be a reluctance to include energy efficiency requirements systematically in procurement, mainly because purchase price - rather than 'total cost of ownership' - is still regarded as the main criterion.

Industry

Industry is one of the sectors that has achieved significant energy efficiency improvements over the last decade. Nevertheless, as demonstrated in **Error! Reference source not found.**, cost-effective savings potentials still exist.

The underlying presumption is that as an economically driven sector, businesses should implement economically viable energy saving investments. There are however various reasons why this may not be the case. There may be challenges related to the availability of finance or to uncertainty over whether energy efficiency investments would really deliver the savings claimed, especially if it is a vendor of the equipment that is explaining its potential.

Nonetheless, a key barrier is likely to be that most businesses do not have the expertise to know what technical energy saving opportunities are available, or what their economic benefits might be for the business.

It is to address this weakness that the EED contains an obligation for energy audits for larger businesses and requires Member States to also make energy audits available to SMEs. Nevertheless, information from stakeholders and assessments indicates that only a small proportion of cost effective energy saving opportunities identified in audits are implemented.

The EED mainly addresses energy efficiency in industry through the requirement for large companies to carry out energy audits (Article 8). The evaluation indicates that audits have been effective for increasing awareness of energy savings potentials, identifying energy saving opportunities and assessing their financial feasibility in enterprises. Nevertheless, the share of cost-effective potential identified in audits that are actually implemented is rather low.

A study exploring the implementation of the energy audit requirements notes that recommendations are implemented following mandatory audits are only around a quarter of those for voluntary audits. It states *"The main reason for this difference seems to be the lack of implementation of recommendations. While the likelihood of recommendations for activities by the auditor are broadly similar across the two studies, the rate of implementation is much lower for companies in the study undertaking obligatory audits. The reason for this seems to be that voluntary participation in an audit may already signal a motivation to improve and follow through on audit recommendations."*

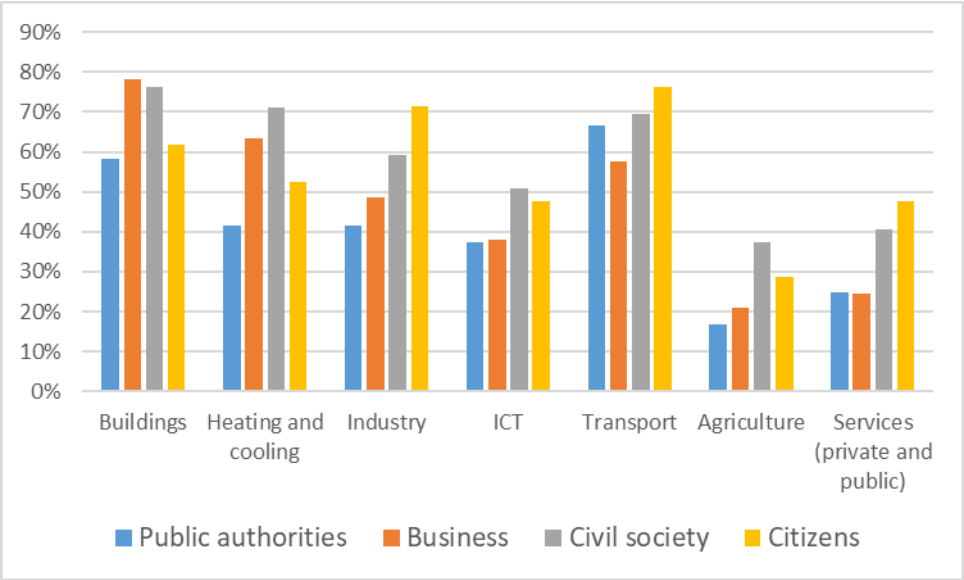
[48] DG GROW estimate

A specific industry sector that has seen a significant increase in energy consumption over the last decade is information and communication technologies (ICT), including data centres. In 2018, the energy consumption of data centres in the EU was 76.8 TWh. This is expected to rise to 98.52 TWh by 2030, a 28% increase.

This increase in absolute terms can as well be seen in relative terms: within the EU, data centres accounted for 2.7% of electricity demand in 2018 and will reach 3.21% by 2030, if development continues on the current trajectory[49]. Europe's Digital Strategy[50] already highlighted the need for highly energy-efficient and sustainable data centres and transparency measures for telecoms operators on their environmental footprint.

In the PC, 41% of respondents believed that more action was needed in the ICT sector in view of the higher energy savings ambition for 2030. The disaggregation of these opinions is shown in Figure 5 where it can be seen that this view is relatively consistent across the groups. The siting of data centres and ensuring their waste heat could be used was considered important or very important by the majority of respondents.

Figure 5 Stakeholder views on the sectors in which additional effort is needed



Heating & Cooling

Heating and cooling consumes half of EU FEC, making it the biggest energy end-use sector. There remains much potential for reducing energy use in this sector, while still achieving the temperatures needed. Heating and cooling, therefore, plays a crucial role in the EU's ambition to transition into a clean and carbon-neutral economy by 2050. Much of the effort is needed in the field of better insulating buildings but there is also potential

[49] https://digital-strategy.ec.europa.eu/en/library/energy-efficient-cloud-computing-technologies-and-policies-eco-friendly-cloud-market

[50] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Shaping Europe's digital future (COM(2020) 67 final)

in terms of more efficiently supplying the heat or cold needed[51]. As Figure 5 shows, there is considerable support for taking more action in this area, especially from business.

Measures in other legislation, for example the RED, aim to increase the share of lower GHG energy in the supply of heating and cooling. Similarly, pricing measures can encourage the replacement of heating equipment and use of less GHG intense fuels.

The use of networks, which currently supply around 13% of heat needs, for heating or cooling, in particular if these are receiving surplus heat or cooling input from industry, involves many barriers and coordination challenges. It is a sector where there is substantial expertise available within the EU and where an industry has evolved to supply this market. For these reasons, the EED contains specific provisions on heating and cooling, which address high-efficiency cogeneration and efficient district heating and cooling.

The EED requires Member States to carry out comprehensive assessments of the potential for high-efficiency cogeneration and efficient district heating and cooling (Article 14)[52]. The requirement to carry out cost-benefit analyses has helped stimulate the uptake of high-efficiency cogeneration that delivered 30.2 Mtoe primary energy savings in 2018[53]. There is still evidence of considerable amount of waste heat available in the most recent comprehensive heating and cooling assessments submitted by the Member States[54]. PC respondents indicated these elements were considered to have had a moderate impact (3.2/5) in stimulating energy efficiency in the sector. Overall, the evaluation found that the comprehensive assessments helped to increase the overall importance and awareness of heating and cooling in Member States, but that the overall impact is rather low. This is largely due to the lack of follow up given to the findings from these assessments and the wide use of exemptions allowed by Article 14.6. CHP heat supply has remained relatively constant around 40 Mtoe over the whole of the last decade.

The definitions are also used in assessing the provision of state aid. Concern has been raised that the current definitions result in state aid being granted to installations with GHG emissions that are unlikely to remain compatible with the decarbonisation trajectory required.

Energy transformation, transmission and distribution

Energy losses in energy transformation, transmission and distribution can be significant[55] and therefore the EED requires Member States to ensure that energy efficiency is

---

51 An EU Strategy on Heating and Cooling (COM/2016/051 final)

52 For an overview of these comprehensive assessments please see: https://ec.europa.eu/energy/topics/energy-efficiency/heating-and-cooling_en#comprehensive-assessments

53 Eurostat 2021 https://ec.europa.eu/eurostat/documents/38154/4956229/CHPdata2005-2017.xlsx/871cc151-5733-423f-ae38-de9b733aa81e [22.04.2021]

54 Comprehensive assessments are published at https://ec.europa.eu/energy/topics/energy-efficiency/heating-and-cooling_en. As examples, the assessment by Finland estimates remaining waste heat potential at 35 TWh, while France estimates its waste heat potential above 60 °C from industry as 12,3 TWh.

55 See for example; 2nd CEER Report on Power Losses; Council of European Energy Regulators; 2020

considered in these sectors (Article 15)[56]. At the same time, as equipment is replaced at the end of its lifetimes, there will be a gradual natural evolution toward higher efficiency, in particular for electricity.

The available information shows a gradual reduction in energy supply losses[57], but there remains potential to increase its energy efficiency. However, a number of key factors limit action to realise it. There is a concern that investments to increase energy efficiency may ultimately result in higher prices for final consumers and Cost Benefit Analysis results often advise against significant intervention. In the case of gas network operators, there may be a reluctance to invest because of uncertainty about their long term role.

Given the diversity of network structures there is also a reluctance to have a "common methodology". The absence of common methodologies and reporting, make it difficult to compare networks or operators or benchmark performance. In fact, there is no uniform EU definition of energy losses, which results in sub-optimal data quality.

The evaluation found that several provisions of Article 15 have been effectively implemented in the Member States, for example, treating energy losses as a separate item in the national efficiency regulations and incentivising demand-side resources. However, there is not sufficient data to enable a comprehensive analysis of the effectiveness of the provisions.

Transport

While the energy savings potential remains large in all sectors, there is a particular challenge related to transport, as it is responsible of 33% of FEC[58] and is one of the few sectors that has seen an increase in energy consumption over the last decade.

The Sustainable and Smart Mobility Strategy[59] adopted in 2020 lays the foundation for how the EU transport system could achieve its green and digital transformation and become more resilient to future crises. However, it does not include explicit energy efficiency measures.

Currently, the EED does not directly address the transport sector, although Member States can count energy savings from national measures targeting transport sector towards the Article 7 target. Nevertheless, only a small share of energy savings (5%)[60] reported by Member States under the EED stems from transport, indicating a lack of focus on energy savings from this sector.

This seems to be at least partly due to the fact that energy efficiency and transport policy are traditionally the responsibility of different government departments with little or no synergies in policymaking. Moreover, the required changes necessitates a multi-level

---

56 Certain of these (parts of Article 15(5) and Article 15(8)) were removed in 2018 as part of the Clean Energy for All Europeans and replaced with consolidated provisions in the new Electricity Market legislation.

57 Identifying energy efficiency improvements and saving potential in energy networks, including analysis of the value of demand response; Tractebel Engineering, Ecofys; 2015

58 Eurostat 2019 data

59 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Sustainable and Smart Mobility Strategy – Putting European transport on track for the future (COM/2020/789 final)

60 5% represent energy savings reported by Member States for 2014-2018

adoption (national, regional, provincial) of specific policy mixes to increase transport energy efficiency and to reduce transport energy, which is complex[61].

The PC results clearly support stronger action on transport energy efficiency as shown in Figure 5, with 62% of respondents stating that transport is a sector where extra energy efficiency efforts are most needed to achieve a higher energy efficiency ambition for 2030. In the case of public authorities this view is even stronger with 67% stating that more action is needed. It is therefore a legitimate question to explore whether there can be measures under the EED that foster energy efficiency improvements in transport in a manner complementary to the other existing policy instruments targeting the sector, including measures reducing the need to travel, shifting travel to more energy-efficient modes and/or improving the efficiency of transport modes.

Enabling and supporting measures – Consumers, financing, energy services and support schemes

Consumers & households

Table 1 shows the household sector makes up around a quarter of all EU FEC. The behaviour of consumers and citizens has an important impact on this energy consumption and the EED contains several provisions that support the empowerment of citizens and consumers, including:

- The establishment of more frequent and transparent billing regimes based on the actual consumption patterns at the end use level (Articles 9-11[62]);
- Information and empowerment programmes (Article 12), and;
- The exchange and dissemination of information and awareness raising (Article 17).

In addition, it contains provisions that aim to tackle long-standing socio-economic challenges like energy poverty (Article 7) and the split of incentives between tenants and owners or among owners (Article 19).

Despite these provisions, the evaluation has shown that Member States struggle to address consumer behaviour and consumer empowerment aspects in promoting energy efficiency, in particular at more local levels. This results in insufficient incentives for consumers to realise energy efficiency improvements and to tackle high upfront costs and the split incentives problem. This is compounded by a low level of awareness and lack of information among consumers about the potential of energy services and energy performance contracting.

Moreover, certain energy efficiency changes may involve significant hassle costs for those carrying out the investment, which increases the costs of the investment. For example, disruption caused by building works or the efforts needed to identify appropriate financial support schemes. In particular, if the estimated relative gain is

[61] Energy efficiency in the transport sector: policy evaluation and evaluation in some European countries. Eva Valeri, Amanda Stathopoulos, Edoardo Marcucci

[62] Please note that the metering and billing provisions on electricity were moved to the electricity Directive during the 2018 revision of the EED. Similar provisions related to gas are intended to be included in the ongoing revision of the gas legislation.

small, then the hassle costs can act as a significant barrier, especially if there is uncertainty around the benefits of the investment.

This is exacerbated by the fact that the additional benefits of energy efficiency measures – for example regards health, local air pollution, poverty alleviation, energy security, local job creation, etc. – are often not known or taken into account by economic operators or society. As a result of the pervasive externalities linked to these co-benefits, which are not priced, 'rational' economic operators do not take them into account when taking decisions. This results in an underinvestment in energy efficiency.

While the EED already provides some incentives for Member States to address energy poverty (e.g. Article 7), stakeholders consider energy efficiency as the most effective solution to alleviate energy poverty and suggested to use the revision to overcome some of the potential negative distributional impacts of pricing measures (see **Error! Reference source not found.** for a more detailed discussion of the link between energy efficiency and energy poverty).

Financing

Achieving energy savings requires investment in energy efficiency (such as insulation to reduce unwanted heat transfers or the acquisition of new equipment that requires less energy to operate). While investments are expected to be paid back over time through the avoided cost of the energy saved, bridging financing is often needed.

The CTP IA estimated that average annual energy system investments needs (excluding transport) in the period 2021-2030 to achieve the 55% level of ambition would be between €401 and 438 billion. Energy efficiency faces one of the largest investment gaps, estimated at around €165 billion. This is mostly due to higher rates and stringency of building renovation.

The problem is that, despite the profitability of investments, a complex set of market and regulatory barriers may limit the access to finance. Finance market imperfections, in particular at local and regional level, a fragmented market, complex procurement rules and decision making processes (e.g. multi-family apartment buildings), split incentives, scarcity of public funding and difficulty to combine different sources of financing or lending solutions not adapted to energy efficiency needs, are some of most important barriers.

Several pieces of EU legislation aim to address these barriers (over and beyond their impact on energy efficiency investments. The EED contain two specific provisions aimed at overcoming some of these barriers: Article 19 on split incentives and Article 20 on support for energy efficiency investments at Member State level by facilitating the establishment of national financing facilities for energy efficiency. However, the evaluation showed that this has only been partially successful. In addition, the lack of available data on the level of energy efficiency investments and financing in the Member States does not allow a comprehensive assessment of the magnitude of the financing measures put in place (and thus hampers a thorough evaluation of their effectiveness).

On the other hand, the evaluation found that the requirement for the Commission to assist the Member States in setting up financing facilities and technical support has been effective, due to its active role over the past years through EU funding programmes and support measures. This is expected to continue until 2030 and beyond, in particular under the NextGenerationEU recovery instrument (under which Member States have to ensure

that a minimum of 37% of actions included in their Recovery and Resilience Plans contribute to climate action), cohesion funding and InvestEU. In total, this would amount to around 12-14 billion per year in EU funds between 2021 and 2027[63].

About half of the PC respondents consider that Article 20 has contributed to facilitate access to finance for energy efficiency projects, although the impact of the specific provisions was often considered as moderate at best.

Certification, accreditation and qualifications

In the PC 92% of respondents said that they were aware of the certification, accreditation and qualification schemes for providers of energy services, energy audits, energy managers and installers in their Member State. Respondents' views on the benefits of qualification schemes vary as shown in Table 2 below:

Table 2 Stakeholder opinion on certification and accreditation scheme benefits

Benefits of certification and accreditation schemes	
Ensures availability of skills (providers of energy services, energy auditors, energy managers and installers)	26%
Ensures quality of energy services offered by energy service providers	17%
Increases confidence in the energy services sector	12%
Facilitates the development of the energy services markets	11%
Other	34%

In terms of effectiveness, most stakeholders (68%) thought the schemes were effective to some extent, with 22% saying they were fully effective and 10% finding them not effective.

Energy services, support schemes

The implementation of energy efficiency measures also requires a supporting structure, for example as regards the availability of a skilled workforce (e.g. installers, energy auditors) or energy services companies. The EED enables the establishment of such structures, in particular through obligations on the availability of qualification, accreditation and certification schemes (Article 16) and the promotion of the energy service market and energy performance contracting (Article 18).

With regard to energy services, 56% of PC respondents said that the EED had contributed to the development of the energy services market. Nevertheless, their effectiveness was uneven and diminished due to persistent barriers in the market. When asked for the important factors for the development of energy services the responses are shown in Table 3 below:

[63] For a more detailed overview of available instruments please see Commission Staff Working Document: "Support from the EU budget to unlock investment into building renovation" accompanying the Renovation Wave Communication (SWD(2020) 550 final)

Table 3 Stakeholder opinion on energy services market contributory factors

Important factors that contributed to the development of the energy services market	
Financing and support mechanisms have been made available	57%
Information about energy services has been made available to SMEs and consumers	55%
Certification and accreditation schemes ensured the needed skills are available	39%
Regulatory framework has been properly set	29%
Model energy performance contracts have been developed and deployed	14%
Other	20%

Of these, the most relevant (financing and information) are addressed elsewhere. The third most important factor, certification and accreditation, is discussed above and this supports the importance of its relevance for energy services.

2.2.3. Driver 3 - Lack of systematic information about the impacts of energy efficiency measures

Measuring the impacts of energy efficiency policies requires measuring the bottom-up impact from specific policies, measures and actions in many sectors. This is challenging and requires robust methodologies, which capture rebound effects, interaction or overlaps between the different measures, as well as 'additionality' compared to the situation where energy savings could have happened without a policy measure in place.

The evaluation shows that comprehensive information on the impacts of energy efficiency measures at national level is often lacking, except for measures reported under Article 7, which requires Member States to establish specific calculation methodologies for capturing energy savings per measure.

Due to the absence of reporting, information on the impact of several provisions is missing or uneven, for example as regards energy efficiency uptake in public procurement, energy transformation, transmission and distribution (Article 15) or national qualification, accreditation and certification schemes (Article 16), making it challenging to assess and compare the impacts of Member States' energy saving measures. As indicated above, this also applies to the impacts of financing measures.

Moreover, in some important sub-sectors, such as ICT, there is a lack of reliable, disaggregated information about energy consumption. The limited resources made available at Member States level to develop new high-quality European statistics for monitoring energy efficiency improvements in detail exacerbate this.

Due to lack of robust monitoring and measurement, expected energy savings from planned policies are often overestimated. The Member States' Task Force identified this as one of the reasons why progress towards achieving the energy efficiency targets is low.

These findings are supported by independent research[64] that also indicates the poor quality of underlying data, and that more resources are needed to enhance the availability and quality of data and reporting on demand side energy efficiency in all Member States,

[64] The Potential for Energy Efficiency in the EU Member States – A Comparison of Studies. 2017. Katharina Knoop and Stefan Lechtenböhmer. Research Group Future Energy and Mobility Structures, Wuppertal Institute for Climate, Germany.

which would highlight the large savings that addressing the causes of underinvestment in energy efficiency could deliver.

These concerns about the monitoring framework are supported by 72% of PC respondents, who indicated that the EED has not provided the right monitoring and enforcement mechanisms to achieve national energy efficiency targets.

2.3. How will the problem evolve?

The increased awareness of the importance of effectively addressing climate change, of the need to act swiftly and of the role that energy efficiency plays in that context are expected to drive policy makers, investors and the citizens at large to give a higher priority to energy efficiency.

However, the identified weaknesses in the existing legal framework, including the EED, and the underlying market failures and market barriers will not be solved autonomously. Member States' ambition, which has been insufficient so far, needs to be supported by strong and effective policies and measures at EU level.

Prior to the COVID-19 crisis, the EU was not on track to meeting its 2020 energy saving targets[65]. The above-mentioned Task Force reported in January 2019 that possible, and at least partial, explanations for this were good economic performance, low oil prices, and cold winter and warm summers during some years. The main increases in energy consumption were observed in buildings followed by transport and industry.

The latest EU27 energy consumption figures for 2019 showed that PEC was 1 352 million tonnes of oil equivalent (Mtoe), which is 3.0% above the 2020 target and 19.9% away from the current 2030 target. FEC was 984 Mtoe: 2.6% above the 2020 target and 16.3% away from the 2030 target. These are decreases of 2% in PEC and 1% in FEC compared with 2018.

The COVID-19 crisis has influenced energy demand, which might make the achievement of the 2020 targets possible. However, this impact is expected to be short-term, since it is not attributable to policies, measures and structural changes to increase energy efficiency[66]. With a possible rebound effect, it would still be hard to reach the current 2030 target.

While there might be some longer-term impacts of the COVID-19 crisis on energy consumption (e.g. remote working, video conferencing are likely to remain at higher levels than would previously have been expected), a number of energy consuming economic activities may simply have been postponed rather than cancelled. Therefore, the long-term energy impacts of these changes are at least uncertain, but more probably limited.

---

[65] Report from the Commission to the European Parliament and the Council – 2019 assessment of the progress made by Member States towards the national energy efficiency targets for 2020 and towards the implementation of the Energy Efficiency Directive as required by Article 24(3) of the Energy Efficiency Directive 2012/27/EU (COM(2020) 326 final)

[66] The IEA (https://www.iea.org/reports/energy-efficiency-2020/covid-19-and-energy-efficiency) notes that the changes in primary energy intensity mainly reflect the pandemic's impact on the economy. Historical GDP and energy intensity data suggest that large falls in GDP, like those in 2020, tend to be followed by falls in the future energy intensity improvement rate.

The assessment of the Member States' energy efficiency contributions included in their NECPs has shown that the current EU energy efficiency targets for 2030 will not be achieved with the policies planned. The CTP IA concludes that it is unlikely that the necessary higher levels of energy efficiency needed would be achieved through market forces, current market organisation and technology development alone, meaning that further efforts are needed.

In conclusion, while the 2020 energy efficiency target may have been achieved due to exceptional circumstances, increased efforts are required to achieve a reinforced energy efficiency ambition level in line with the 55% GHG emissions reduction target as set out in the CTP.

3. WHY SHOULD THE EU ACT?

3.1. Legal basis

The EED was adopted under Article 194 of the Treaty on the Functioning of the European Union (TFEU) in 2012 as the key instrument for reducing the EU's primary and final energy consumption in 2020. In 2018, it was partially amended in view of the EU's 2030 targets.

Article 194 TFEU, paragraph 1, states that the aim of Union policy on energy includes ensuring security of energy supply and promoting energy efficiency and energy saving.

This provides the appropriate legal basis for further action to promote energy efficiency and energy savings.

3.2. Subsidiarity: Necessity of EU action

The underlying problems causing a shortfall in energy savings (compared to the optimal level from the perspective of society) are the same across the EU and are present everywhere.

In view of the external costs[67] of energy consumption (e.g. greenhouse gas emissions, air pollutant emissions, energy security), actions to increase energy efficiency and reduce energy use are likely to lead to benefits beyond national borders. For trans-boundary problems, Member State action is unlikely to lead to optimal outcomes.

In the presence of a higher climate target, which requires a higher energy efficiency target, EU action must supplement and reinforce national and local action. It is worth underlining that the Governance Regulation already foresees the obligation for the Commission to act in case of a lack of ambition by the Member States to reach the targets, thus *de facto* formally recognising the essential role of EU action in this context.

Coordination at the European level, in fact, enhances energy security and environmental and climate benefits, and EU action is thus justified on grounds of subsidiarity in line with Article 191 TFEU. In addition, the nature of the instrument and of the fact that the energy efficiency target is not binding at national level respects the principle of

[67] An external cost occurs when producing or consuming a good or service imposes a cost (negative effect) on a third party

subsidiarity. Member States retain the same level of flexibility in terms of selecting their policy mix, sectors and the approach to achieve the required energy savings by 2030, by taking into account the national context and specificities. However, energy is a policy field with high investment needs. A coordinated approach at EU level can create trust, reliability and continuity, increasing the likelihood of different actors investing and getting involved. Policies at EU level can also create a just and fair transition for countries and regions with economies that may be significantly impacted by changes in industrial structure or employment as a result of the energy transition towards decarbonisation. Coordinated action at the EU level, furthermore, enables fuller account to be taken of the different capabilities to act among Member States.

3.3. Subsidiarity: Added value of EU action

As discussed previously, energy efficiency policies are a crucial mechanism to reduce greenhouse gas emissions, something which is also highlighted in the evaluation of the EED and OPC. In this regard, coordinated EU policies have a better chance of transforming the EU to a climate neutral continent by 2050.

The EU's energy and climate targets for 2030 are collective targets. Nevertheless, many actions to reduce energy consumption are taken at Member States' level. In many cases, this is most appropriate. At the same time, action at the EU level can enable and enhance those efforts by ensuring a more coordinated and harmonised approach, for example by helping to create larger markets for European suppliers, and ensuring that they are under the same obligations and rules. This way consumers enjoy the same basic rights and be provided with comparable and recognisable information across the EU. Delivering on energy efficiency while empowering consumers requires meaningful, accurate and understandable information on energy use, related costs, and easy access to a competitive market of building construction materials (windows, insulation, etc.), heating and cooling solutions, and other products that help improve energy efficiency.

Effects on the single market concerning growth, investments and jobs creation can thus be considered when policies and measures are being decided and implemented. Moreover, the EU single market acts as a strong driver for cost-efficiency in achieving GHG emission reductions.

A common EU approach to energy efficiency also enables addressing the specific common challenges such as alleviation of energy poverty. The EED framework allows for the inclusion of targeted energy efficiency measures by Member States for certain income classes (for instance promote the achievement of the obligations in Article 7 of the EED by focusing on reducing energy bills of vulnerable consumers).

The experience from the implementation of the EED indicates that having a common EU framework is socially just, reduces costs, increases benefits from the internal market and allows national policy-makers to learn from each other. The EED effectively complements and catalyses other national and EU measures. Policies adopted at EU level reflect the close interrelation of the policy areas of climate change, security of supply, sustainability, environment, internal market, social and economic development. This was supported by the Task Force of mobilising Member States efforts to reach 2020 energy efficiency targets, which called for a strong, targeted and common energy efficiency policy framework to attract the necessary investments, ensure the energy savings are achieved in a just and fair way.

4. OBJECTIVES: WHAT IS TO BE ACHIEVED?

4.1. General objectives

In view of the above, the general objective of this initiative is to revise the EED to further promote energy efficiency and energy savings to contribute optimally to the cost-effective achievement of the EU 55% GHG reduction ambition for 2030, by achieving a 36-37% energy efficiency target as shown in the Climate Target Plan.

4.2. Specific objectives

Based on the considerations set out in chapters 2 and 3, the intervention has the following specific objectives:

- **Objective 1:** Strengthen incentives in support of ambition and efforts in the Member States to achieve a 36-37% energy efficiency target;
- **Objective 2:** Reinforce the EED to better address market barriers and failures;
- **Objective 3:** Improve understanding of impacts of energy efficiency measures taken by Member States, while optimising the administrative burden through the approach of the Governance Regulation.

The revision of the EED also needs to consider the broader objectives of the European Green Deal, which aims to leave no one behind and to deliver a sustainable economy.

Furthermore, as this is a revision of an existing Directive, the Better Regulation framework requires exploring the potential for simplification and improving the efficiency of the legislation (e.g. by reducing regulatory costs and administrative burden).

Table 4 sets out the relation between the problem, the problem drivers and the objectives.

Table 4: Problem, drivers and objectives

Problem	Current policies and measures are not sufficient to meet the 2030 energy efficiency target		
Problem drivers	Insufficient incentives to drive Member States' ambition and efforts	Continued existence of barriers to energy efficient behaviour, including for investments	Lack of systematic information about the impacts of energy efficiency measures
General objective	Promote energy efficiency to ensure a 36-37% energy efficiency target for final energy consumption to contribute optimally to achievement of the EU 55% GHG reduction ambition for 2030.		
Specific objectives	Strengthen incentives in support of ambition and efforts by Member States	Reinforce the EED to better address market barriers and failures	Improve understanding of impacts of energy efficiency measures taken by Member States, while optimising the administrative burden through the approach of the Governance Regulation

5. WHAT ARE THE AVAILABLE POLICY OPTIONS?

5.1. What is the baseline from which options are assessed?

All the 'Fit for 55' initiatives are considered as one package and share a common baseline. Concerning energy system modelling, the EU Reference Scenario 2020 (REF) is the common starting point for energy system modelling in the impact assessments for all the initiatives of the 'Fit for 55' Package). More details about the Reference scenarios (including assumptions and main results) is presented in **Error! Reference source not found.**. A separate publication dedicated to the Reference scenario contains complete information about preparation process, assumptions and results[68]. The most relevant information for this assessment is also presented in **Error! Reference source not found.**.

REF reflects the agreed 2030 EU climate and energy targets: at least 40% GHG reduction, at least 32% renewables share and at least 32.5% energy efficiency (energy efficiency target is, however, not achieved – see below). REF also reflects main policy tools at EU level to implement these targets as well as the aggregate ambition and, to the extent possible, the complete range of foreseen national policies and measures of the final NECPs that Member States submitted in 2019 according to the Governance Regulation[69]. In particular, at the EU level, the REF2020 takes into account the legislation adopted in the Clean Energy for All European package[70].

The REF also takes into account the energy system impacts of the COVID-19 crisis that already heavily impacted the EU and Member States' economies in 2020/2021. The Reference scenario does not assume intensification of any type of policies beyond what Member States have already implemented or committed to (including any intensification of non-regulatory instruments).

For 2030, REF projects that final energy consumption is 886 Mtoe, which is 29.3% below the trajectory of the 2007 Baseline and thus below the agreed 2030 energy efficiency target of at least 32.5%. Both projections are in line[71] with the Commission's assessment of final NECPs[72]. In REF, GHG emissions from the European Union in 2030 (including all domestic emissions & intra EU aviation and maritime) will be 43.7% below the 1990 level. An EU allowance price of 30 EUR/tCO_2eq. in 2030 drives emissions reduction in the ETS sector.

Primary energy consumption decreases by almost 17% in 2030, compared to 2015. Over the same period of time, final energy consumption decreases by almost 8%. Figure 6 shows final energy consumption by sector in the reference scenario.

---

68 Link to webpage with publication – to be available in June

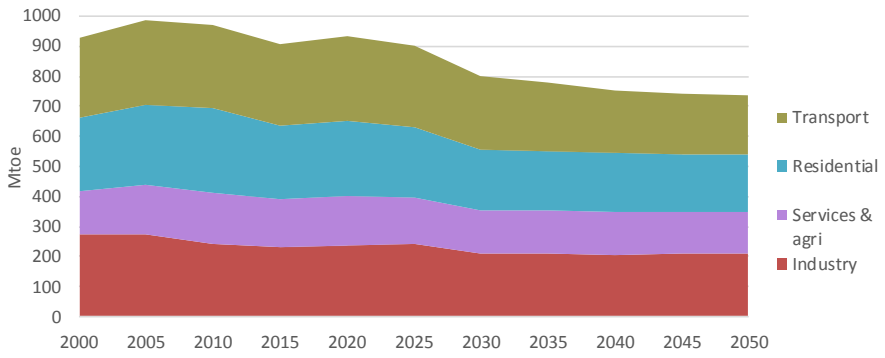
69 Regulation (EU) 2018/1999

70 COM(2016) 860 final. This legislation was adopted in 2019 and will be transposed within maximum two years' time in the Member States' legislation.

71 Primary energy consumption reduction projections in REF (32%) are, however, close to the agreed target for 2030. This is not in line with the Commission's assessment that indicates that the gap in final energy consumption is mirrored by the gap in primary energy consumption. The REF projections, however, capture the latest evolutions in the power generation, notably coal phase-out (not fully reflected in the NECPs) and the latest technology outlook for renewables in power generation (notably smaller role of biomass).

72 COM/2020/564 final

Figure 6: Final energy consumption by sector.



The reference scenario models the policies already adopted, but not the target of net-zero emissions by 2050. As a result, there are no additional policies driving decarbonisation after 2030. However, climate and energy policies are not rolled back after 2030 and several of the measures in place today continue to deliver emissions reduction in the long term. By 2050, GHG emissions in the EU are projected to be 60.7% lower than in 1990 and final energy consumption is projected at 792 Mtoe. These results fall short of the European goal of climate neutrality by 2050.

All the other scenarios used in this Impact Assessment are built on the REF scenario. The REF is similar to the Baseline used in the CTP Impact Assessment, however, it incorporates in much more detail Member States' policies and objectives as put forward in their NECPs and makes assumptions on the impact of the COVID crisis linked to recent macro-economic forecasts.

The projected energy use for 2030 in the baseline referred to above falls short of meeting the required level of energy savings as defined by the CTP.

5.2. Description of the policy options

Addressing the problems and drivers outlined in chapter 2, and meeting the objectives set out above, will require improvements to the EED across many areas. In this context, 63% of PC respondents support stronger implementation and enforcement, and 41% favour additional technical support for Member States. This was also acknowledged by the Member States themselves, which called for increased capacity building and exchange of best practices in view of meeting the 2030 targets. These general views have informed the measures explored.

Based on the evaluation outcomes, an assessment of the final NECPs, the support study, the results of stakeholder meetings and the PC, a broad set of potential measures was identified. These were then further assessed based on their pertinence, feasibility and coherence with the existing framework to produce a shorter set of retained measures, divided into 'intermediate' and 'higher' ambition packages. A distinction was also made between regulatory and non-regulatory measures.

5.2.1. Policy measures to address driver 1 – Insufficient incentives to drive ambition and efforts by Member States

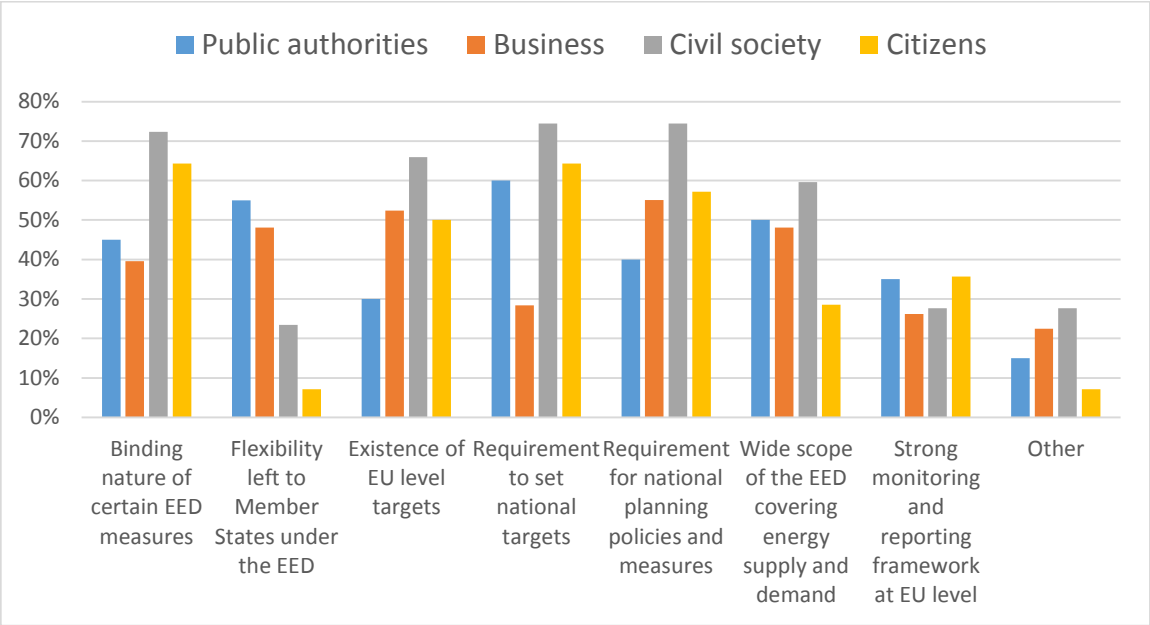
1. Energy efficiency targets at EU and Member State level

Under **BAU,** the EU level energy efficiency target set in the EED determine the overall level of energy efficiency efforts that Member States must collectively attain by 2020 and 2030. This target is expressed in the EED as a percentage of energy efficiency improvement (in Article 1) and as a maximum level of final and primary energy consumption (in Article 3). Although the Governance Regulation provides for a mechanism that allows for EU measures in case these targets are not met, they remain indicative, unlike the EU-level targets for GHG emissions reduction and the share of renewable energy.

Making the EU-level energy efficiency targets binding would align them with the other Green Deal targets and make it clear that they are of equal importance **(TARGET.1)**.

Although the Directive requires each Member State to set "*an indicative national energy efficiency target*", there is no indicator of how the efforts ought to be spread among the Member States and there may be reasons for some Member States to take more action than others.

Figure 7 Stakeholder views of the factors that most helped achieve the objectives of the EED

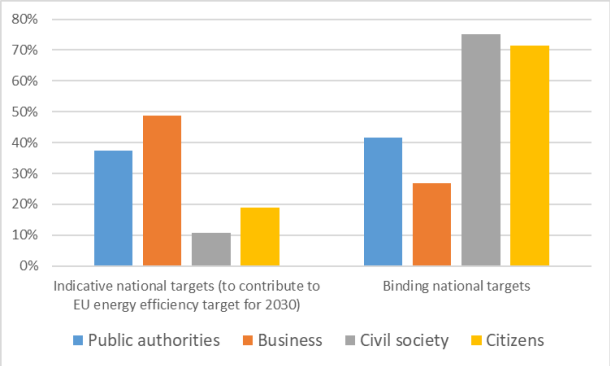


The evaluation of the EED showed that Member States have made efforts to promote energy efficiency and the EU energy efficiency target and the binding measures have contributed to this. Nevertheless, the efforts fell short of the required energy efficiency ambition in some Member States and for the EU as a whole. In the PC responses, as shown in Figure 7 above, 42% of stakeholders who thought the EED had helped to promote energy efficiency believed that the national targets had been important. Of those who believed the EED had failed to achieve its objectives, 57% indicated that the absence of binding national targets was one of the factors.

Whether or not Member States have a binding target can have an impact on the certainty with which the overall EU target will be achieved. This is likely to also have an impact on the degree of certainty for business operating in the field of supplying energy saving solutions. It also impacts on the scope for the Commission to effectively enforce compliance with these targets, e.g. through infringement action.

In view of these potential benefits, options are explored for targets for Member States. In their PC responses, overall 36% of responses favoured indicative national targets while 47% favoured binding national targets. The responses disaggregated by category of respondent are shown in Figure 8. It can be seen that public authorities' views are close to the average while businesses and civil society have opposing views that diverge from the average. In view of this, two further options are explored of setting indicative Member State targets **(TARGET.2)** or binding targets (**TARGET.3)**.

Figure 8 What should be the nature of the national targets



A further aspect that is important to explore is how the overall effort should be distributed across Member States. No indication is given in the current EED. However, in contrast, both the Effort Sharing Regulation and the Renewable Energy Directive have mechanisms to distribute effort based upon a set of parameters. In the case of the RED, this provides the basis against which Member State efforts are assessed, even though it does not have a mandatory effect. Having indicative benchmarks for Member States could facilitate more constructive dialogue on the level of ambition and the possible closing of any ambition gap by Member States (as shown by the experience with the collective ambition gap for RES in the draft NECPs). This aspect therefore is also explored.

As regards the way such indicative benchmarks would be established, the Commission is currently studying different alternatives but, following the experience gained with a similar approach for renewables, it is considering a formula based on a set of criteria taking into account national circumstances. Tentatively, this could be based on the following criteria (having an equal weight):

- Fixed rate (all Member States have to decrease their energy consumption – same rate as for the EU compared to REF2020 i.e. 9%);
- Energy intensity (EU ambition multiplied by intensity factor FEC/GDP);
- Wealth (EU ambition multiplied by wealth factor GDP/capita);
- Energy savings potential (it is associated with PRIMES MIX scenario results).

Other criteria and weightings are possible but these are still under consideration.

The approach to the definition of the target that currently uses both FEC and PEC remains unchanged in the absence of clear evidence of need for any change since the last revision of the EED in 2018.

Options:

Nature of the target.

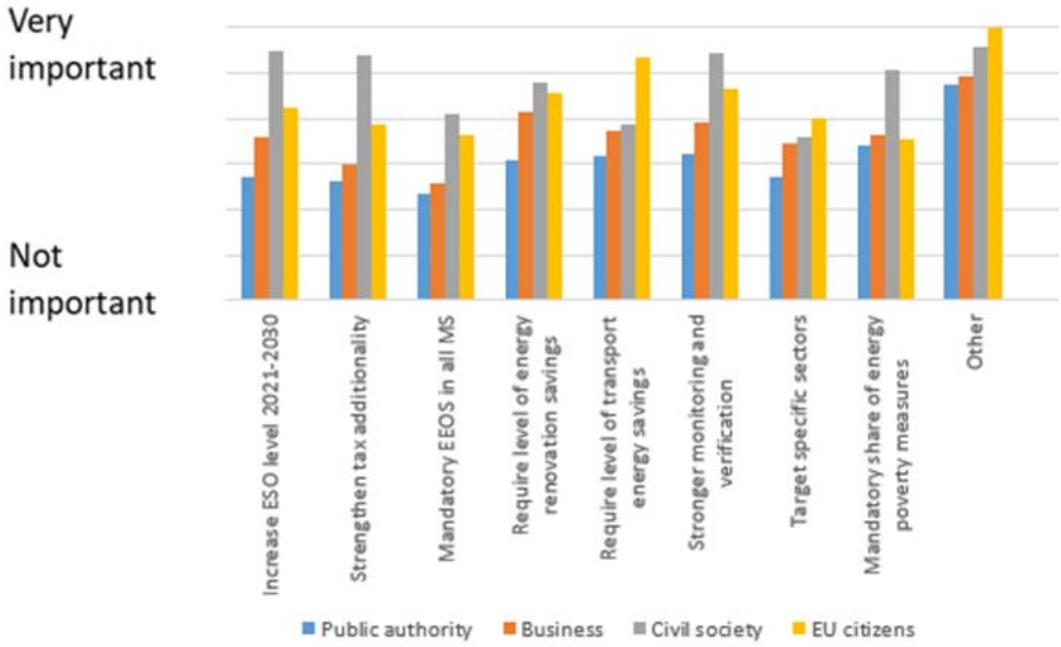
- **BAU**:
  EU-level target is not binding and Member States' voluntary contributions are delivered through NECPs
- **TARGET.1**:
  Binding EU-level energy efficiency targets
- **TARGET.2**:
  Indicative national benchmarks based upon a mechanism for distribution of effort taking account of relevant parameters
- **TARGET.3**:
  Binding national targets

2. Energy savings obligations

Article 7 is an important provision delivering around 50% of Member States' savings necessary to meet the overall EU energy efficiency target. It requires Member States to achieve a total amount of energy savings by the end of the obligation period and provides a specific rate for new annual energy savings to be achieved by Member States. A detailed description of how Article 7 works and the types of actions taken by Member States under it is set out in **Error! Reference source not found.**. Under **BAU** the requirements for Member States are not given any specific focus and they therefore have full flexibility how to target their efforts.

In the PC, 47% of respondents who believed that the EED had been important in promoting energy efficiency said that the binding nature of Article 7 was part of the reason for that as shown in Figure 7, with civil society thinking it much more important and business a bit less. The PC asked how Article 7 might be amended in view of the need for a higher level of energy savings. Figure 9 below show the responses by stakeholder group. Public authorities showed the least support for all aspects with businesses showing the second least support. Civil society and EU citizens were the most positive about almost all of the options.

Figure 9 Stakeholder views of the Article 7 elements to address for higher energy savings



On possible specific changes, in the PC 69% supported requiring a certain level of energy savings from building renovations and half the respondents supported requiring Member States to target specific (undefined) sectors. Some 60% of respondents supported requiring a certain level of energy savings in transport. As already noted, transport accounts for a third of all final energy use yet only 5% of the measures reported under Article 7 are transport specific. In the transport field it is acknowledged that it is necessary to follow an 'Avoid-Shift-Improve' methodology to address energy use and GHG emissions. While the EU addresses the 'Improve' element of vehicle efficiency through EU standards, there is limited action to address the other two legs. This is not because these actions are not cost-effective. Analysis shows that different types of actions can have high benefits[73].

An often encountered difficulty is that these benefits occur in different areas such as air quality, noise, health, and energy savings, and that hence they are not always seen holistically. There are therefore clear public policy benefits to encourage further intensification of measures in this area and this is explored further **(ESO.1)**. While the average of energy savings from the transport sector is 5%, some Member States such as Italy and Spain are planning to deliver respectively 23% and 38% of their savings in this sector.

The added value of a sub-target for transport in article 7 would be to focus attention and measures by Member States (as well as stakeholders) on a sector where energy consumption is still increasing and where energy efficiency improvements are long overdue. Also, such a target could be used for enforcement by the Commission.

[73] https://www.eutransportghg2050.eu/cms/assets/Uploads/Reports/EU-Transport-GHG-2050-II-Task-8-FINAL-29July12.pdf

The level of such a target would have to be above 5% and below what some Member States are planning to achieve (e.g. up to 40%). It can be achieved by a reinforcement of the proposed policies and actions in the Sustainable and Smart Mobility Strategy, which are expected to lead to tangible energy savings (such as modal shift, transport system optimisation, seamless mobility etc.), for example thanks to subsidy schemes, regulations and incentives that would ensure the assumed impact (i.e. energy savings) is delivered in reality. In view of the EU funding, which is being provided to support building renovation, it could be reasonable to ensure that a proportion of it is specifically targeted at addressing energy poverty, which has been identified as a major challenge for the EU, due to the fact that nearly 34 million Europeans are unable to afford keeping their homes adequately warm in 2019. Such a programme would contribute to the savings required by Article 7. Stakeholders have called for measures and requirements at EU level to accompany Member States' social safeguarding policies, whilst delivering targeted energy savings among energy poor households.

In workshops organised with stakeholders to discuss the energy saving obligations, a number of stakeholders identified energy efficiency measures as the most effective solution to alleviate energy poverty, and to mitigate social impacts from pricing measures, e.g. from carbon pricing under an extended ETS.

Stakeholders also stated that NECPs submitted by Member States failed to address a sufficient level of policy measures alleviating energy poverty. They called upon the Commission to ensure that energy efficiency improvement measures alleviating energy poverty are planned and implemented throughout the EU by all Member States and to ensure that vulnerable customers have access to technical and financial support. In total, 61% of respondents voiced some to a high degree of importance to requiring a specific share of measures to address energy poverty and this is explored further **(ESO.2)**.

This could be achieved by obliging Member States to deliver a certain percentage of the annual energy savings obligation to come from measures directed at energy poor and vulnerable households, to require a certain number of measures to address energy poverty, or to prioritise energy poor and vulnerable households when implementing energy efficiency measures. As energy poor households often live in poorly insulated housing, building renovation is a very cost-effective measure to address energy poverty and brings additional benefits in terms of increased job creation, skills improvement, comfort, air quality and health. Social policy, and therefore measures to address energy poverty, is primarily the responsibility of Member States. Nevertheless, supporting energy poor households to reduce their energy consumption through targeted funding programmes is a mechanism that can help to reduce their energy consumption and expenditure. The Commission has issued a Recommendation to Member States[74] and uses EU funding programmes to address the issue.

While sub-targets for other key sectors (e.g. heating and cooling) could also be considered, the specific nature of transport (i.e. large and increasing energy consumption; limited success of existing policies) and energy poverty (i.e. key to address for just transition and mitigating distributional impacts of ETS extension) make these sectors a priority for action under the EED.

[74] Commission Recommendation (EU) 2020/1563 of 14 October 2020 on energy poverty C/2020/9600, OJ L 357, 27.10.2020, p. 35–41.

In view of the need to accelerate the transition to electrification to reduce GHG emissions, for example through the promotion of heat pumps, and align the energy savings with the rapid need to decarbonise energy use, the option of excluding energy savings from fossil fuel using technologies being counted under the ESO will be explored **(ESO.3)**.

Finally, an alternative option **(ESO.4)** would be to replace the Article 7 scheme by an EU-wide scheme of tradeable certificates for energy savings often referred to as White Certificates. Such a scheme may present opportunities and also challenges[75] and further details are provided in **Error! Reference source not found.**.

Measures:

- **BAU**:
  Member States have flexibility on how to target their savings efforts under Article 7.
- **ESO.1 (Energy Saving Obligation.1)**:
  Require a share of the energy savings to come from transport.
- **ESO.2 (Energy Saving Obligation.2)**:
  Require a minimum share of energy savings to be achieved in vulnerable households to contribute to alleviating energy poverty.
- **ESO.3 (Energy Saving Obligation.3)**
  Exclude energy savings from measures promoting savings from fossil fuel using technologies.
- **ESO.4 (Energy Saving Obligation.4)**
  Replace the Article 7 scheme by an EU-wide scheme of tradeable certificates for energy savings.

3. Energy Efficiency First (EE1st) principle

Energy Efficiency First (EE1st) principle is a guiding principle of EU energy policy, already set out in the 2015 Energy Union Communication[76], and the need to prioritise energy efficiency is recognised in the European Green Deal. The principle is defined in the Governance Regulation as *"taking utmost account in energy planning, and in policy and investment decisions, of alternative cost-efficient energy efficiency measures to make energy demand and energy supply more efficient, in particular by means of cost-effective end-use energy savings, demand response initiatives and more efficient conversion, transmission and distribution of energy, whilst still achieving the objectives of those decisions."* Following strong support for this principle from the European Parliament, it was incorporated in the EED noting that it *"contributes to the implementation of the energy efficiency first principle"*.

However, limited progress has been made with applying the EE1st principle across sectoral policies and making it more operational. The feedback from national authorities and the experience from the NECPs show that the principle is still not fully understood

[75] Tradable Certificates for Energy Savings (White Certificates) - Theory and Practice)

[76] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank – A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy (COM(2015) 80 final)

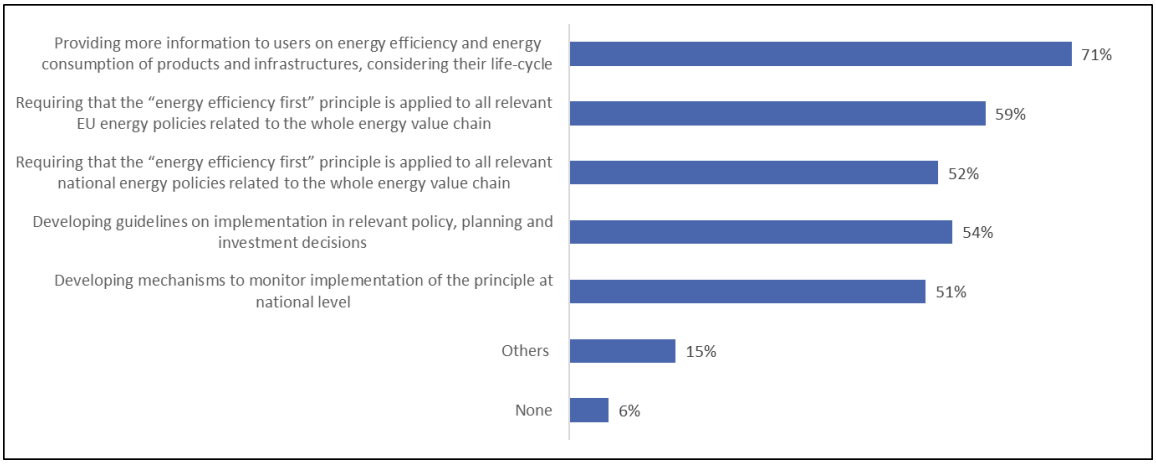
and needs to be better explained in specific contexts. This was confirmed by two specific expert meetings where stakeholders indicated that a specific cost-benefit analysis methodology, manuals and methodologies in line with the EE1st would be useful, as the application of the principle is quite complex.

At present, the precise application is less clear and the Governance Regulation merely requires Member States to *"take into account the interlinkages between the five dimensions of the Energy Union, in particular the energy efficiency first principle"*. This situation with the statements in the EED and Governance Regulations represents **BAU**.

The Commission, therefore, aims to adopt guidance on the application of the EE1st principle together with the 'Fit for 55' package so as to facilitate and clarify its use. This is included in the non-regulatory option (**EE1st.1**). The non-regulatory measures could also cover the development of a CBA methodology that includes the co-benefits from energy savings. However, their voluntary nature will mean that their implementation will largely depend on the willingness of Member States to apply them. Providing guidance and requiring application of EE1st are relatively well supported by stakeholders.

In view of this, as a cornerstone of energy policy and with the EED providing the framework for energy efficiency policy and measures for the EU, the EED would be the appropriate instrument to provide a legal basis for the practical application of the principle. In the PC 53% of respondents supported making the "Energy Efficiency First" principle a compulsory test in relevant legislative, investment and planning decisions in view of the higher energy savings target for 2030. This option is also explored (**EE1st.2**). Figure 10 below shows stakeholder views on which measures are needed to ensure it is consistently applied.

Figure 10 Stakeholder views on measures needed to consistently apply the EE1st principle



It is also possible to conceive of a stronger requirement for Member States to assess their legislation in key areas to identify measures that are contrary to EE1st principles. This could be accompanied by an obligation to set up a structure responsible for applying the EE1st principle and monitoring the impacts of policy and investment decisions on energy consumption **(EE1st.3**).

Measures:

- **BAU**:
  The EED and Governance Regulation do not provide clarity on the action Member States should take to implement the principle.

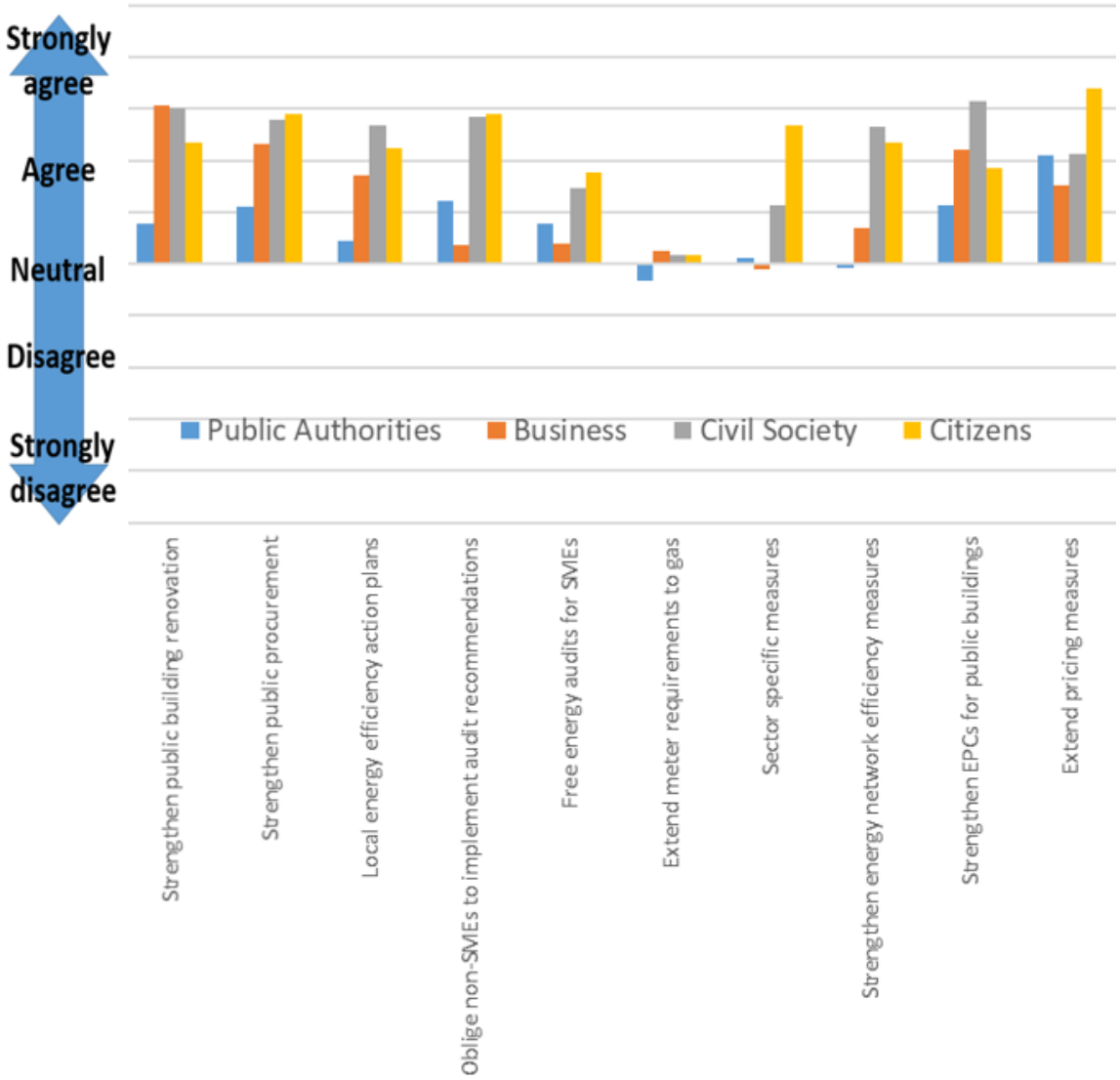
- **EE1st.1**:
  Provide Member States guidance on applying the EE1st principle and develop a CBA methodology including energy savings co-benefits.
- **EE1st.2**:
  Oblige Member States to implement the EE1st principle and test energy infrastructure projects or plans against alternative energy efficiency measures.
- **EE1st.3:**
  Member States would be obliged to review their legislation for coherence with the EE1st principle and establish a body for applying the principle.

5.2.2. Policy measures to address driver 2 – Continued existence of barriers to energy efficient behaviour, including for investments

4. Obligations for public sector buildings

In the Commission's original proposal for the EED, it envisaged that the public building renovation requirement would apply to all public buildings except social housing. It was estimated that the energy savings till 2020 would amount to 3.4 Mtoe. The final requirement only applies to central government buildings and these represent somewhat less than a quarter of all government buildings, and maybe only a tenth. This means that the energy saving potential from increased renovation rates for these buildings has not been realised (the underlying renovation rate was reported as around 1.5%). **BAU** therefore requires the renovation of 3% of central government building floor area annually. These buildings are required to be renovated in line with the minimum energy performance requirements set under Article 4 of the EPBD. PC responses show a considerable support, except among public authorities, for strengthening the public building renovation and energy performance contract (EPC) requirements as shown in Figure 11 below.

Figure 11 Stakeholder view whether these measures should be considered to strengthen the EED



In view of the lower energy savings as a result of the limitation to central government buildings, one option to realise greater energy savings is to increase the target annual renovation rate (**BUILD.2a)**.

An important reason for requiring public buildings to be renovated was because of the fact that they are visited by many people and would therefore play an exemplary role in demonstrating the potential for energy savings. The buildings that are likely to be most visited by the public are ones that are more a part of their daily life rather than central government buildings. Therefore, to address this while increasing overall energy savings, another option is to extend the scope of the requirement, for example to all government buildings(**BUILD.2b)**.

The energy savings from this provision of the EED depend not only on the renovation rate and the scope, but also on the depth of the energy renovation carried out. The EPBD requires all new public buildings to be nearly zero-energy buildings (NZEB) after the end of 2018 and all new buildings to be NZEB by the end of 2020. The 2018 cost-optimal reports developed by Member States show that the progressive tightening of the Minimum Energy Performance Requirements for existing non-residential buildings undergoing major renovation reveal that for many Member States these minimum requirements are already at a comparable level to NZEB requirements. While achieving

the NZEB levels may not be possible for every building due to technical or economic reasons, in general it could be considered feasible for major renovations. Already ten Member States have equal requirements for new and existing buildings in their national legislation transposing the EPBD.

According to the 2020 assessment of the progress made by Member States towards the implementation of the EED and towards the deployment of nearly zero-energy buildings and cost-optimal minimum energy performance requirements in the EU in accordance with the EPBD, the construction market is ready to take steps towards the improvement of the energy performance of the future building stock. A significant reduction of relevant technology costs is expected (e.g. in heat pumps, biomass boilers, heat recovery systems, solar thermal collectors, photovoltaics energy storage, etc.), which could make it possible to further increase the level of ambition for NZEBs.

A detailed assessment of the progress with energy renovations in buildings including to NZEB standards[77] illustrates that at present energy renovations represent only a third of expenditure on renovations. It also showed that at that time some non-residential buildings were being renovated to NZEB standards but that these were a small proportion of the total. No barriers to carrying out renovations to this standard are identified in the report. (**BUILD.3**)

The provisions on public buildings provide for many flexibilities and conditionalities **allowing Member States to choose alternatives that often result in a lower amount of energy savings**. While a certain level of flexibility is justified to account for national specificities, it also provides a way for Member States to avoid taking measures that are perceived to be too difficult despite their clear benefits. The feedback received in the targeted stakeholder workshop revealed that Article 5 is perceived as a crucial aspect of the EED, as they consider that the public sector should lead by example. At the same time, stakeholders expressed the view that because of the limited scope, the limitations of alternative approach and the absence of a clear link between the regulatory provisions and available funding, the results are insufficient. Stakeholders also stated that this made it hard to monitor and led in many cases to only short-term energy savings.

In this context, a recurrent issue is that a number of articles allow alternative ways of compliance, but these do not always result in the same level of energy savings. For example, the flexibility given to Member States in view of the renovation target limits its effectiveness, as it allows to renovate less buildings to the cost optimal level. In addition, the option of using alternative measures (instead of renovating 3% of building owned and occupied by central government) often results in energy savings measures (e.g. awareness raising) that tend to end after only a few years and are often not repeated. Research shows that individuals tend to slowly resume previous habits, if awareness raising campaigns are not repeated[78][79], and actions of this kind therefore have a limited effect compared to the actual renovation of a building.

The PC responses echo these findings. Some 47% of stakeholders identify the binding nature of the EED measures (including Article 5) as important with a majority indicating that existing flexibilities (e.g. alternative approach in Art. 5) does not allow these articles

[77] Comprehensive study of building energy renovation activities and the uptake of nearly zero-energy buildings in the EU; Ipsos and Navigant; 2019

[78] Information measures to promote energy use reduction across EU Member States. Analysis of information, empowerment and training measures in Member States National Energy Efficiency Action Plans. Silvia Rivas, Barbara Cuniberti, Paolo Bertoldi, 2016.

[79] Long term effects of an energy efficiency advertising campaign Klaus Wortmann and Werner Möhring-Hüser.

to fully achieve their objectives. Buildings are considered as one of the most important area for strengthening EED requirements as shown in Figure 5 for all stakeholder groups. Of the respondents, 85% agreed that strengthening the renovation obligation for public buildings should be considered to achieve a higher ambition, while 15% disagreed. Among public authorities 72% agreed and 28% disagreed. Moreover, 82% of respondents support strengthening the energy performance contracting requirements in the renovation of public buildings.

The evaluation therefore supports the need for strengthening the requirements to drive more, and more ambitious, renovations of public buildings. In view of this, a reduction of the flexibility available is therefore explored as an option through the removal of the alternative method (**BUILD.4**).

Measures:

- **BAU:**
  The public building renovation requirement applies only to central government buildings, requires 3% of the floor area to be renovated annually, only requires renovation to minimum energy performance requirements and allows for alternative approaches.
- **BUILD.1:**
  Provide further guidance and necessary tools to national authorities and procurement officials, and strengthen the existing support fora (e.g. Concerted Action) to guide Member States towards renovation and uptake of energy efficiency requirements in building procurement and management practices.
- **BUILD.2a:**
  Increase the overall ambition through an increased annual target.
- **BUILD.2b:**
  Increase the overall ambition through a wider scope.
- **BUILD.3:**
  Strengthen requirements to achieve the obligations, for example renovations to the Near Zero Energy Building (NZEB) standard.
- **BUILD.4:**
  Delete the alternative method in Article 5.

5. Obligations for public procurement

Under **BAU** the EED requires central governments to purchase only products, services and buildings with high energy-efficiency performance. This is limited by possible exclusions on grounds of cost-effectiveness, economic feasibility, sustainability, technical suitability and sufficient competition. There is no definitive information available about the impact of applying BAU as there are no reporting requirements for this.

In the PC, 85% of all respondents, and 63% of public authorities, agreed to some degree that strengthening the energy efficiency requirements for public procurement should be considered as a way to contribute to achieve a higher energy savings ambition. Figure 11 shows this support by stakeholder group.

The PC also asked whether the requirement for central governments to purchase only products, services and buildings with high energy-efficiency performance helped to develop a market for energy efficiency products and services. In response 64% said no.

They were then asked about the reasons for this and the options as well as the proportion supporting them are shown below in order of decreasing support:

Table 5 PC ranking of reasons why EED procurement measures have not developed a market for energy efficient products and services

It is too easy to evade the requirement to purchase highly energy efficient products, services or buildings on grounds such as cost-effectiveness, economic feasibility or technical suitability	67%
The scope is too limited as it applies only to the central government bodies	63%
It is too difficult for public bodies to identify energy efficient products in case they are not regulated under the EU Energy Labelling rules	49%
Public authorities lack specific guidelines to improve their purchasing practices	47%
There is no obligation to apply Green Public Procurement criteria	39%

Of these issues, there is clearly potential to reduce the conditionalities that are reported to be used to avoid the requirements as well as to extend the scope beyond central government. It is less clear what can be done to assist public bodies identify efficient products not covered by energy labelling, but it is in any case likely that these will be classes of products that are less energy using. This aspect might usefully be addressed in guidance that could be expanded and through the existing supporting fora.

Stakeholders in the targeted workshop on energy efficiency in the public sector and in the PC called for an extension of the scope to all public administration levels, and the need to raise awareness and capacity of public administrations for applying energy efficiency criteria in public procurement more systematically.

The aspect with the least support is to require Member States to take into account Green Public Procurement criteria, e.g. related to circular economy and climate resilience. While this might be desirable for wider reasons, and for example for public buildings above a certain threshold, this option is discarded since it would be outside the legal scope of the EED. Nevertheless, efforts could be made to encourage the use of such criteria.

Efforts could be made to do this through non-regulatory means. For example the Commission could provide further guidance and tools to national authorities and procurement officials. It can strengthen the existing support fora (e.g. Concerted Action) for Member States and to assist them in taking Green Public Procurement (GPP) criteria into account e.g. related to circular economy and climate resilience **(PROCURE.1)**.

Central government procurement is estimated to only account for about 16% of all public procurement. Therefore, extending the EED requirements to all public authorities would substantially increase their impact and has a high support among stakeholders and is therefore assessed **(PROCURE.2)**

Measures:

- **BAU:**
  Central governments to purchase only high energy-efficiency performance products, services and buildings subject to possible exclusions.

- **PROCURE.1:**
  Continue and expand support efforts to boost energy efficiency in procurement.
- **PROCURE.2**
  Extend the energy efficient procurement obligation to all public bodies.

Given the exemplary role of the public sector an overall obligation to save energy in the public sector would frame the specific obligations of energy efficiency procurement and renovation of public buildings. This obligation would ensures that the public sector contributes its fair share to the energy efficiency targets in particular and to the decarbonisation of the economy in general. It will also ensure that it is not left out from the efforts. This is particularly important as the public sector offers public services to all the population and thereby it will bring benefits to all in accordance with the Green Deal Objective of letting no one behind.

6. Industry

Industry can be addressed by the EED measures relating to energy efficiency obligations where Member States may choose to address specific measures to industry. There are also specific provision in the EED relating to the use of waste heat from industry and the use of cogeneration that are addressed under heating and cooling.

The other main avenue of action in the EED is through the promotion of energy audits and the obligation for non-SME enterprises to carry out an energy audit at least every 4 years (**BAU**). The evaluation identified important limitations in these provisions, such as the lack of monitoring requirements for energy audits, the absence of an obligation to implement audit recommendations, difficulties related to application of the SMEs definition, and missing incentives for implementing energy management systems.

In the PC, stakeholders indicated that industry was the third most important sector in terms of the impact the EED has had on promoting energy efficiency. They also indicated that the audit obligation for large enterprises was the second most important in terms of the EED's effect on energy savings (41% of all responses and 63% of public authorities). Support provided to SMEs to carry out energy audits, learn about their energy consumption and identify energy saving opportunities ranked fifth (26% of all responses and 33% of public authorities).

It has been observed that there is a low implementation of audit recommendations. While there are likely to be multiple reasons for this, one could be that the person responsible for the audit may not have any budget or power to have the findings implemented. Another is that the managers of the business may not be aware of the economic potential offered by energy savings in their business and therefore do not properly take this into account in their planning. An obligation for the results of the audit to be seen and approved by the management of the business could ensure that this is less likely to occur.

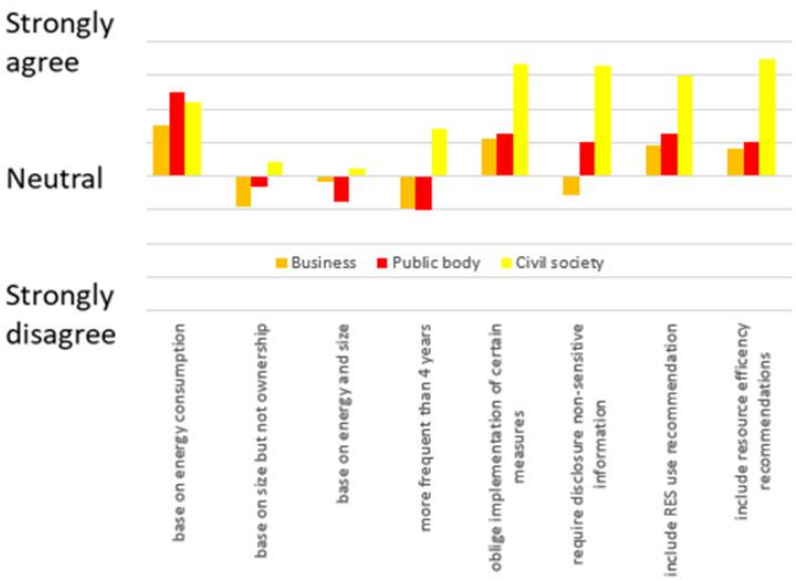
Other options to increase business awareness of energy saving potential may exist though benchmarking enterprises in a specific sector. This already happens through a private

sector imitative for the refining industry[80] (where energy use is a key parameter) and the IEA is also seeking to promote further benchmarking[81].

With regard to strengthening the EED, as shown in Figure 5, industry was indicated as the fourth most important area (52% of respondents) where more effort should be made to achieve the higher ambition for 2030. As shown in Figure 11 by stakeholder group, around 66% of respondents supported to some degree that an obligation to implement some audit recommendations was desirable. A slightly smaller proportion (59%) thought that that requiring free audits for SMEs should be considered. However, support for these options from business and public authorities was low.

Around 61% of all respondents thought that the current mandatory audit requirements should be changed. They were asked about a range of options. Figure 12 below shows that the option with the biggest support was for taking account of energy use, with overall five times as many respondents agreeing as disagreeing with this. Other options with strong support were including resource efficiency recommendations in audits with seven times as much support as opposition, including renewable energy potential with five times as much support and an obligation to implement certain recommendations with three times as much support. There is little support for a higher mandatory frequency or including size as a parameter.

Figure 12 Stakeholder views on options to amend the mandatory audit obligation



A detailed analysis of the difficulties that Member States experience with implementing the current non-SME definition has been carried out[82]. This also considers other options and the energy based options appear to have considerable benefits since they would require substantially fewer companies to be subject to mandatory audits while it is estimated that the energy savings could be of a similar magnitude.

80 Refining Benchmarking Study | Solomon (solomoninsight.com)
81 Expert Workshop on Industry Energy Efficiency Benchmarking - Event - IEA
82 Technical assistance on assessing the effectiveness of the implementation of the definition of small and medium-sized enterprises for the purposes of Article 8(4) of the Energy Efficiency Directive

The same study demonstrates the skewed nature of energy use across enterprises with a very small share of businesses accounting for by far the largest share. Given the importance of energy use in their business, these very largest energy users should already have more sophisticated energy management systems in place. In case they have not, it makes sense to replace the audit obligation for these businesses with one to have such a system. It is likely that most of these enterprises will be covered by the requirements of the Industrial Emissions Directive and the obligations through it to use Best Available Techniques. The use of an Environment Management System is a key obligation for them and this means that implementing an Energy Management System may require little or no extra effort.

The current requirement only applies to enterprises. However, there has been a growing interest in the energy-water nexus. Waste water treatment plants (WWTPs) are major energy users and account for around 0.8% of all electricity use. Recent analysis[83] shows that there is substantial potential to improve their energy efficiency yet because of their nature there may be limited market pressure for them to do so. Including them within the scope of the audit obligation would add no more than 1000 plants but cover about 40% of the sector's energy use.

A range of measures are therefore assessed to strengthen the current audit requirements. These range from non-regulatory measures exploring benchmarking (**IND.1**), through changes to the audit requirements to base it on energy use and include WWTPs (**IND.2**) to the most extreme of obliging companies to implement the most cost-effective measures identified in audits (**IND.3**).

Measures:

- **BAU:**
  Non-SME enterprises must have an energy audit at least every four years.
- **IND.1:**
  Promote energy benchmarking of significant energy using sectors.
- **IND.2:**
  i. Replace, for the largest energy users, the audit obligation with a requirement to put in place an energy management system.
  ii. Replace the non-SME definition as the basis for the energy audit obligation with one based on energy use and amend it to include waste water treatment plants.
  iii. Oblige the results of energy audits, including the recommendations, to be presented to the management of the company and be approved by them.
- **IND.3:**
  Require companies subject to audits to implement energy audit recommendations with a payback time of less than 2 years.

7. Heating and cooling

The EED requires Member States to carry out comprehensive assessments of the potential for high-efficiency cogeneration and efficient district heating and cooling. This should be based on cost-benefit assessment taking into account their specific

[83] https://iopscience.iop.org/article/10.1088/1748-9326/ab0b54/pdf

circumstances. They are required to encourage the use of high-efficiency cogeneration and efficient district heating and cooling. Comprehensive assessment should include information on the potential for new and renovated significant energy using installations for their cogeneration or district heating potential. These elements would continue under **BAU**.

In terms of the sectors where additional energy efficiency efforts are needed to achieve a higher energy efficiency ambition for 2030, as shown in Figure 5, 63% of PC respondents indicated heating and cooling making it the second most important after buildings.

The stakeholder consultation, including the workshop on heating and cooling, revealed that many Member States believe that Article 14 has contributed only to small efficiency improvements and that some key areas are left out such as data centres, higher system integration (use of waste heat, electrical and thermal efficiencies), building-level measures (heating systems and heat pumps) and local planning and development. Also, cooling has often not been addressed.

Furthermore, the comprehensive analysis has often not been followed up, i.e. the identified potential has not been captured by sufficient implementation of policies and measures, for example waste heat reuse not being sufficiently addressed and a lack of focus on local aspects of planning and development of heating and cooling.

These factors make it desirable to strengthen the existing provisions on the assessment of alternative energy supply options. The stakeholder workshop addressing heating and cooling was positive about the current measures but noted that there was insufficient implementation of policies identified in the comprehensive assessments. The cost-benefit analysis requirement was criticised because of a lack of appropriate follow-up.

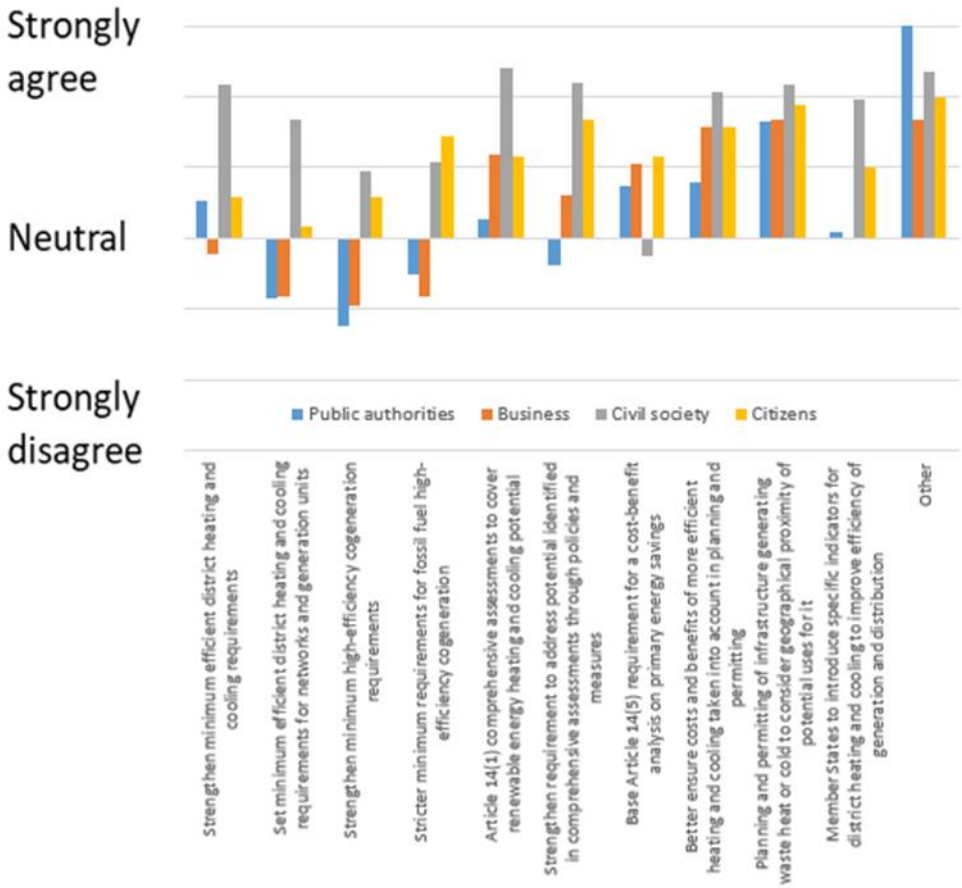
Table 6 PC responses to which heating and cooling measures should be considered

Statement	Overall view (1-strongly diagree, 5 strongly agree)
The recovery of waste heat from heating and cooling (air-conditioning) systems in individual buildings should be promoted	4.8
Member States should facilitate local and district approaches to policy and infrastructure planning and development in heating and cooling	4.8
Fossil fuels in heating systems (in buildings and district heating) should be gradually phased out with a faster phasing out of the most polluting ones	4.4
Requiring district heating and cooling operators to prepare long-term plans to improve their energy efficiency in terms of primary energy intensity energy	4.4
Fossil fuel heating system should be banned for new buildings whenever technical feasible	4.2
Allow public support for heating systems only to non-fossil fuel technologies	4.1
Member States should introduce specific energy efficiency targets for the heating and cooling sector to ensure that energy consumption in this sector is	4.0
Specific requirements for utilization of waste heat and waste cold should be set for industry and services	4.0
Member States should unbundle the management of the generation and distribution heat network	3.0

The PC asked stakeholders for their views on whether a series of possible measures should be considered in the heating and cooling policy area objectives. There was considerable support for most of these as shown in Table 6 above.

The PC also asked how the elements of the EED addressing heating and cooling (Article 14, the related Annexes and definitions in Article 2) could be made more effective. The results in Figure 13 below show differentiated views about strengthening the minimum requirements of the definition of efficient district heating and cooling. Civil society strongly support this change but public authorities and business are less positive. Most respondents are positive about measures relating to the planning of infrastructure, including those generating waste heat or cold. There is also quite strong support amongst stakeholders, except civil society, for a strengthen account of the benefits of the cost-benefit analyses, especially for the utilisation of waste heat.

Figure 13 PC response on measures to make Article 14 more effective



In view of these views, one step to improve efforts could be to make it mandatory to implement cost effective measures identified in Member States' comprehensive assessments. In addition, the larger local governments could be required to assess local heating and cooling supply options since they would be best informed of the local conditions and for example the availability of waste heat from business installations through permitting. It is also desirable to ensure that cost-benefit analyses of alternative heating and cooling supply options for individual installations with large energy consumption are made.

A further challenge arises because the definition of efficient district heating is used as a basis for assessing whether or not it is legitimate to grant state aid to installations. The current definition means that state aid can be granted to installations which will have lifetimes significantly beyond 2030 but which will be major emitters of greenhouse gases. This points to a need to revisit the definition so as to ensure coherence with wider policy goals.

Cogeneration or Combined Heat and Power (CHP) is another route to provide heating and electricity simultaneously, requiring less energy overall than for their separate supply. In 2018, CHP supplied 11.7% of EU27 electricity generation. It simultaneously supplied 2651 PJ of heat, which is 13.7% of the energy used for heating and cooling.

CHP also involves more complexity than just supplying heat on its own, which merits greater governmental intervention to ensure a larger share of the potential for this market is exploited. There is also an EU market for the supply of the equipment and it is desirable to ensure that the incentives are correct to encourage greater efficiency in the equipment supplied and fitted which might not happen were there not to be a governmental drive to do so. In view of this, it seems desirable to update the definition of high-efficiency cogeneration in the EED and to strengthen implementation of the comprehensive assessments.

However, as illustrated above, the PC showed conflicting opinions on the update of the definition of high-efficiency cogeneration. Public authorities and business do not support stricter minimum requirements or addressing fossil fuel use while civil society does. A revision of the definitions is assessed (**HEAT.2**).

While district heating and CHP account for significant shares of overall heat supply, the majority remain supplied by more standard equipment. There is a need for this to be fairly rapidly replaced by much more efficient equipment that causes much lower GHG emissions. The main option available for heating is heat pumps and the CTP modelling scenarios indicate a 12% year on year growth rate in their installation. It is unclear whether this will be achieved purely through market mechanisms and so consideration can be given to for example setting an end date for installing combustion boilers. This could be justified in the EED by the multiple times increase in overall energy efficiency that would be achieved (provided the primary energy factor of electricity supply is sufficiently low).

As illustrated in Table 6 above, there was strong support from the PC for phasing out the use of fossil fuels in heating. Set against this are the difficulties such an approach could cause in the single market, where other legislation is setting product standards, and subsidiarity questions. This is assessed as **HEAT.3**.

Measures:

- **BAU:**
  Retain existing definitions and assessment requirements
- **HEAT.1:**
  Promote energy benchmarking of significant energy using sectors.
- **HEAT.2:**
  i. Strengthen the definitions (‘efficient district heating and cooling’, ‘high-efficiency CHP’, and ‘energy losses’) in line with the pathway to overall decarbonisation.

ii. Strengthen the obligations to ensure a better implementation of the findings from comprehensive assessments and to require local heating and cooling plans.
iii. Strengthen obligations to ensure new or refurbished district heating facilities meet the 'efficient district heating and cooling' definition and that existing facilities that do not meet it establish an upgrading plan.

- **HEAT.3:**
  Require phasing out fossil fuel boilers.

8. Energy transmission systems

The EED requires tariff structures for gas and electricity infrastructures to be set in a way to encourage energy efficiency, assessment of the potential for efficiency improvements and development of a common methodology for assessing losses. It also encourages high efficiency co-generation and promotes the use of demand side response mechanisms (**BAU**).

Besides the EED, energy efficiency improvements on energy transformation and distribution are affected by a large number of EU legislative acts[84], in particular by the ETS, RED and ESR. The transformation and supply sectors should also react to changes in energy demand caused by competition with other energy supply options, new or relocated demand points and energy efficiency actions taken by consumers. To reflect energy system integration ambitions, energy distribution systems need to bridge energy suppliers and consumers and to provide new services.

In gas grids the largest energy losses occur in the form of methane leaking in the atmosphere (up to 98% in some systems)[85], and such leakages, already the object of stringent safety rules, will be further addressed by the follow-up to the Commission's Methane Strategy launched in 2020. In addition, while leakage is common in old gas pipes, often made of gas iron, it is rare in new gas pipes, which are made of high-density polyethylene. In the PC, 49% of stakeholders agreed that the wide scope of the EED, which includes energy supply and distribution as well as regulators, had helped to achieve its objectives. However, only 21% of stakeholders thought that measures stemming from the EED to increase efficiency in energy production, conversion, transmission and distribution had been the most successful in delivering energy savings and other benefits. Some 65% of stakeholders agreed to some degree that strengthening these requirements is important. However, when looking by stakeholder group, Figure 11 shows little support for this from public authorities or business. Despite this, 45% of respondents stated that electricity and gas networks do not operate in the most efficient way in their country. A first step to improve the effectiveness can be to consider enhancing comparison between networks through a benchmarking approach (**NET.1**).

The evaluation has shown that the lack of common definitions has hampered any meaningful comparison of overall energy efficiency between networks. Steps to address this seem a prerequisite to inform operators, regulators and Member States of the need

[84] For more details about this legislation, see https://ec.europa.eu/energy/topics/markets-and-consumers/market-legislation_en

[85] See Shrinkage Leakage Model Review, pages 13-17. Available at: https://www.gasgovernance.co.uk/sites/default/files/ggf/book/2017-12/Shrinkage%20Leakage%20Model%20Review%20-%20Final%20Report%202017%20%28Joint%20GDN%29.pdf

for further action. It is therefore envisaged to seek to address these weaknesses through common definitions and reporting (**NET.2**).

Stakeholders were asked what the main factors limiting energy efficiency improvements in networks and their responses in order of importance are shown below:

Table 7 PC ranking of the factors limiting energy efficiency of national energy networks

Which are the main factors limiting energy efficiency improvements of the networks in your country?	**Percentage agreeing**
Tariff structure is not conducive to minimise energy losses in the grid	42%
Permit authorisation takes too long	27%
Capital expenditure would lead to unacceptable network tariff increase for final consumers	22%
Regulatory authorities discourage investment by not accepting it in the Regulatory Asset Base	19%
Financing for investments is not easily available	18%
The efforts needed to upgrade the physical infrastructure of the grid would disturb households	8%
Environmental impact of infrastructure upgrading would be larger than that of the energy losses	6%

It can be seen that the most important relates to the incentive structure (which is also linked with the fourth most important). The second biggest reason slows upgrading but should not prevent it happening. The third and fifth most important relate to how the investments needed can be financed which is beyond what can be addressed in the EED.

As regards energy efficiency improvements for energy transmission and distribution, the potential for the transmission system appears limited, while it is more significant for distribution[86]. Provisions on energy efficiency are integrated into Directive (EU) 2019/944 for the internal market of electricity, as well as in the draft TEN-E Regulation, and there are plans for integrating such provisions into the future review of the Directive for internal market of natural gas (which should include hydrogen and biogas as well). Nevertheless, the EED could be further strengthened in this area.

Finally, stakeholder feedback suggests that the objectives of Article 15 may have not been fully appropriate and could better reflect how the different grid elements can contribute to the improvement of overall energy system efficiency, for instance in terms of smart grid deployment. In view of all these elements, it seems desirable to place a greater focus on ensuring that regulators ensure network operators have a sufficiently strong incentive to make energy saving investments (**NET.3**).

Measures:

- **BAU:**
  Continue to assess and promote efficiency in networks through tariffs and encourage co-generation and demand side response.
- **NET.1:**
  Promote benchmarking of energy transmission and distribution networks.
- **NET.2:**

[86] As already indicated in several available reports and studies drafted from JRC (electricity and natural gas), by Tractebel/Ecofys and limited to electricity grids from CEER

Develop (with Eurostat) a common definition of energy losses and require reporting by system operators on how they identify and reduce these through energy efficiency measures.

- **NET.3:**
  Require National Regulatory Authorities to monitor and incentive energy efficiency investments by system operators.

9. Transport

The EED does not directly address or have any specific requirements in relation to energy saving in transport. However, Member States around 5% of the energy saving measures reported under Article 7 (see **Error! Reference source not found.** for details) directly relate to transport and some proportion of the other combined measures may also relate to it (**BAU**).

As indicated in section 2.2, the transport sector is one of the few sectors that has seen an increase in energy consumption over the last decade (despite stricter vehicle CO_2 limits, which also improve energy efficiency). However, vehicle standards form only part of a successful strategy to address energy use in transport that, in addition to improving vehicles, should also look at avoiding transport through higher efficiency systems and shifting to less energy intense transport modes[87]. Transport is the largest energy-using sector where the EED does not contain any specific provisions. Stakeholders in the PC indicated that it is the sector where the EED has had the least impact on energy use (after agriculture). Linked to this, as shown in Figure 5, it is ranked as the third sector where stakeholders believe additional action through the EED is needed (after buildings and heating and cooling) with broad agreement from all stakeholder groups.

However, a particular challenge in the transport sector is that energy saving measures in vehicles, by reducing the cost often leads to a greater propensity to travel. It is therefore important to accompany measures addressing vehicles with ones that address overall energy use. This implies measures that are at the border of transport and energy policy and this may be one of the reasons why so little action has been taken. The EU specifically attempted to address the issue of energy use in transport through the STEER part of the Intelligent Energy Europe Programme.

The Smart and Sustainable Mobility Strategy lists many existing and planned policies that may lead to energy efficiency improvements in transport although there is no quantification of their contribution to saving energy. In view of this, the EED could complement these policies by providing a framework for stimulating the uptake of specific energy efficiency actions under other policy measures (e.g. promotion of modal shift, urban mobility planning).

Urban transport is estimated to use around 40% of all road transport energy[88]. It is therefore a key area to address and urban areas have the advantage of offering many potential alternative modes of transport (walking, cycling, public transport, shared mobility options). While there have been voluntary initiatives to encourage the development of Sustainable Urban Mobility Plans (SUMPs) these rarely place much emphasis on energy use although they are likely to bring some energy saving benefits.

[87] https://www.sutp.org/publications/sustainable-urban-transport-avoid-shift-improve-a-s-i-inua-9/
[88] https://ec.europa.eu/transport/themes/urban/urban_mobility_en

Such schemes bring wide multiple benefits for health and local environment in addition to energy savings.

However, the coordination challenges and ensuring that all the benefits are taken into account calls for strong incentives to take action. Urban areas have widely varying populations. Nevertheless the bulk of energy use occurs in the larger ones and those over 1 million inhabitants are reported to account for 60% of urban transport energy use[89] and therefore would still cover a significant amount of overall transport energy use. In view of this, legal requirements to address transport energy consumption could be envisaged in the largest urban areas and also the largest transport generating sites within them. Since these both offer the largest share of potential while providing many alternative mobility options it would be most appropriate to include specific transport energy saving obligations for them (**TRANS.1**).

Internal combustion engines typically have an energy efficiency of 15 to 25% and no means to recuperate kinetic energy when braking. As vehicles have started to be electrified, through hybridisation and full battery electric vehicles, the efficiency of the powertrain increases and larger shares of kinetic energy can be recuperated. Typically a fully electric vehicle will use only a quarter of the energy to travel the same distance as an internal combustion engine one.

Measures to require the phase out of internal combustion engine cars are gaining momentum across the EU and neighbouring countries as shown in Table 8 below. These are likely to lead to a patchwork of dates and differing requirements. A transition from internal combustion engines to electric propulsion with a motor efficiency around 90% implies very substantial energy savings. This is illustrated by the fact that while cars use around 20% of all FEC at present it has been estimated that if they were all electrified it would probably add only around 10% to total electricity demand.

Table 8 Overview of reported ICE phase out intentions in Member States

European countries with indications of the scope, date and appicability of their plans to ban internal combusiton engined cars				
Country	**Start year**	**Status**	**Scope**	**Applicability**
EU Member States				
Austria	2027	government plan	Non-electric	Newly registered taxis, car shares and hire cars
Belgium	2026		Diesel, petrol	New company cars
Denmark	2030–35		Diesel, petrol	New vehicle sales (2030), all vehicle use (2035)
France	2040	climate plan	Diesel, petrol	New car sales
Germany	2030	Bundesrat decision	Emitting	New car sales
Ireland	2030	government plan but dropped from Bill	Diesel, petrol	New car sales
Netherlands	2030	coalition agreement	Diesel, petrol	All cars
Slovenia	2030	emission limit of 50 g/km	Diesel, petrol	New car sales
Spain	2040		ICE	New vehicle sales
Sweden	2030	coalition agreement	Diesel, petrol	New car sales
EEA and neighbouring countries				
Iceland	2030	climate plan	Diesel, petrol	New car sales
Norway	2025	tax and usage incentives	Diesel, petrol	All cars
United Kingdom	2030, 2035 (PHEV)		Non-electric	New car sales

Source: https://en.wikipedia.org/wiki/Phase-out_of_fossil_fuel_vehicles

[89] International Transport Forum

In view of the substantial energy savings and the benefits of providing greater certainty for the automotive industry on the transition to electrified vehicles it could be desirable to set a requirement to set an end date for the sales of internal combustion engine cars linked to the primary energy factor (PEF) for electricity generation. The link to the PEF would ensure that the transition was only required once it is clear that it will lead to primary energy savings. This should be coherent with EU legislation on the CO_2 performance of passenger cars which has a high equivalence to energy consumption (**TRANS.2**).

Measures:

- **BAU**
  No specific measures but some transport energy savings reported under Article 7.
- **TRANS.1**:
  Mandatory requirements in line with the Sustainable and Smart Mobility Strategy to require urban areas over 1 million inhabitants without a sustainable urban mobility plan to establish a plan covering energy use in passenger and freight transport and identifying and implementing measures to improve transport energy efficiency.
- **TRANS.2:**
  Require Member States to set a date for the end of sales of new internal combustion engine cars within ten years of the value of the national electricity PEF going below a threshold.

10. Enabling and Supporting measures – Consumers, energy services, support schemes, financing

Enabling and supporting measures under the EED are aimed at creating the right conditions in Member States to facilitate the implementation of energy efficiency measures, and putting in place the necessary mechanisms, such as financing incentives or instruments, in view of achieving the energy efficiency targets in an optimal way. These measures aim to strengthen the provisions on energy services and energy performance contracting, to ensure an appropriate level of qualifications and certifications of energy services providers, and ensure that information and appropriate technical advice is available on energy efficiency to different market actors and energy consumers (**BAU**).

Consumers

The PC and the consumer information and empowerment workshop confirmed the relevance of the EED provisions and showed that it was considered to have made a moderate contribution (65% moderate contribution, 25% small contribution) to informing and empowering (small) energy consumers. Respondents and participants mentioned the broad formulation of Article 12 as a key reason for its moderate impact. Next to that, respondents stressed the difficulty to estimate the effectiveness of information measures towards consumers.

Stakeholders offered a variety of ways to reinforce the provisions. These include:

- Stronger engagement of consumers which consume small amounts of energy;
- Stronger support to enable consumers to actively participate in the energy market;
- More detailed guidelines for Article 12 implementation, and sharing of good practices at EU level;
- Strengthened Articles 12 and 17 to further empower citizens, and consumers, but also their associations and energy cooperatives;

- Measures targeting households in energy poverty;
- Access of consumers to independent and qualitative advice on energy efficiency improvements, such as Building Renovation Passports, One-Stop-Shops.

Finally, the Member States' Taskforce identified the insufficient consideration of the impact of behavioural aspects such as the rebound effect as one of the reasons for increased energy consumption. This is reinforced by the fact that 60% of PC respondents believe that more effort is needed on awareness raising and behavioural change.

Energy services

When asked for their views on what can be done to improve the functioning of energy services and energy performance contracting the prioritisation of stakeholders is shown in Table 9 below:

Table 9 PC prioritisation of elements to improve energy services and performance contracting

Elements to improve the functioning of energy services and energy performance contracting	
Strengthen requirements on independent market intermediaries, facilitators, one-stop shops to increase trust	58%
Introduce requirement for independent monitoring and verification of energy performance contracts	37%
Introduce Member State reporting on certified energy services providers and number of energy performance contracts concluded in the public sector	34%
Other	44%

Options to strengthen non-regulatory efforts would continue the existing Concerted Action dedicated to supporting Member States in the implementation of the EED. Member States would also continue information campaigns to increase awareness and change behaviour of consumers and market actors to make energy saving decisions as well as to provide guidance and support to market operators and intermediaries (**SUPPORT.1**).

It is therefore clear that stakeholders find that there is value from the accreditation and certification schemes but that these could be enhanced. To do this it may be useful to require minimum quality criteria and the regular assessment of the schemes (**SUPPORT.2**).

There appears to be support to strengthen oversight of intermediary businesses in the field of energy services and performance contracting. There is also some support for a better monitoring of the availability of energy service providers and the degree to which the public sector uses energy performance contracting (**SUPPORT.3**).

Measures:

- **BAU**
  Continuation of existing support, information and enabling measures.
- **SUPPORT.1:**
  Concerted Action dedicated to supporting Member States in the implementation of the EED will be continued. At Member State level continue information campaigns to increase awareness and change behaviour of consumers and market

actors to make energy saving decisions as well as to provide guidance and support to market operators and intermediaries.

- **SUPPORT.2:**
  i. Establish minimum quality assurance criteria for energy services providers;
  ii. Require periodic assessment of qualification and certification schemes
  iii. Strengthen quality and oversight of energy services market intermediaries.
- **SUPPORT.3:**
  i. Stricter requirements for uptake of energy performance contracts and measurement and verification requirements for the public sector,
  ii. Require Member States to assess barriers to dissemination of information and investments
  iii. Require establishment of project development assistance mechanisms.

5.2.3. Policy measures to address driver 3 – Lack of systematic information about the impacts of energy efficiency measures

11. Measures to improve measuring and monitoring

The assessment of the achievement of the EED's overall energy saving target is based purely on the actual energy used which is data gathered and reported by Eurostat. This data is also broken down into main sectors and so provides insights on which sectors are increasing or decreasing their consumption. Member States also report on progress under the Governance Regulation and on their savings achieved under Article 7. However, this aggregated data is of little use to understand what is driving the changes observed and how well the specific measures required in the EED are working (**BAU**).

As described in section 2, a large share of stakeholders think that EED did not provide the right monitoring and enforcement mechanisms. This weakness hampered the evaluation where it was extremely difficult to establish what impact had been achieved by different measures due to the lack of solid information for many aspects. It is not surprising that only 27% of OPC respondents thought that a strong monitoring and reporting framework at EU level had been important in achieving the EED's objectives which was the lowest of the 7 factors. However, it is important to note that among public authorities, slightly more (35%) found it important. Only 38% of respondents said that the lack of effective monitoring had been a factor in not realising the EED's potential, which was among the bottom 3 of 9 factors.

There are already some monitoring and reporting requirements in place in the EED, but there is no detailed information on how much effort is currently required to carry out these tasks. One factor to consider is that increasing digitalisation of data gathering may make it easier to transfer or make available data that is already gathered by Member States. As an example, monitoring of actual energy savings from renovations has been demonstrated and basing Article 7 savings on this would avoid uncertainty over estimates and rebound effects.

At the same time it is clear that to systematically gather the information that would enable better monitoring of whether the required actions are being taken, progress made and assessment of whether the available potentials are being fully exploited, would require additional effort by different stakeholders. In view of this additional effort, it is not surprising that there is limited support for the need for enhancing monitoring and reporting.

Stakeholders were asked in relation to specific aspects of the EED whether they thought a strengthening of monitoring requirements was desirable. In the case of the Energy Saving Obligation, strengthening the monitoring and verification rules was the second most supported measure (67%). Also in relation to enhancing public procurement provisions, the second most important measure was considered to be improved reporting of lifecycle energy use by 45% of all respondents and 29% of public authorities. In contrast, in relation to enhancing the provisions on energy services, enhanced reporting requirements was the least supported of all measures by 34% of all respondents and only 15% of public authorities.

A non-regulatory approach to increase the quality and amount of data available would be to expand the use of surveys, studies and other sources of analytical data to gather more data on actions taken by different actors and Member States. This is considered as **MONITOR.1.**

A further step to improve information availability in certain areas can be taken by strengthening the existing reporting requirements. Because of the existing structures this should involve little further effort or burden and is considered as **MONITOR.2.**

However, in certain areas there are currently no monitoring and reporting requirements and this creates considerable uncertainty over the impact and effectiveness of the measures. To address this, additional requirement are considered on how energy efficiency requirements are taken into account in public procurement and on public sector energy efficiency investments and energy performance contracts concluded above a threshold **(MONITOR.3).**

Measures:

- **BAU**
  Continue with existing monitoring mechanisms.
- **MONITOR.1**
  Expand the use of surveys, studies and other sources of analytical data to gather more data on actions taken by different actors and Member States.
- **MONITOR.2**
  i. Strengthen monitoring and verification including on additionality for counting energy savings in Article 7.
  ii. Strengthen monitoring and reporting of public building renovations.
- **MONITOR.3**
  i. Additional monitoring and reporting requirements on how energy efficiency requirements are taken into account in public procurement.
  ii. Reporting on public sector energy performance contracts concluded above certain threshold and energy efficiency investments.

Table 10 below provides an overview of the link between the problem, drivers and the above outlined policy options.

Table 10: Overview of the link between the problem, drivers and policy options

Problem: EU will not be able to decarbonise sufficiently to achieve the higher 55% GHG emission reduction ambition in a cost-effective way without capturing the remaining energy savings potential
Driver 1: insufficient incentives in support of Member States' ambition and efforts

	Policy packages and measures		
	Non-regulatory	**Regulatory** **Intermediate ambition**	**Regulatory** **Higher ambition**
Nature of EE targets		TARGET.1: Binding EU-level target TARGET.2: Indicative national benchmarks	TARGET.3: Binding national targets
Energy Savings Obligations		ESO.1: Transport sub-target ESO.2: Energy poverty sub-target ESO.3: Exclude fossil fuel technologies	ESO 4: Replace article 7 obligation with white certificates scheme
EE1st	EE1st.1 Guidance on application of EE1st principle Development of CBA methodology	EE1st.2 Obligation to implement EE1st principle Obligation to test energy infrastructure projects against EE1st principle	EE1st.3 Obligation to review legislation for EE1st coherence and establish 'application' body
Driver 2: continuous existence of barriers and weaknesses in main intervention areas			
	Policy measures		
	Non-regulatory	**Regulatory** **Intermediate ambition**	**Regulatory** **Higher ambition**
Public sector buildings	BUILD.1 Guidance in support of public building renovation	BUILD.2 a) and b): increased annual target and extend scope to all public bodies BUILD.3: strengthen requirements	BUILD.4 Delete alternative method
Public sector procurement	PROCURE.1 Guidance in support of energy efficient and green public procurement	PROCURE.2 Extend scope to all public bodies	
Industry	IND.1 Promote benchmarking of energy using sectors	IND.2 Strengthen audit requirements	IND.3 Require implementation of certain audit recommendations
Heating & Cooling	HEAT.1 Promote benchmarking of energy using sectors	HEAT.2 Strengthen certain definitions and obligations	HEAT.3 Phase out of fossil fuel boilers
Energy networks	NET.1 Promote benchmarking of networks	NET.2 Develop common definition of energy losses and require reporting by system operators	NET.3 Require authorities to monitor and incentivise implementation
Transport		TRANS.1	TRANS.2

		Mandatory mobility planning for certain urban areas	Require phase-out of internal combustion engine cars
Support measures	SUPPORT.1 Further capacity building, guidance and awareness campaigns	SUPPORT.2 Strengthen requirements for energy service providers, intermediaries and qualification & certification schemes	SUPPORT.3 Require MS to take up energy performance contracting, address barriers and establish project assistance.
Driver 3: Lack of sufficient information			
	Policy measures		
	Non-regulatory	**Regulatory** **Intermediate ambition**	**Regulatory** **Higher ambition**
Monitoring	MONITOR.1 Expand use of surveys, studies, etc.	MONITOR.2 Strengthen monitoring and reporting on article 7 and public building renovations	MONITOR.3 Additional monitoring and reporting requirements for public buildings, procurement and energy performance contracting

5.3. From options to scenarios that build on the Climate Target Plan

The Commission adopted the CTP in September 2020. It showed that the achievement of increased climate target of at least 55% net GHG emissions reduction is feasible, enables a smoother trajectory to climate neutrality in 2050, but requires that all sectors contribute to the increased effort.

With the energy sector contributing currently to just over 75% of GHG emissions, the clean energy transition in the current decade plays a central role. This transition has to accelerate significantly compared to scenarios leading to the previously agreed climate target of at least 40% GHG reduction in 2030. In the CTP, the increase of efforts needed for the GHG 55% target was illustrated by policy scenarios showing increased ambition (or stringency) of climate, energy and transport policies and, consequently, leading to a significant investment challenge.

The CTP made use of a several policy scenarios illustrating, in particular, the fundamental interplay between the strength of the carbon pricing and intensity of regulatory measures. The results obtained with these scenarios were convergent. All CTP policy scenarios that achieved 55% GHG target showed very similar level of ambition for energy efficiency, renewables (overall and on sectoral level) and GHG reductions across the sectors. More details about the key finding of the CTP (and how the scenarios have been updated in the current impact assessment) are presented in **Error! Reference source not found.**.

The results is that three common scenarios are used as the basis for all the FF55 package which are:

- REG (intensification of energy and transport policies in absence of carbon pricing beyond the current ETS sectors);

- MIX (relying on both carbon price signal extension to road transport and buildings and intensification of energy and transport policies).
- MIX-CP, lower ambition energy policies with a strong role for carbon pricing for road transport and buildings.

For this Impact Assessment, in addition to these common policy scenarios, some variants were developed to address – to the extent possible given the nature of energy efficiency – specific energy efficiency policies and measures. Table 11 gives an overview of how the policy options and 'packages' are applied to the scenarios underpinning them. More details on the specification of each option can be found in **Error! Reference source not found.**.

Different packages of measures were tested against the common 'fit for 55' scenarios, reflecting greater or lesser energy efficiency requirements. The elements included are shown by row. Except for the baseline, all scenarios assume an intensification of non-regulatory measures (as described in Section 5.1, the baseline does not assume intensification of policies beyond what Member States have already implemented or committed to. The 'MS target' indicates whether national targets are indicative or mandatory. The 'ESO' row refers to the level of Energy Savings Obligations in Article 7[90]. For a number of scenarios, the intermediate ambition measures are deployed in addition to the non-regulatory ones. For a limited set of scenarios, high ambition measures are also added. Two scenarios, MIX-FLEX and REG-CERT deviate from this model to test specific elements.

Table 11 Overview of scenarios

Scenarios									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Name	**REF**	**NON REG**	**MIX-CP**	**MIX-FLEX**	**MIX**	**MIX-MAX**	**REG**	**REG-MAX**	**REG-CERT**
MS target	NECP[i]	NECP	IND	MAN	IND	IND	IND	MAN	IND
ESO[ii]	0.8%	0.8%	1.4%	1.5%	1.5%	1.5%	1.6%	1.6%	
Non-regulatory measures	None	✓	✓	✓	✓	✓	✓	✓	✓
Intermediate ambition measures				Only EE1st	✓	✓	✓	✓	✓

[90] Article 7 (energy efficiency obligation schemes and alternative policy measures) is a key measure of the EED, estimated to contribute by about half of energy savings to the overall EU energy efficiency target for 2020 and 2030. See **Error! Reference source not found.** for more detailed information on this article.

Higher ambition measures						✓		✓	White certificate

i) NECP – ambition in line with National Energy and Climate Plans
ii) ESO – level of Energy Saving Obligations

The scenarios shown in the table are briefly described below.

Scenario 1: No policy change (baseline scenario)

The baseline scenario assumes continued implementation of the existing framework without changes to the EED.

Enforcement takes place through established methods, including the annual monitoring of Member States' performance under the Governance Regulation, continuous dialogue with Member States where necessary supported by further Commission recommendations to Member States, and infringement proceedings where relevant.

Guidance has been provided on specific provisions including amended Article 7 on energy efficiency obligations[91], Articles 9 to 11[92] on access to metering and billing information for consumers, and Article 14[93] on heating and cooling. It also assumes the adoption of guidance on the application of the EE1st principle, which is planned to be adopted as part of the 'Fit for 55' package.

Scenario 2: Non-regulatory measures

This option involves the use of non-regulatory measures alone, as identified under the different policy options. These offer the possibility to enhance the correct implementation of the EED in a more harmonised manner.

A certain amount of guidance has already been published and support measures, such as Concerted Actions are undertaken. Expanding these activities could help to address some weaknesses identified, for example on lack of capacity at Member State level, further improve implementation and monitoring, and the application of the EE1st principle.

As such, this scenario goes beyond what is already included in the baseline.

Scenario 3: EED – MIX-CP

As indicated above, the MIX-CP scenario was added to the "Fit for 55" core scenarios to explore a dedicated ETS for buildings and transport, with higher prices than the main ETS. This results in a lower-ambition revision of energy policies and CO_2 standards for vehicles.

[91] Commission Recommendation on transposing the energy savings obligations under the Energy Efficiency Directive (COM(2019)6621)

[92] Commission Recommendation on the implementation of the new metering and billing provisions of the Energy Efficiency Directive 2012/27/EU (COM(2019)6631)

[93] Commission Recommendation on the content of the comprehensive assessment of the potential for efficient heating and cooling under Article 14 of Directive 2012/27/EU (COM(2019)6625)

Consequently, under this scenario, changes to the EED are minor; the overall target is increased, but by less than other scenarios, and the only other change to the EED is to introduce the EE1st principle in the legal text. Non-regulatory measures are also part of this scenario.

Scenario 4: EED – MIX-FLEX

Under this scenario, the major change to the EED is the level of the overall EU target and that targets are made mandatory at Member State level.

The only other change is to introduce the EE1st principle in an article, but no other changes are made, thereby leaving the maximum of flexibility to Member States as to how they achieve their target.

Scenario 5: EED – MIX

Under this scenario, intermediate ambition changes are proposed to address the identified weaknesses. The overall target is increased in line with the CTP but the target remains indicative for Member States. Also, the level of ambition of Article 7 is increased.

Scenario 6: EED – MIX-MAX

Under this scenario, the revision of the EED includes all elements of option 5, but additionally aims to strengthen other aspects of the Directive where high ambition options were identified. These include *inter alia* aspects related to buildings, transport and the phasing out of gas boilers and combustion engines.

Scenario 7: EED – REG

The three REG scenarios are based upon the corresponding CTP IA scenarios, which assumed the maximum regulatory effort to achieve the 55% GHG reduction in 2030. Under this option, the main change is the increase in the level of energy efficiency obligations under article 7, as well as the intermediate ambition changes to address weaknesses. The overall target is increased but remains indicative for Member States.

Scenario 8: EED – REG-MAX

Compared to scenario 7, this option introduces mandatory energy efficiency targets at Member State level and strengthens other aspects of the Directive where high ambition options were identified. These include new aspects related to transport and measures related to phasing out of gas boilers and combustion engines.

Scenario 9: EED – REG-CERT

The main characteristic of this scenario compared to the other REG ones is to replace the energy efficiency obligations under Article 7 with an EU-wide white certificates scheme (see **Error! Reference source not found.** for further details about such a scheme). The other changes include the intermediate ambition measures.

5.4. Scenarios discarded at an early stage

Scenario 2: Non-regulatory measures, which envisages only non-regulatory action, has been discarded as a stand-alone option. This is because it cannot resolve a number of the underlying problems. In particular, Member States are unlikely to increase their overall

level of energy savings, which is crucial to delivering the 55% GHG reduction, purely in response to a request from the Commission since they have not done so voluntarily so far.

As regards the other identified problems, while some could be addressed through further guidance, this will provide less certainty than improving the legal text and will not address situations where the Directive allows for weaker alternatives or there is insufficient reporting. However, as such measures are in any case beneficial in support of energy efficiency, all other scenarios include the non-regulatory measures identified in section 5.2.

6. WHAT ARE THE IMPACTS OF THE SCENARIOS AND POLICY OPTIONS?

It is necessary to carry out an assessment of the individual detailed measures to determine whether they make sense in terms of their contribution to the effort needed from the EED as well as whether they might result in an excessive administrative effort or they are no justified in view of subsidiarity or coherence with other EU legislation. Those measures that would be retained also need to be assessed for coherence with each other as a package.

A separate assessment is needed of whether the whole package of EED measures works appropriately with the other FF55 proposals to deliver the CTP ambition. That assessment is necessary to ensure that the FF55 package is coherent in view of the interactions between its elements and that its overall impact on factors such as energy prices, ETS prices and economic activity is considered acceptable.

6.1. How the assessment is carried out

The assessment of whether the package of EED measures works appropriately with the other FF55 proposals to deliver the CTP ambition is necessarily carried out using an energy system model. To take account of the fact that other proposals are simultaneously under consideration, the approach uses the three core scenarios used for all the 'Fit for 55' initiatives determine the boundary conditions for all policy options. The key difference between the three core scenarios (MIX-CP, MIX and REG) that is pertinent for the EED assessment is the extent and nature of pricing measures for GHG emissions.

As previously explained, certain outcomes of the CTP define the framework within which the current assessment is taking place. In particular this includes the overall level of the energy saving target set by the EED and as a consequence the level of the Article 7 ambition.

The measures implemented to promote energy efficiency in each scenario will have the effect of facilitating investments in energy efficiency and therefore lead to more energy savings than without them, all else being equal. Conversely they will result in lower emission prices to achieve the same level of savings. Nevertheless, the results of these scenarios establish the range of expected impacts of all 'Fit for 55'initiatives acting together. Consequently, the quantitative impacts are also the result from the overall combined effects of all the 'Fit for 55' initiatives and not just those from the EED.

The key question that the modelling needs to answer for this impact assessment is whether the assessed packages of EED measures are adequate to ensure that the FF55 policy package achieve the CTP parameters, in particular for the EED the energy savings needed. This is assessed for all the retained scenarios.

Using an energy system model does not allow for a granular analysis by policy measure. In view of this inability to provide such a detailed quantitative analysis of many of the individual policy options, section 6.3 therefore provides a detailed qualitative assessment of the different policy options against the objectives of the review as well as administrative burden and coherence.

6.2. Summary of quantitative results

The projections obtained from scenario modelling provide quantitative elements for analysis. Models necessarily are limited in the granularity to which they can illustrate the complexity of the real world. All models require large amounts of data and assumptions as inputs and yet there may not be precise econometric data for all variables needed. In addition, because of their forward looking nature it is necessary to assume how all these variables may change in the future. These features mean that model outputs are necessarily uncertain. Efforts are made to reduce this uncertainty for example by trying to tune the outputs to observed outcomes, but it must be understood that the outcomes are not a precise prediction.

A detailed presentation of the modelling results is provided in **Error! Reference source not found.**. This also describes the assumptions underpinning the scenarios (in particular regarding projected economic activity and fuel prices). Scenario results are reported in this Impact Assessment only at EU level, but impacts on Member States will be reported in the forthcoming technical publication. Figure 14 shows the reduction in Final Energy Consumption in the different scenarios and variants. Scenarios with higher intensification of policies (e.g. MIX-MAX and REG-MAX) show slightly higher energy savings. These scenarios also reach very slightly higher emissions reduction (for example, -54.3% GHG emissions for MIX-MAX and -54.4% for REG-MAX in 2030[94]). Furthermore, the MIX-CP is the only scenario that does not reach the level on energy savings analysed in the CTP Impact Assessment. In 2030 FEC in the MIX-CP scenario is 34.2% below the 2007 baseline projections while the CTP scenarios all reached reductions between -36 and -37%.

As discussed in the CTP Impact Assessment, projections for the different scenarios are remarkably close. In particular, the climate impact of all scenarios and options is very similar. There are small differences between scenarios in GHG emissions by sectors. Scenarios based on carbon pricing (e.g. the MIX scenario) tend to reduce supply side emissions more and in particular emissions from power generation (up to 3% points more). However, scenarios based on bottom up policies (e.g. the REG scenario) compensate with higher reduction in the residential sector.

[94] Excluding intra EU aviation and maritime, and LULUCF

Figure 14: Final energy savings in 2030 (with reference to PRIMES 2007 baseline projection).

Looking at these changes by main sectors (Table 12 below) shows that the energy savings in each sector increase progressively through the options. The main exception to this is MIX-MAX for industry and residential, where the energy savings are higher than in all other options.

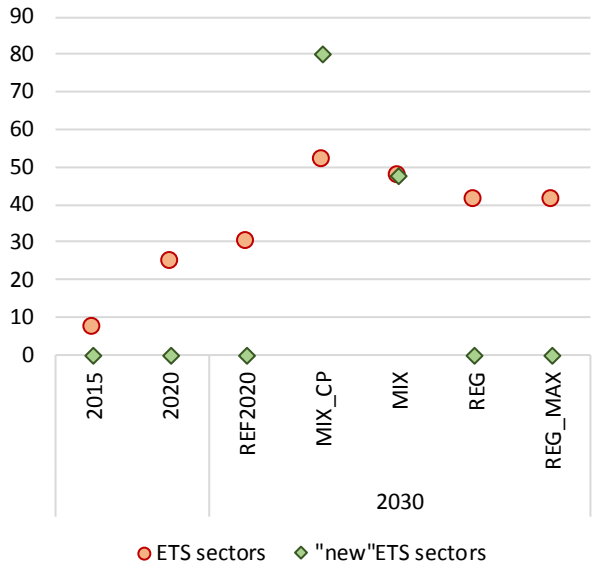
Table 12: Final energy use by sector.

		Services & agriculture	**Industry**	**Residential**	**Transport**
2000		144	272	248	263
2005		163	275	267	282
2030	REF	143	244	215	280
	MIX-CP	132	228	191	269
	MIX	129	226	182	269
	MIX-MAX	128	224	181	269
	REG	124	221	197	267
	REG-MAX	124	219	197	267

6.2.1. Economic impact

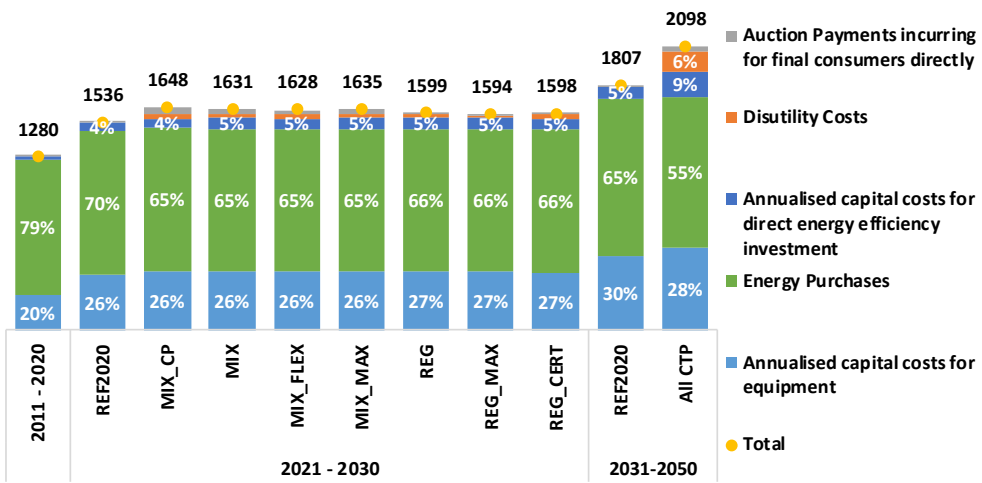
Figure 15 shows the ETS carbon price in the different scenarios including for the transport and building sectors in the scenarios with extension of ETS (the results for MIX-MAX are the same as in MIX).

Figure 15: Carbon price ETS sectors (€'15/ t of CO2).



System costs, including auction payments and disutilities, measure the policy costs for the final consumers. As shown in Figure 16, the costs for consumers increase significantly compared to the previous decade and are also higher than in the reference scenario. At the same time, total system costs are remarkably close in all scenarios.

Figure 16: average annual cost over 10-year periods, in billion € '15.



Because of the increased system costs, electricity costs also increase as shown in Figure 17. The average electricity cost increase up to 2030 and then tends to decrease due to decreasing technology costs. Moreover, scenarios with high carbon price (like MIX-CP) tend to have slightly higher electricity prices due to pass-through of carbon cost to final consumers.

Figure 17: Average electricity price (€'15/MWh).

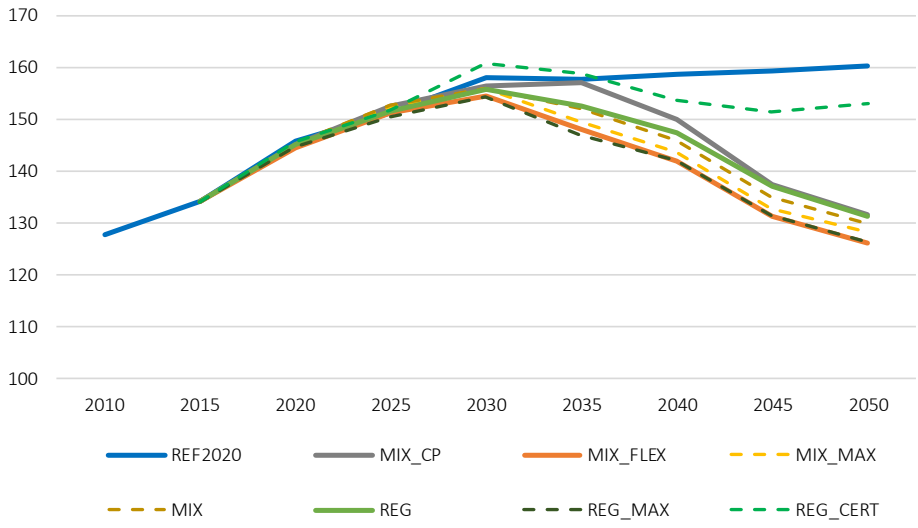


Table 13 below compares the change in the cumulative energy system costs over ten years for each of the three main sectors against the change in their final energy consumption in 2030. This is to provide a measure of the cost-effectiveness of the different scenarios. For comparison, the change in cost in the ten years before and after 2030 are shown.

The system costs including auction and disutility are a measure of the costs for final consumers. However, as public policies recycle carbon auction revenues in the economy, the indicator of total energy system cost excluding auction payments is the appropriate indicator for comparing the macroeconomic impact of different scenarios. Moreover, the disutility costs are not meaningful from a macroeconomic perspective.

Table 13 shows the system cost excluding auction payments and disutilities expressed as % of GDP. Very small differences can be observed between scenarios and the increase compared to the reference scenario is also limited. Therefore, this alone does not provide a key determining factor in selecting a preferred approach.

Table 13: Total system costs excluding auction payments and disutility as % of GDP.

	2010	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**
REF	11.7	10.5	9.7	10.9	11.6	11.0	10.5	9.8	9.4
MIX-CP		10.5	9.6	11.3	12.4	12.3	12.6	12.3	11.7
MIX		10.5	9.6	11.3	12.4	12.2	12.4	12.1	11.5
MIX-FLEX		10.5	9.6	11.3	12.3	12.0	12.2	11.9	11.4
MIX-MAX		10.5	9.6	11.4	12.4	12.2	12.4	12.2	11.6
REG		10.5	9.6	11.3	12.4	12.0	12.0	12.0	11.5
REG-MAX		10.5	9.6	11.3	12.4	11.8	11.8	11.7	11.2
REG-CERT		10.4	9.6	11.4	12.2	11.5	11.6	11.7	11.7

6.2.2. *Investment, GDP and employment effects*

Table 14 below indicates the levels of investment by sector for the period 2026-30 for each option.

Total investment expenditures in final energy consumption sectors (demand sectors) in the Reference scenario increase in the 2021-2030 decade by 41% compared to 2011-2020. In the decade 2021-2030, the investment expenditures in the demand sectors in the policy scenarios increase between 6.9% and 11.8% relative to the Reference scenario. The REG scenarios project slightly higher investment expenditures in demand sectors compared to the MIX scenario (an increase from Reference of 11.8% instead of 9.7%).

Investment expenditure increases considerably above business as usual also in supply sectors (including power and heat production, grids, and production and distribution of alternative fuels). In the Reference scenario, investment expenditures in the supply sectors increase by 45.2% in the decade 2021-2030, cumulatively, compared to the previous decade. The policy scenarios involve 28.7% to 30.7% higher supply sector investment expenditure above the Reference in the decade 2021-2030. The increase in the policy scenarios is much higher after 2030 and is on average 80% higher than Reference in the period 2031-2050.

Table 14: Investment expenditures (in billion € '15).

				Demand side		
		Industry	**Residential**	**Tertiary**	**Total excl. transport**	**Transport**
	2011-2020	9,4	81,8	45,4	136,6	476,4
2021-2030	REF	17,0	125,5	74,6	864,5	647,4
	MIX-CP	24,1	157,6	94,5	924,3	648,2
	MIX	24,7	180,1	94,2	948,2	649,3
	MIX-MAX	26,7	185,8	95,1	956,8	649,3
	REG	23,6	194,4	97,5	966,2	650,6
	REG-MAX	25,9	189,0	98,3	963,9	650,7

				Supply side	
		Grids	**Power and heat plants**	**Total**	**New fuels**
	2011-2020	21,0	33,8	54,8	0,0
2021 - 2030	REF	35,1	44,4	79,6	0,0
	MIX-CP	43,9	58,8	103,3	0,6
	MIX	43,8	58,5	103,0	0,7
	MIX-MAX	43,6	58,4	102,7	0,7
	REG	44,3	58,6	103,7	0,7

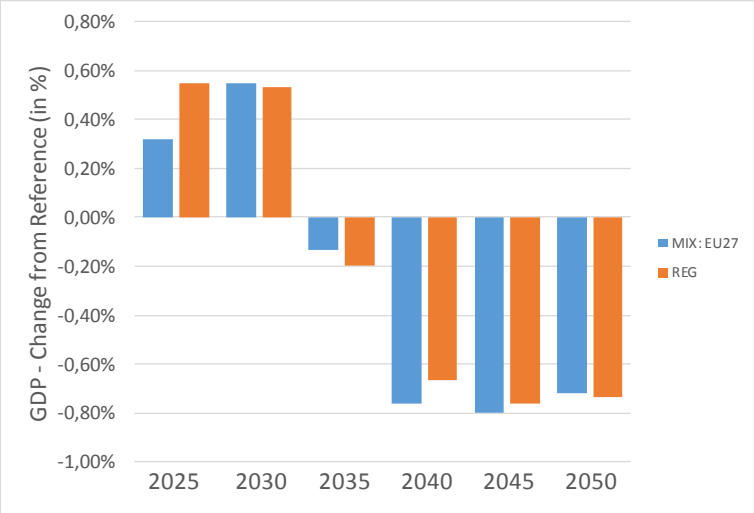
REG-MAX	44,9	58,7	104,4	0,7

The increase in investments has a critical impact on the cost of the transition. If financing is available to fund capital costs, additional investments can generate a significant multiplier effect. It is estimated that around 9-20 jobs in manufacturing and construction are created for every million dollars invested in retrofits or efficiency measures in new builds in the EU. Construction jobs would mostly be local, while manufacturing jobs in the industrial sector would be created by increased demand for building materials and equipment such as insulation, efficient glazing and heat pumps.

If financing is not available, however, the additional expenditures divert productive resources (either capital or labour) from other productive uses. Such crowding out results in scarcity conditions that have adverse effects on the entire economy.

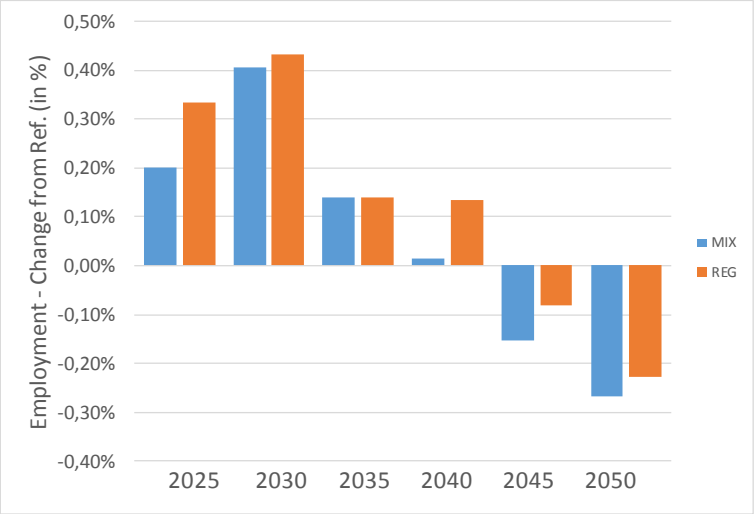
Analysis with macroeconomic models confirms the results obtained in the CTP impact assessment. The impact on the European GDP and employment of the climate targets is small in any of the cases assessed. Projections obtained with the GEM-E3 macroeconomic model indicate a small positive effect on GDP and employment with favourable financing conditions. Compared to Reference projections, GDP is 0.52% higher in 2030 and employment is 0.36% higher. Assuming crowding out of investments, however, GDP and employment in 2030 are 0.2% and 03% below the Reference level respectively. In line with previous findings, result for the MIX and REG scenarios are very similar. It is likely that the conditions for investments will lie in between the two cases of favourable financing and crowding out. Uncertainty on other parameters such as baseline economic growth is expected to have smaller impacts on macroeconomic aggregates[95]. The difference between the favourable financing and crowding out conditions can be interpreted as a measure for the uncertainty in the outcome of the policies proposed. Figure 18 and Figure 19 show the economic impact of the core policy scenarios on GDP and employment in case with no crowding out of investments.

Figure 18: % change of GDP in volume from Reference.



[95] The CTP baseline, for example, had higher economic growth, but the macroeconomic impact of increasing climate ambitions was comparable.

Figure 19: % change of employment from Reference.



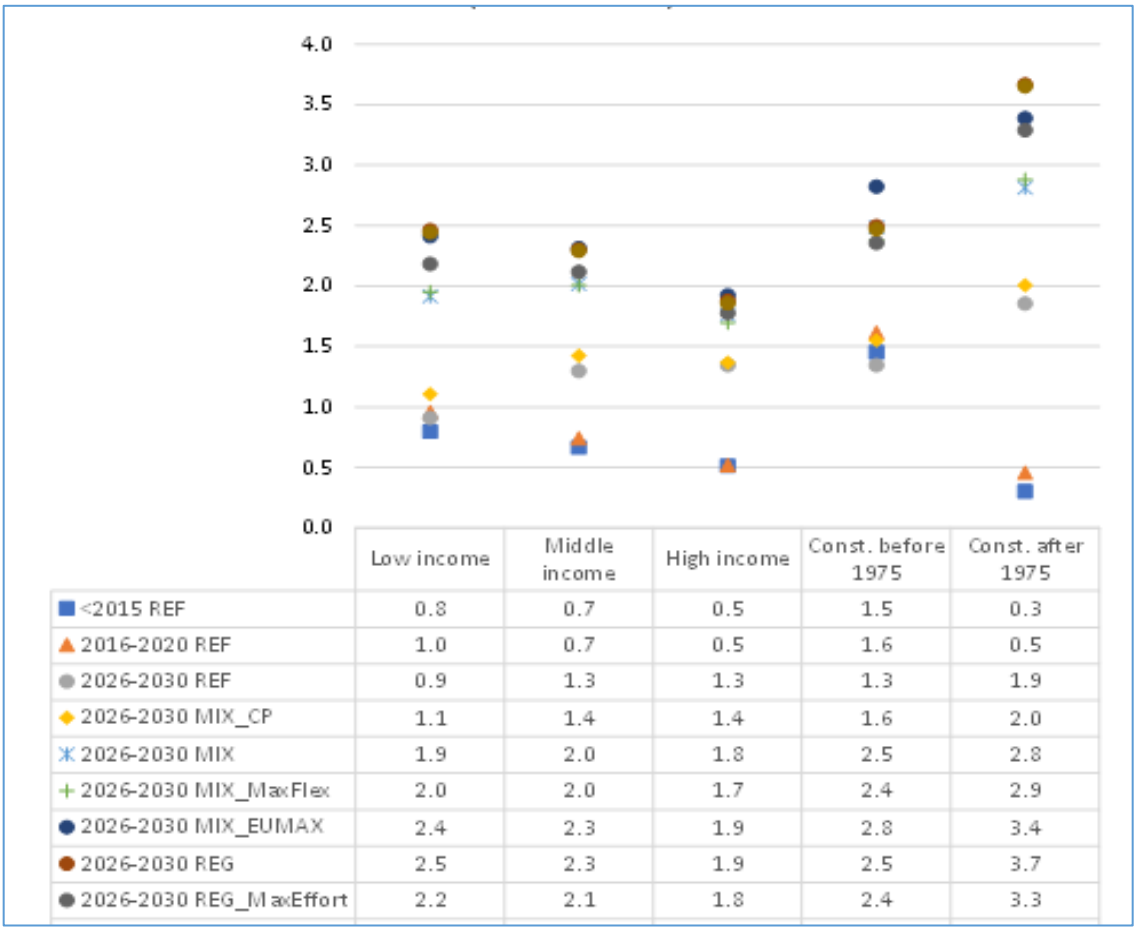
Investments in energy efficiency measures cause positive GDP impacts for the entire economy through multiplier effects assuming that crowding out effects are not present. Accounting only for multiplier effect, but ignoring wider macroeconomic effects (*i.e.*, via the readjustment of wages, interest rates, prices and the financial closure for funding) GDP would be approximately 0.5% and 1.1% higher in 2025 and 2030 respectively. Similarly, accounting for multipliers only, employment would be approximately 0.25% and 0.5% higher in 2025 and 2030. If the extra investment in energy efficiency and renewables included in the MIX and REG scenario were to be implemented without secondary and indirect effects in the macro economy, they would have a significant positive growth inducement impact.

6.2.3. Social impacts

All policy options are characterised by an increase in investments and in particular increase in energy efficiency investments. The CTP Impact Assessment showed that, in the absence of mitigating measures, climate policies could have a regressive impact affecting negatively vulnerable consumers. However, not all policies have equal social impacts. Policies based on carbon prices tend to promote fuel switch by increasing the cost of fuels. This could have negative effect for vulnerable consumers, as lower income households tend to spend a larger share of income on energy services such as heating and electricity consumption. Bottom up energy efficiency measures, on the other hand, tend to promote investments and renovations. Energy savings eventually repay capital investments. Assuming that financing is available, energy efficiency investments result in lower total costs.

Figure 20 shows the average renovation rate over the 2016-2030 period by household income for the different scenario. Scenarios with higher energy efficiency ambition tend to have significantly higher renovation rates. Because of the policies included in the scenarios' specification, renovation rates are higher in particular for low income households.

Figure 20: Annual renovation rate of dwellings' building envelope (in percentage of stock).



	Low income	Middle income	High income	Const. before 1975	Const. after 1975
<2015 REF	0.8	0.7	0.5	1.5	0.3
2016-2020 REF	1.0	0.7	0.5	1.6	0.5
2026-2030 REF	0.9	1.3	1.3	1.3	1.9
2026-2030 MIX_CP	1.1	1.4	1.4	1.6	2.0
2026-2030 MIX	1.9	2.0	1.8	2.5	2.8
2026-2030 MIX_MaxFlex	2.0	2.0	1.7	2.4	2.9
2026-2030 MIX_EUMAX	2.4	2.3	1.9	2.8	3.4
2026-2030 REG	2.5	2.3	1.9	2.5	3.7
2026-2030 REG_MaxEffort	2.2	2.1	1.8	2.4	3.3

The CTP Impact Assessment (under comparable modelling assumptions) explored a lump-sum redistribution of carbon revenue at the national level (i.e. additional revenues relative to baseline are recycled within country). It was shown that this approach based on household size could generate a positive welfare impact on the bottom expenditure decile of the EU population as a whole under MIX, and sharply reduce the negative impact on all other expenditure. The nature of such a redistribution mechanism can affect the overall welfare impact.

6.2.4. Coherence

Any changes to the policy architecture, which are under consideration in this Impact Assessment would not take place in a policy vacuum, but would interact with existing and planned policies and measures of a different nature to reach the 55% climate target, including pricing and non-pricing mechanisms and measures, and policies promoting renewables.

Assessing the interplay between each of the various elements of an extended and deepened policy architecture, and the interaction with existing related EU-level and national level policies is fundamental. The revision of the EED is a key element in achieving the increased 2030 EU climate target in a cost-efficient manner, while helping to address existing market barriers and redress distributional impacts. Most of the relevant EU policies are under review in the ‘Fit for 55’ package.

Policy interactions are already manifold between existing climate and energy policies. Two areas worth mentioning in this respect are the buildings and transport sectors, which are covered by horizontal legislation on energy efficiency (EED and EPBD), renewables (RED), GHG emissions (ESR) and fuel infrastructure (Alternative Fuels Infrastructure Directive), but not by the EU ETS (except for aviation). In addition, several pieces of sector specific EU legislation apply.

Therefore, in view of a possible scenario extending the ETS to buildings and transport, as regards energy efficiency the most relevant interactions are with the EED and the EPBD.

Having in mind existing market barriers hampering energy efficiency, striking a balance between carbon pricing and the policies in the MIX scenarios would help the 'Fit for 55' package achieve the increased climate target in a cost-efficient manner, without excessive increases of the carbon prices and mitigating their impacts in particular on vulnerable consumers.

There are some interaction differences which depend on, or link with, the choice of the carbon pricing instrument (i.e. ETS or carbon taxation), which are analysed in the IA accompanying the revision of the ETD.

Interactions with the ESR are different in nature. Its binding national emission reduction targets mainly function as a safeguard to ensure the intended energy-related emission reductions through the specific policies are achieved, incentivising Member States to effectively implement policies and mitigate distributional effects between Member States, while ensuring that also in the ESR sectors not addressed by renewables and efficiency policies (currently around 40% and in 2030 around 45% of ESR emissions) sufficient emission reduction policies are implemented at the national level. EU energy efficiency policies can also lower the need for national emission reductions in other effort sharing sectors.

The different combinations of policy instruments considered in the scenarios achieving the 55% GHG target deliver only limited differences in energy savings and renewable energy shares. This confirms the findings in the CTP Impact Assessment: the ambitious targets require significant contributions from all sectors and all policy instruments. Without the possibility of deploying new technologies, the cost-effective solutions converge to very similar pathways.

All scenarios show that final energy consumption should be further reduced by 35% (MIX-CP) to 37% (REG) compared to the 2007 baseline used as a business as usual trajectory for the EU energy efficiency targets. Moreover, increased ambition in the MIX-MAX scenario results in slightly lower energy consumption and a further reduction of 0.3% GHG emissions compared to 1990.

Although achieving 55% with lower levels of energy efficiency has not been analysed in detail, it can be assumed that it would either require increasing other targets (RED, ESR) beyond their cost-efficient levels or it would rely on a very high carbon price. However, without an appropriately targeted energy efficiency policy, a high carbon price would increase costs for consumers, in particular low and medium income households and vulnerable consumers, and exacerbate distributional effects.

Indicative national targets could provide a further instrument to ensure delivery of the Fit for 55 package. However, indicative national targets will have to be reconciled with an equitable distribution of effort and with the options considered for burden sharing in the

ESR revision. The option of proposing a binding EU level target would reduce the risks of non-compliance at the expense of flexibility. The risk of overlap with other policy initiatives is limited since the range for the possible energy efficiency target under the CTP is narrow.

In the transport sector, the energy efficiency measures could complement the existing and planned policies under the Smart and Sustainable Mobility Strategy. Options set the level of ambition for transport measures. New measures and requirements for urban mobility and transport could help reducing energy consumption in one of the few sectors that has seen an increase in energy consumption over the last decade. However, overlaps with the SSMS and added administrative burden should be carefully considered.

For the remaining options described in Section 5.2, the risk of overlap with other policy areas is limited. These options deal mainly with the level of ambition required in different sectors for reaching either 36% or 37% energy savings (and are thus coherent with the pathways proposed in the core policy scenarios). Options discussing scope extension of existing measures are generally limited to specific sectors (e.g. public buildings) with little risk of overlap with other policy initiatives.

Based on considerations above, there are a number of arguments in favour of combining elements from both policy mix approaches, which is already the case in several Member States. Economic incentives are important, but so are specific measures targeted to address either specific barriers or addressing cost-effective untapped potentials related to specific alternatives to fossil fuel use. Specific energy efficiency policy (as well as renewable and transport policies) will continue to address the split-incentive dilemma in building renovation, increase coherence of energy infrastructure planning, support licensing and certification procedures or ensure better available information for energy consumers.

For further discussion on the interactions between the EED and the ETS, ESR, RED, ETD, see the instrument-specific Impact Assessments.

6.2.5. Implications of the modelling results for the assessment of measures

The majority of additional actions (beyond the EU-level actions) that will be taken to achieve the necessary energy savings will be at Member State level. This means that the distribution between sectors remains uncertain. Nevertheless, based upon the parameters in the model, this results in a certain distribution of efforts. The overall economic and environmental impacts are largely driven by the aggregate energy savings that result from the design of the whole package of measures, in particular those elements determined from the CTP as regards the level of the overall EU energy saving target and the energy savings obligation in Article 7.

In view of this, the economic and environmental impacts are discussed only in relation to the policy scenarios rather than in relation to each of the policy options. Similarly, with regard to social impacts, these relate to a large degree to jobs and energy poverty. Employment impacts are estimated based on the overall packages. However, energy poverty impacts will largely be a result of Member State choices about how to support building renovations. Realistic choices have been made in the modelling, but the measures of the EED in those areas are not expected to have major direct impact and so these impacts are only presented in relation to the overall packages. Coherence with the other instruments in the ‘Fit for 55’ package is assessed in section 6.2.4.

It can be seen that the modelled packages of measures are of the right order of stringency to deliver energy savings within the CTP range. In view of the high level of the modelling, it is not possible to draw conclusions form it about the desirability of the specific measures. In view of that, it is necessary to assess these against the objectives and wider policy considerations before concluding on the most appropriate overall package. This assessment is carried out in the following section.

Comparing the scenario results between MIX and MIX-MAX or REG and REG-MAX shows the impact of a change from the intermediate to higher ambition package of energy efficiency measures within that policy environment. As shown in Figure 14 the difference between these scenarios that results from the alternative packages is 0.5% in MIX (from 35.8 to 36.3%) and 0.1% in REG (from 36.7 to 36.8%).

6.3. Assessment of policy options

Next to the quantitative analysis of the scenarios above, the following sections provide a qualitative assessment of the different policy options presented in section 5.2 against the objectives identified in section 4.2 and the Better Regulation criteria, compared to the baseline:

1. Effectiveness;
2. Administrative burden and compliance costs;
3. Coherence: coherence of each option with the overarching objectives of EU policies, and the 'Fit for 55' package in particular;
4. Subsidiarity and proportionality.

To simplify the assessment, the effectiveness criterion has been assessed against the three specific objectives of the initiative (where appropriate), i.e. strengthen **incentives**, addressing **barriers** and improve **understanding of impacts**. This assessment aims to identify those measures that would most cost-effectively contribute to achieving the energy efficiency target established by the CTP.

Effort has been made to quantify the administrative burden but there is limited understanding of this burden due to the current legislation. The absence of this baseline makes any estimate of the additional burden due to a strengthening of the provisions difficult. In an attempt to remedy this situation a short survey was organised addressed to all the participants in the stakeholder workshops. This survey sought their views on the current administrative burden and the probable increase that the types of provisions under consideration could cause.

The survey resulted in a relatively limited number of responses that could not be considered as being sufficiently representative of the EU as a whole. Within the estimates of the existing administrative burden there were significant variations that may have multiple causes that could not be verified. The questions about increased burden were of the nature of percentage increase and actual FTE increase. It is not possible to reconcile these two parameters with the range of existing burden indicated. In view of these problems with the data it was decided that the quantification of the increase in administrative burden for all the measures would be misleading and therefore this assessment is qualitative. A quantitative estimate is provided for the elements of the preferred option.

6.3.1. Energy efficiency targets

6.3.1.1.Effectiveness

Under **BAU** there is an insufficient obligation to ensure that Member States take sufficient and effective energy saving actions.

TARGET.1 would make the EU-level target binding, which would increase its effectiveness as an instrument incentivising energy efficiency efforts, in combination with the mechanisms under the Governance Regulation.

Under **TARGET.2**, the EU would define national benchmarks based upon an appropriate distribution mechanism. Such benchmarks for Member States would give clarity about the expected level of national efforts and facilitate better monitoring, which would encourage Member States to achieve the optimal level of ambition in energy efficiency.

Under **TARGET.3**, the EU would define binding national targets. This would give greater certainty that they would be achieved since there would be a potential recourse to enforcement (e.g. through infringement procedures). As such, **TARGET.3** would be more effective than **TARGET.1** and **TARGET.2** in achieving the necessary ambition and efforts at Member State level.

TARGET.3 would also provide more incentives to Member States to address existing market barriers and failures as a binding target would presumably create more pressure to achieve the necessary savings in a cost-effective manner.

6.3.1.2.Administrative burden and compliance costs

The administrative burden for **TARGET.2** and **TARGET.3** is estimated to be low, as the national indicative energy efficiency benchmarks or binding targets can be monitored through official statistics, which are readily available at national level and from Eurostat. Besides, these data have been collected and reported by Member States for quite some time and no new actions would be needed.

Compliance cost, e.g. for industry, would not be expected to change significantly as a result of the three options.

6.3.1.3.Coherence

TARGET.1 is fully coherent with the other actions in the ‘Fit for 55’ package, in particular the GHG emissions reduction and the renewables target, as both are binding at EU level. **TARGET.2** is similar to the approach for renewables, while **TARGET.3** would diverge from this approach.

6.3.1.4.Subsidiarity and proportionality

In particular **TARGET.3** impinges on subsidiarity as it provides for a mandatory national target that Member would have to meet.

TARGET.2 and **TARGET.3** are both considered proportional, in view of the importance of meeting the 55% GHG target and of the contribution of energy efficiency.

In summary:

Criteria		Comparison of options against the baseline			
		BAU	TARGET.1	TARGET.2	TARGET.3
Effectiveness	Incentives	0	+	+	++
	Barriers	0	0	+	+
	Understanding impacts	0	0	0	0
Administrative burden/compliance costs		0	0	-	-
Coherence		0	+	+	-
Subsidiarity and proportionality		0	0	-	--

6.3.2. Energy Savings Obligations

6.3.2.1.Effectiveness

BAU leaves full flexibility to Member States. This may have the weakness of not delivering energy savings in areas where they may be feasible but simply require more coordination to achieve.

ESO.1 appears effective. It supports the European Green Deal objectives by a broader coverage of sectors. It would also be the most effective way to ensure the transport sector will contribute to the decarbonisation target of at least 55%. Achieving a certain amount of energy savings in the transport sector would create synergies with a revised ETS on transport, the ESR and the Sustainable Mobility Action Plan, and unlock additional energy savings achievable in the transport sector.

ESO.2 would remove the flexibility of Member States whether to implement policy measures alleviating energy poverty or not. Member States would be required to implement such measures in any case to fulfil their energy savings obligation. The COVID-19 crisis has highlighted the urgency of addressing energy poverty if we are to create a social Europe that caters for the needs of all citizens. Energy poverty levels across Member States will be in the spotlight as more Europeans may struggle to afford access to essential energy, particularly with rising unemployment. Also medium income households should be considered as the COVID-19 crises has increased the risk of energy poverty in such households. Against this background, this option would be very effective to achieve the European Green Deal objective of ensuring a just transition. The assessment of the progress of Member States towards the alleviation of energy poverty shows that Article 7 with its flexibilities as it stands does not drive sufficient action.

Excluding the possibility for Member States to count energy savings from measures promoting the use of fossil fuels under option **ESO.3** would be an effective way to contribute to the energy efficiency target and the objectives of European Green Deal. The decarbonisation target of at least 55% implies a rapid movement away from fossil fuel use, particularly in buildings. It also reflects that public policy should not reward marginal energy savings gains that lead to stranded assets and slowing down the energy transition.

ESO.4 would be effective as it would create an EU-wide white certificate scheme that could result in cost optimisation to achieve energy savings, open the energy savings markets to third parties, provide price signals to market actors and give a formal value to energy savings. Modelling shows that this would result in a lower overall cost of achieving the energy saving goal, provided there is effective implementation.

6.3.2.2.Administrative burden and compliance costs

ESO.1 and **ESO.2** would see a moderate increase of administrative burden and higher compliance costs. Member States would have to plan and implement additional measures or revise existing measures to ensure the achievement of the sub-targets for transport and energy poverty.

ESO.3 would not have an impact on administrative burden or entail any additional compliance cost.

ESO.4 would raise significant complexities and may require a complex administrative scheme to be put in place. As such it would create a high additional administrative burden and high compliance costs to implement.

6.3.2.3.Coherence

Requiring a certain percentage of Article 7 savings to come from transport under option **ESO.1** would be fully coherent with existing measures in the transport sector. In fact, under Article 7 Member States can already count measures targeting the transport sector towards their annual savings obligation, e.g. through scrapping schemes, modal shift and higher efficiency of vehicles, behavioural measures (e.g. eco-driving), and environmental taxes on transport fuels.

This would stimulate Member States to take further action on transport, which is needed because the transport sector has been identified in the European Green Deal and the Climate Target Plan 2030 as one of the key sectors for lowering GHG emissions and reducing energy consumption. There would therefore not be regulatory overlap but rather synergies with the measures of the Sustainable and Smart Mobility Strategy, as the EED would establish a result-oriented obligation while leaving it to Member States which measures they would like to use for achieving the reduction in energy use in transport.

The strengthening of Article 7 as regards energy poverty under option **ESO.2** would contribute to making the energy transition just and inclusive, by obliging Member States to address vulnerable, energy poor households, low- or medium income households and homeowners.

Discouraging the promotion of combustion fossil fuel technologies under Article 7 (**ESO.3**) would be fully coherent with all measures in the ‘Fit for 55’ package and the European Green Deal. It would also mirror the possible extension of ETS on buildings and transport.

ESO.4 would most likely create undesirable results if applied together with the EU ETS and in particular an ETS extension to buildings and transport. Both schemes are based on the principle of passing on the costs to the consumer. On the one hand, this could financially overextend consumers in some Member States and increase the risk of energy poverty, unless additional, well-balanced actions would be taken to counterbalance these effects. On the other hand, the co-existence of both schemes could potentially lead to a

significant imbalance in some countries between the costs being borne (and passed through to energy consumers) and the benefits received.

6.3.2.4.Subsidiarity and proportionality

ESO.1, ESO.2 and **ESO.3** have an impact on subsidiarity as they limit (to some extent) the freedom of Member States to decide in which sectors they would achieve the necessary energy savings. Moreover, **ESO.2** would require Member States to substitute the savings from the replacement of fossil fuel technologies with savings from other measures, which may be harder.

ESO.4 causes the most problems for subsidiarity, as an EU-wide scheme would require Member States to align their calculation methods and monitoring requirements.

In addition, its implementation would be incompatible with the existing Article 7. This would therefore require Member States to change the approach they have put in place half way through the compliance period until 2030, which could be considered disproportionate.

In summary:

Criteria		**Comparison of options against the baseline**				
		BAU	ESO.1	ESO.2	ESO.3	ESO.4
Effectiveness	Strengthen incentives	0	+	+	+	++
	Address barriers	0	+	+	+	+
	Understanding impacts	0	0	0	0	+
Administrative burden		0	-	-	0	--
Coherence		0	0	++	++	--
Subsidiarity and proportionality		0	-	-	-	--

6.3.3. EE1st principle

6.3.3.1.Effectiveness

BAU continues the situation where the EED states that it contributes to implementation of the energy efficiency first principle but gives no indication of what Member States should do to implement this.

EE1st.1 would provide much-needed guidance on how different players and different sectors could apply the EE1st principle. It would address the lack of clarity and details on how the principle could be applicable in specific contexts and provide some tools for proper cost-benefit analysis, which is at the core of the principle. This option, however, would not ensure that the principle or the guidelines are applied.

EE1st.2 would ensure that the principle is applied in decisions where it could have the biggest impacts. By setting appropriate legal requirements, Member States would be obliged to provide the right conditions for enabling the application of the principle. Together with the guidelines, Member States would be able to properly apply the

principle, including by specifying in which areas the principle would need to be applied. Reporting requirements would help verify if the principle is applied, but enforcement and verification of whether it is applied properly would be difficult.

In principle, **EE1st.3** would be the most effective, as it requires specific actions that could ensure incorporation of the principle in all relevant legal acts. A dedicated body would ensure that the principle is properly implemented. However, its effectiveness would depend on Member States' administrative performance and might require deployment of dedicated administrative resources to a newly created structure and tasks. These elements should be weighed against any benefits in terms of verification and enforcement compared to option EE1st.2.

The increased stringency of the options would have an increased, albeit moderate, positive impact on the need to address the barriers to an effective implementation of the EE1st principle.

6.3.3.2.Administrative burden and compliance costs

EE1st.1 is voluntary and so any burden and compliance costs would be limited.

EE1st.2 would require application of the principle, which is linked with data collection and analysis. However, these actions should normally be part of existing impact assessments and cost-benefit analyses (CBAs), so the compliance costs are not expected to be high. Nevertheless, additional reporting by Member States would increase the administrative burden even if it would be part of other reporting obligations.

EE1st.3 would impose compliance checks, which could be burdensome unless accompanied with a regular revision of legislative activities, which tends to be relatively infrequent. Establishing a monitoring structure would have some compliance costs, which could be minimised if done by the existing energy regulatory authorities, which already undertake monitoring actions.

6.3.3.3.Coherence

All options would be coherent with other initiatives and objectives, as the application of the principle (even if mandatory) does not limit the possibilities of other objectives and actions not aiming at energy efficiency to be pursued. Strengthening of the EE1st principle would also support the objective of prioritising energy efficiency set in the Green Deal Communication.

6.3.3.4.Subsidiarity and proportionality

As a voluntary option, **EE1st.1** fully reflects the subsidiarity principle. **EE1st.2** imposes more obligations on Member States as regards the implementation of the EE1st principle, while **EE1st.3** goes even further, imposing compliance checks and requiring the establishment of a specific national monitoring structure.

While **EE1st.1** and **EE1st.2** could be considered proportionate in view of the expected benefits, **EE1st.3** would impose significant additional costs which may not be justified by the expected benefits in comparison with **EE1st.2**.

In summary:

Criteria		Comparison of options against the baseline			
		BAU	**EE1st.1**	**EE1st.2**	**EE1st.3**
Effectiveness	Strengthen incentives	0	+	++	+++
	Address barriers	0	+	+	++
	Understanding impacts	0	0	+	+
Administrative burden		0	0	-	--
Coherence		0	+	+	+
Subsidiarity and proportionality		0	+	-	--

6.3.4. Public sector buildings

6.3.4.1.Effectiveness

BAU continues the situation where the energy renovation obligation only applies to central government buildings and to the minimum energy performance levels described in Article 4 of the EPBD.

BUILD.1 would increase to some extent the rate and depth, and hence the effectiveness, of public building renovation at national level thanks to increased knowledge and capacity to act in this area. As such, it would also help in addressing certain market barriers and failures due to increased awareness.

BUILD.2a and 2b would address the issue of low renovation rates in the public sector. This would significantly increase the energy savings in the public sector[96] and contribute to faster decarbonisation of the public building stock which could reach decarbonisation earlier than in 2050 when the entire EU building stock is to be decarbonised. In addition, it would extend the market volume of renovations and attract capital, workforce and innovation to the renovation sector.

BUILD.2a would double the renovation rate for Member States or energy savings in public buildings. The extension of the scope to all public buildings under **BUILD.2b** would allow covering about four times more buildings. Extending the scope to both owned and occupied buildings (by public bodies) would further increase the extent of renovations and linked benefits to all regions and citizens, and would contribute to Green Deal's no-one-left-behind objective. While some municipalities and regions already have a strong internal drive for renovation, **BUILD.2b** would ensure that this is extended throughout the EU.

[96] According to the technical assistance study on assessing energy efficiency policies (Fraunhofer 2020), an extension of the obligation to all public buildings at the rate of 3% would allow reaching 2,6 Mtoe energy savings by 2030 compared to 0,6 Mtoe if targeting only central government buildings.

BUILD.3 would increase the renovation standards, and thereby the multiple benefits and energy savings, to the Near Zero Energy Building standard, which is the current cost effective standard. In some Member States this is the same standard as for the minimum requirement under Article 4 EPBD, in other Member States this standard is higher.

By deleting the alternative approach to renovations, **BUILD.4** would further drive renovations, which would result in durable measures with multiple benefits. It would also limit the risk of using only space optimisation to achieve energy savings in the public sector. With wider use of teleworking, instead of renovating, public authorities could have opted to give up a significant part of their administrative buildings. Member States will retain all the flexibility concerning choosing, which 3% of the public building stock will be renovated every year. This means that they can chose not to renovate up to 70% of the building stock over a period of 10 years.

6.3.4.2. Administrative burden and compliance costs

Feedback received from stakeholders, as part of the PC, suggests that the costs and benefits of implementing Article 5 are well balanced. Stakeholders also highlighted that the benefits arising from energy efficiency measures in public buildings include other benefits that are not always factored into cost-benefit analyses, e.g. improved indoor air quality, increased comfort, better lighting, etc.

As regards the cost effectiveness of the investments, the DEEP database[97] shows that the median avoidance costs (average cost in Eurocent for each kWh energy saved over the lifetime of the measure) of energy efficiency projects is 7.89 c/kWh (75% percentile is 12.24 c/kWh) in public buildings, 2.53 c/kWh (75% percentile is 8.05 c/kWh) in health care buildings and 2.77 c/kWh (75% percentile is 7.71 c/kWh) in educational buildings. In 2018, the price of electricity for industrial consumers was 11.49 c/kWh excluding taxes and levies[98]. As a consequence, when renovating, in most circumstances, investing into energy efficient measures pays off.

Doubling the renovation rate under **BUILD.2a** would double the overall costs of renovation. The usual buildings renovation cycle is 30 years, which corresponds to a 3% renovation rate, at which point general renovation costs are incurred anyway and the dedicated energy efficiency costs are only a part of the overall costs. When buildings are renovated predominantly for energy efficiency purposes, sooner than is usually required, a higher share of the renovation costs would be attributable to the energy performance improvement and the relevant energy efficiency measures would therefore trigger higher costs. In Member States, where there is a renovation back-log, a higher renovation rate than 3% would remain cost effective.

The extension of renovation obligation to 3% of all public buildings under **BUILD.2b** remains cost effective.

---

97 https://deep.eefig.eu/. In the DEEP database, public buildings, health care buildings and educational buildings best correspond to the public bodies' buildings among the 13 categories that those who fill in their projects can choose. The DEEP database includes a large number of building projects (7767), of which 239 are public buildings, 219 healthcare and 592 educational buildings.

98 European Commission, EU energy in figures, Statistical pocketbook 2019, p. 134.

Increasing the standard of the renovations to the Nearly Zero Energy Buildings standard under **BUILD.3** may increase the costs of renovation in some Member States, but remains cost effective as this is the new cost-effective standard.

Deleting the alternative approach under **BUILD.4** will increase the renovation costs of those Member States that were relying on other measures than renovations. Member States that were so far relying on low-cost optimisation of building use or behavioural measures to fulfil Article 5 obligations would incur additional renovation costs to achieve the required savings by renovations. However, these costs would remain proportionate to the expected benefits of the renovations.

6.3.4.3.Coherence

BUILD.2 and **BUILD.3** would strongly support the aim of the Renovation wave to double the overall renovation rate by 2030 thanks to the increased annual obligation rate and strengthening of other requirements. **BUILD.4** would go even further by deleting the alternative method, thereby forcing public bodies to undertake actual renovations.

6.3.4.4.Subsidiarity and proportionality

BUILD.1 and introducing the NZEB standard under **BUILD.3**do not have major impact on subsidiarity beyond the baseline. NZEB standards are defined based on common criteria by the Member States taking into account particular national circumstances. Some Member States have recently adjusted their NZEB standards to correspond to cost-optimal levels of renovations. Increasing the renovation rate under **BUILD.2a** and extending the scope under **BUILD.2b** are more prescriptive about what Member States should do to achieve additional savings from building renovation. In particular in Member States with small back-log of public buildings renovations, BUILD.2a may lead to higher costs of energy efficiency measures and limit the MSs capacity to invest into more cost-effective renovations. BUILD.2b would ensure that in the public sector as a whole a minimum of cost effective renovations takes place. It is proportionate to its aims of energy savings and multiple benefits, while keeping the specific costs of renovation low. **BUILD.4** goes even further as it removes the option of alternative measures and forces Member States to undertake actual renovations. In all options, as every year only a small portion of the public building stock shall be renovated, Member States and the sub-national administration retain the a significant flexibility to direct the renovations to specific levels of public administration or to specific sub-sectors, where the renovation will correspond best to the local circumstances.

In summary:

Criteria		**Comparison of options against the baseline**					
		BAU	**BUILD.1**	**BUILD.2a**	**BUILD.2b**	**BUILD.3**	**BUILD.4**
Effectiveness	Address barriers	0	+	++	++	++	+++
	Understanding impacts	0	0	0	0	0	0
Administrative Burden		0	+	-	-	0	0

Coherence	0	+	++	++	++	++
Subsidiarity and proportionality	0	0	-	-	0	--

6.3.5. Public procurement

6.3.5.1.Effectiveness

Under **BAU** the requirement to procure only products, services and buildings with high energy-efficiency performance only applies to central government.

The effectiveness of **PROCURE.1** would be limited by its reliance on guidance and the fact that it would be up to Member States to decide whether to make use of tools and best practices.

The extension of the procurement obligation to all public bodies under **PROCURE.2** would be more effective in spreading energy efficient procurement to all levels of government (e.g. regions, municipalities and other public bodies) and increase the value of energy efficient procurement by six times.

6.3.5.2.Administrative burden and compliance costs

The implementation of the EED as regards public procurement (Article 6) is based on the principle that, even if the initial purchase cost for energy efficient products, services and buildings may be higher, those extra costs usually are paid back over the lifetime of products, buildings or services, thanks to lower energy consumption during use. This principle also underpins the Ecodesign Directive and the Energy Labelling Regulation appliances covering appliances[99].

PROCURE.1 would induce small administrative costs in terms of providing additional guidance for public authorities in the area of public procurement. It would be more cost-efficient to do this at EU level, than if national or sub-national authorities would have to prepare their own guidance.

There would be additional costs in Member States for disseminating the guidance and training procurement experts. Existing monitoring and compliance mechanisms could be used with no additional costs. Some costs would result in the private sector for adapting existing processes to the new procurement requirements.

Under **PROCURE.2**, additional administrative costs may occur with those public bodies covered by the extended obligation (although many such organisations already practice ‘green’ procurement). In addition the option would entail an increase of initial investment, which would be offset by lower costs of use or balanced by multiple benefits of the procured buildings, services and products.

[99] https://ec.europa.eu/growth/industry/sustainability/product-policy-and-ecodesign_en

6.3.5.3.Coherence

PROCURE.1 would increase synergies with the existing green public procurement guidelines, thanks to better guidance on energy efficiency and lifetime costs of procured buildings, services and products.

PROCURE.2 would extend the scope of the requirements to all public bodies but would remain coherent with, and complementary to, the general Public Procurement Directive[100] (notably Articles 67 and 68), which sets the procedures for the award of public works contracts, public supply contracts and public service contracts above certain thresholds, and allows for including environmental considerations. Since the requirements will lead through energy savings to environmental benefits and public sector cost savings it can be considered to increase coherence with other objectives.

6.3.5.4.Subsidiarity and proportionality

PROCURE.1 would fully respect the subsidiarity and proportionality principles as it only focuses on increased guidance and support for Member States in applying relevant procurement practices.

PROCURE.2 would extend the energy efficient procurement obligation to all public bodies, but it would be proportionate with the requirements of the public procurement Directives. It is considered proportionate as it would push public procurement at all levels towards a focus on 'total cost of ownership' which ultimately benefits the public purse.

In summary:

Criteria		**Comparison of options against the baseline**		
		BAU	**PROCURE.1**	**PROCURE.2**
Effectiveness	Address barriers	0	+	++
	Understanding impacts	0	0	0
Administrative burden		0	0	-
Coherence		0	0	+
Subsidiarity and proportionality		0	0	-

6.3.6. Industry

6.3.6.1.Effectiveness

With **BAU** the difficulties of identifying companies required to carry out energy audits due to the non-SME definition would remain and the current low level of implementation of recommendations would not be expected to change.

[100] Directive 2004/18/EC of the European Parliament and of the Council of 31 March 2004 on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts

Under **IND.1**, a voluntary scheme for energy benchmarking would mirror an existing private sector initiative for oil refining. It would be important to gain sufficient interest and ensure that industry is ready to participate. The approach would need to be well designed and ensure confidentiality. This approach would be expected to increase interest in implementing energy efficiency measures since it would demonstrate the level of performance achievable in a particular sector. As such, its effectiveness would depend on uptake of the scheme.

IND.2 would ensure that efforts are focussed on larger energy users and should lead to proportionately higher energy savings. The obligation to implement energy management systems for the largest energy users is likely to already largely be followed. For those which are required to implement it there should be a larger take up of energy saving measures.

IND.3, while appearing to offer a route to ensure a greater take-up of energy saving measures, it would also run the risk of undermining the quality of energy audits. This is because energy auditors have a commercial relationship with the business being audited. This risk meant the measure was somewhat controversial in discussions with stakeholders.

6.3.6.2.Administrative burden and compliance costs

IND.1 would be voluntary and so a burden would only arise where businesses believe they will overall benefit. **IND.2** would result in a substantial reduction in burden for businesses with a lower energy use as well as simplifying the burden on public administrations, since they would have a simpler criterion to assess the need for audits as well as a smaller number of businesses to verify. The increased compliance costs for those businesses remaining under the scope of the provision would be expected to be paid back through increased uptake of cost-effective improvement measures. **IND.3** would require a mechanism to verify that recommendations were implemented, which would create a moderate additional burden.

6.3.6.3.Coherence

Encouraging further energy saving in industry is fully coherent with all measures in the ‘Fit for 55’ package and the European Green Deal. In particular, there are synergies with resource efficiency and circular economy policies since reductions in use of other resources often also lead to energy savings. The possible introduction of renewable energy aspects to the current requirements would also align with renewable energy policy. Therefore all options are considered to increase coherence with other policies.

6.3.6.4.Subsidiarity and proportionality

None of the options has a major impact on subsidiarity and are proportionate since they identify cost-effective energy savings. **IND.3** may be considered least proportionate as it would intervene in the business processes of companies, even though it would drive cost-effective energy savings.

In summary:

	Comparison of options against the baseline			
Criteria	**BAU**	**IND.1**	**IND.2**	**IND.3**

Effectiveness	Address barriers	0	+	++	++
	Understanding impacts	0	0	0	+
Administrative burden		0	0	+	-
Coherence		0	+	+	+
Subsidiarity and proportionality		0	0	0	-

6.3.7. Heating and cooling

6.3.7.1.Effectiveness

Under **BAU** the existing requirements for assessments and promotion of cogeneration and district heating would continue.

HEAT.1 would have limited value added compared to existing measures in the directive. It can help businesses in heating and cooling compare their performance with others. Benchmarking data are useful for regulatory authorities in the evaluations linked with tariff setting for district heating and cooling services. The data should be regularly updated and for heating and cooling, they could be useful at regional level for companies with similar features.

HEAT.2 would stimulate Member States, local governments and companies to identify and implement sectoral greening activities leading to decarbonisation of heating and cooling. Instruments proposed for EED focus on the planning of heating and cooling systems with an aim to encourage deployment of solutions leading to decrease of GHG emissions of heating and cooling.

Alternatives for fossil fuel based heating and cooling supply should be explored at all levels: at national level in Comprehensive Assessments, at the level of local governments in local heating and cooling plans and at the level of individual installations in Cost-Benefit Analyses. These planning instruments would need to be backed up with provisions on appropriate follow-up.

Continuous attention to decarbonisation would be particularly relevant for district heating and cooling to maintain its competitiveness and to meet expectations consumers have for contemporary energy services. Stricter criteria for high-efficiency cogeneration would facilitate better targeting of support measures for cogeneration that could make substantial contribution to decarbonisation of energy supply. For planned cogeneration installations, criteria should discourage the development of installations that do not contribute to long-term decarbonisation goals.

HEAT.3 would have direct implications of fuel mix used in heating and cooling. With this option, Member States would be forced to adopt phase out dates for combustion boilers when PEF goes below a certain threshold.

6.3.7.2.Administrative burden and compliance costs

HEAT.1 would be voluntary and any resulting administrative burden would only appear if businesses will join the initiative. For the public administration, the resulting workload would be large during the start-up phase of the initiative, later on it will be relatively small.

Compared to the baseline, **HEAT.2** would potentially cause significant additional administrative burden to affected local governments. For the Member States, tightened requirements for the Comprehensive Assessments trigger negligible administrative burden in planning phase, but depending on the outcome of the Comprehensive Assessments, the obligation to implement the measures could lead to new administrative burden and compliance costs. However, these measures could be tightly interlinked with an obligation arising from the Article 23(1) of the RED, which requires increasing the share of renewable energy in heating and cooling.

Administrative burden arising from **HEAT.3** is mostly dependent on the need to ensure compliance with the phase-out legislation. Compliance costs for the heating and cooling suppliers would be much higher than for the baseline.

6.3.7.3.Coherence

The measures planned for heating and cooling under **HEAT.2** are fully coherent with other measures in the 'Fit for 55' package. This is particularly the case for the link with the RED. The EED sets the framework for heating and cooling planning in terms of identifying the energy efficiency potential and requires the Members States to implement policies and measures to exploit this potential. These policies and measures directly support the achievement of the heating and cooling sector target under Article 23 of RED. For example, a revised definition of efficient district heating and cooling (Article 2(41) of the EED) would directly promote the deployment of renewable energy in district heating and cooling. Vice versa, these sub-targets would contribute to the achievement of the energy efficiency objectives of the EED.

However, the more stringent **HEAT.3** of phasing-out fossil fuel boilers is less coherent with the ecodesign Directive and energy labelling Regulation, and could lead to a fragmentation of the internal market.

6.3.7.4.Subsidiarity and proportionality

HEAT.1 has no impact on subsidiarity. The definitions established in the EED for district heating and cogeneration are important in terms of the granting of State aid. In view of this there is a clear need for EU level harmonisation. These definitions need to be made stricter in view of the overall decarbonisation trajectory under **HEAT.2**. As regards **HEAT.3**, this limits the freedom of Member States to choose the optimal mix of heating technologies given their national circumstance (e.g. in some countries it may still be more cost-effective to replace e.g. oil heating with gas condensing boilers). This risks not being proportional in certain Member States.

In summary:

Criteria		**Comparison of options against the baseline**			
		BAU	**HEAT.1**	**HEAT.2**	**HEAT.3**
Effectiveness	Address barriers	0	+	+	++
	Understanding impacts	0	+	++	0
Administrative burden		0	0	-	--
Coherence		0	+	+	--
Subsidiarity and proportionality		0	0	-	--

6.3.8. Energy transmission systems

6.3.8.1.Effectiveness

Under **BAU** problems will remain over unclear definitions preventing effective comparison of energy losses across networks.

NET.1 is useful and would steer the expected evolution of the electricity grid. The normal upgrading of the electricity grid will determine the improvement of its efficiency, as many old (sometimes very old) transformers will be replaced with new ones, which will be compliant with the Ecodesign Directive.

NET.2 is mainly based on the engagement of system operators; the adoption of uniform definitions and the reporting obligation for trade association will facilitate communication and exchange of good practices. A knowledge base will gradually develop, and could represent the foundation for subsequent actions, should they become necessary.

Under **NET.3** National Regulatory Authorities are able to play a stronger role, if they are given a strong and clear mandate. They master the granularity of the national energy system and have developed over time an advanced technical and administrative capacity. As the revenue of the system operators depends on the service tariffs, which are fixed by NRAs, these have a powerful and direct instrument to lead the operators towards higher efficiency.

6.3.8.2.Administrative burden and compliance costs

NET.1 is voluntary and so a burden will only arise where businesses believe they will overall benefit. **NET.2** will result in an additional burden for trade associations and system operators, which could be mitigated by an obligation to report every three or five years instead of each year. **NET.3** will require a significant effort from NRAs, who are generally well equipped for these tasks. A twinning system might be considered to help the smallest and weakest NRAs.

6.3.8.3.Coherence

System operators and NRA already effectively implement the principle of ‘cost efficiency’; enhancing the importance of that of ‘energy efficiency’ under **all three options** is coherent with all measures in the ‘Fit for 55’ package and the European Green Deal.

6.3.8.4.Subsidiarity and proportionality

Being voluntary, **NET.1** is not expected to have an impact on subsidiarity and proportionality. **NET.2** will have some impact as it would force a harmonisation of definitions. In particular **NET.3** intervenes more strongly in the national framework for grid management, but is still considered proportionate due to the strong impact it would have on grid efficiency.

In summary:

Criteria		Comparison of options against the baseline			
		BAU	**NET.1**	**NET.2**	**NET.3**
Effectiveness	Address barriers	0	+	+	++
	Understanding impacts	0	+	++	++
Administrative burden		0	+	0	-
Coherence		0	+	+	0
Subsidiarity and proportionality		0	0	-	--

6.3.9. Transport

6.3.9.1.Effectiveness

Under **BAU** the EED will have limited impact on energy use in transport.

TRANS.1 would increase the effectiveness by ensuring that specific attention is paid to energy consumption in the transport sector and that relevant measures to improve energy efficiency are taken in urban contexts. A requirement to set objectives and plan energy efficiency improvements will lead to additional energy savings in transport. It would also increase the information about the energy efficiency of local transport.

TRANS.2 would be the most effective because in addition it would lead relatively quickly to a ban of combustion engines and the deployment of more energy efficient solutions.

6.3.9.2.Administrative burden and compliance costs

TRANS.1 would impose additional requirements on local authorities, which could be burdensome in the absence of previous experience or lack of information on energy consumption in local transport, and there would be additional compliance costs.

TRANS.2 would also lead to additional compliance costs, because it would require the purchase of more expensive vehicles, at least in the short term. Moreover, it could be quite costly for manufacturers and component suppliers of combustion vehicles, because of the need to change their business model.

6.3.9.3.Coherence

TRANS.1 would create a set of requirements to support what is to be presented in the upcoming Urban Mobility Package. This risks an incoherent approach however, the aim of the measures is to support transport authorities address energy use.

TRANS.2, which includes a proposed ban on combustion engines, would risk overlap with existing (and to be revised) rules, including Euro 7, CO_2 emission standards and AFID. Moreover, leaving a phase out of combustion engines to individual Member State action may hamper the free movement of vehicles in the internal market. Therefore, this measure is considered less coherent with the other measures affecting the transport sector.

6.3.9.4.Subsidiarity and proportionality

Both options have a negative impact on subsidiarity as they oblige national and local governments to take action in an area largely under their control.

In summary:

Criteria		Comparison of options against the baseline		
		BAU	**TRANS.1**	**TRANS.2**
Effectiveness	Address barriers	0	+	++
	Understanding impacts	0	+	0
Administrative burden		0	--	--
Coherence		0	-	--
Subsidiarity and proportionality		0	-	-

6.3.10. Enabling and supporting measures

6.3.10.1. Effectiveness

Under **BAU** the EED enabling and supporting provisions would continue to have only a moderate impact.

SUPPORT.1 is useful and would mirror the existing framework. While guidance and further financing support could contribute to the implementation of the existing framework, the option would most likely not be effective without changes in the legislation given the numerous weakness identified in the evaluation.

SUPPORT.2 is aimed at ensuring that the necessary efforts are made by Member States to improve the framework for greater uptake of energy performance contracting thanks to the minimum quality requirements for energy services providers and regular assessments made of the certification and qualification schemes for energy services professions. This in turn would increase the trust to energy services providers and could provide a significant contribution to doubling the renovation rates by 2030. In addition, energy performance contracting is expected to fulfil the obligation for energy management systems for large non-residential buildings undergoing renovations. In addition, requirements to strengthen the role of intermediaries would help to overcome the market barriers to energy performance contracting and bring down the transaction costs. Reporting on energy efficiency investments would allow assessing the scale of energy efficiency investments in different sectors.

On consumer information and empowerment, **SUPPORT.2** is expected to reinforce access of consumers to information and technical help related to energy efficiency, which in turn will result in behavioural change, better uptake of energy-related renovations, and the ensuing leverage of private funds towards energy efficiency. By strengthening these provisions, two points that were prominent in the stakeholder consultation can also be tackled. The first point is the need to strengthen the existing measures in dealing with energy poverty, for example by targeting behavioural changes towards low or medium income households, by providing incentives to low- or medium income homeowners for energy efficiency renovations, or by removing barriers for raising capital for financing

energy efficiency measures for households facing energy poverty. The second point is to take advantage of the bottom-up, local level initiatives and activities (e.g. owners' cooperatives, energy communities, consumer associations, and local and regional authorities) in meeting the national targets.

SUPPORT.3 would be even more effective thanks to a higher ambition ensured through independent verification of energy performance projects to ensure the quality of the works performed. In addition, setting up project development assistance mechanisms at national, regional and local levels would increase the number of energy performance contracts and renovation projects blending public money with private funds.

6.3.10.2. Administrative burden and compliance costs

SUPPORT.1 would result in a short-term increase of administrative burden and costs as the different information campaigns, knowledge exchanges or support schemes would have to be set up. However, in the mid-term, these measures are expected to be cost effective, as they would have contributed to energy savings and several wider positive results like job creation, increased productivity and reduced healthcare costs. Indications for the cost effectiveness of energy efficiency can be found, among others in the IEA and the BPIE studies[101]. There would be no additional compliance costs.

SUPPORT.2 would result in some additional administrative burden for Member States, as they would need to invest in increased oversight and assessment of quality schemes and market actors. However, this is expected to be limited as it would be based on existing verification structures.

SUPPORT.3 would entail additional administrative burden as Member States would have to make more efforts to create incentives to stimulate further investments. This will however depend on the extent to which Member States already have existing measures in this area that they could build on.

6.3.10.3. Coherence

SUPPORT.2 and SUPPORT.3 are developed to address weaknesses in legislation and create stronger synergies with the EPBD, and contribute to implementing the Renovation Wave that stressed the need for greater uptake of energy performance contracting, boosting skills and facilitate access to financing.

The measures would also aim to improve and reinforce the provisions helping consumers, which face a wide selection of options pertinent to energy efficiency, renovation of buildings, introduction of renewables, new mobility solutions, etc., to take decisions and invest private capital in a way that is not only cost optimal but also can result in the best wider impact. In addition, increased coherence between EED and EPBD can help tackle more efficiently social challenges like energy poverty, development of the necessary skills in relevant professions, faster recovery from the current health crisis, etc.

[101] https://www.iea.org/reports/energy-efficiency-2020 and https://www.bpie.eu/publication/building-4-people-valorising-the-benefits-of-energy-renovation-investments-in-schools-offices-and-hospitals/

6.3.10.4. Subsidiarity and proportionality

SUPPORT.2, and to a larger extend **SUPPORT.3**, require more action by Member States to address the underlying drivers in these areas. This is considered proportionate as a higher uptake of energy efficiency investments is necessary for the higher targets to be met.

In summary:

Criteria		Comparison of options against the baseline			
		BAU	**SUPPORT.1**	**SUPPORT.2**	**SUPPORT.3**
Effectiveness	Barriers	0	+	++	++
	Understanding impacts	0	0	+	+
Administrative burden		0	-	-	-
Coherence		0	0	0	0
Subsidiarity and proportionality		0	0	0	0

6.3.11. Measuring and monitoring measures

6.3.11.1. Effectiveness

Under **BAU** there would continue to be limited understanding of what is driving the changes in energy use observed and how well the specific EED measures are working.

The implementation of **MONITOR.1** would not in itself lead to improved energy performance. The purpose of obtaining better data is to ensure that the measures put in place are delivering the savings envisaged. In this regard, they enable comparison between authorities and Member States and the sharing of good practice where this is identified. The growth in remote monitoring should make it increasingly easier to gather information on actual energy savings and so reinforce the knowledge of actual benefits of policies and programmes.

Clarifying and strengthening the existing provisions on monitoring and verification of energy savings under option **MONITOR.2** would ensure a more reliable achievement of the required energy savings obligation, and would increase the acceptance of policy measures since their effectiveness can be shown to market actors and citizens.

Adding further monitoring and reporting requirements under **MONITOR.3** would be even more effective, as it would result in a better understanding of the impacts of public procurement and energy performance contracting.

6.3.11.2. Administrative burden and compliance costs

MONITOR.1 would lead to some increase in costs due to the need to undertake studies and surveys**,** and in administrative burden due to the need to respond to requests for information.

MONITOR.2 would result in an increase in burden for businesses and public authorities. Some reporting requirements already exist and therefore these changes would only represent an enhancement of those requirements. Further digitalisation should help to reduce the administrative burden and costs.

MONITOR.3 would lead to a higher administrative burden due to additional requirements.

6.3.11.3. Coherence

Enhanced monitoring and reporting requirements are aimed at supporting improved implementation of the EED and increased energy savings. If the options achieve those objectives then they would be coherent with other EU objectives.

6.3.11.4. Subsidiarity and proportionality

MONITOR.2 would require additional monitoring and reporting by Member States. If this would lead to a better understanding of the impact of energy efficiency measures and hence increased savings, this would be proportionate (depending on the balance between increased cost and savings achieved).

MONITOR.3 requires more efforts by Member States compared to **MONITOR.2**, and while this would result in an even better understanding of impacts, proportionality is more difficult to establish.

In summary:

Criteria		**Comparison of options against the baseline**			
		BAU	**MONITOR.1**	**MONITOR.2**	**MONITOR.3**
Effectiveness	Address barriers	0	+	++	++
	Understanding impacts	0	+	++	+++
Administrative burden		0	0	-	--
Coherence		0	+	+	+
Subsidiarity and proportionality		0	0	0	-

7. HOW DO THE OPTIONS COMPARE?

As indicated in section 6.1, the outcome of the scenario analysis shows that both intermediate and higher ambition policy packages would allow the 36-37% target to be met. Section 6.3 therefore assessed the impacts of the individual policy measures against the better regulation criteria.

7.1. How do the policy options compare?

Table 15 summarises the outcome of the qualitative assessment in section 6.3:

Table 15: Overview of the assessment of policy options.

Objectives / Policy options	Effectiveness			Admin. burden	Coherence	Subsidiarity/ Proportionality
	Incentives	Barriers	Impacts			
TARGET.1	+	0	0	0	+	0
TARGET.2	+	+	0	-	+	-
TARGET.3	++	+	0	-	-	--
ESO.1	+	+	0	-	0	-
ESO.2	+	+	0	-	++	-
ESO.3	+	+	0	0	++	-
ESO.4	++	+	+	--	--	--
EE1ST.1	+	+	0	0	+	+
EE1ST.2	++	+	+	-	+	-
EE1ST.3	+++	++	+	--	+	--
BUILD.1	n.a.	+	0	+	+	0
BUILD.2a	n.a.	++	0	0	++	0
BUILD.2b	n.a.	++	0	0	++	+
BUILD.3	n.a.	++	0	0	++	-
BUILD.4	n.a.	+++	0	+	++	--
PROCURE.1	n.a.	+	0	0	0	0
PROCURE.2	n.a.	++	0	-	+	-
IND.1	n.a.	+	0	0	+	0
IND.2	n.a.	++	0	+	+	0
IND.3	n.a.	++	+	-	+	-
HEAT.1	n.a.	+	+	0	+	0
HEAT.2	n.a.	+	++	-	+	-
HEAT.3	n.a.	++	0	--	--	--
NET.1	n.a.	+	+	+	+	0
NET.2	n.a.	+	++	0	+	-
NET.3	n.a.	++	++	-	0	--
TRANS.1	n.a.	+	+	--	-	-
TRANS.2	n.a.	++	0	--	--	-
SUPPORT.1	n.a.	+	0	-	0	0
SUPPORT.2	n.a.	++	+	-	0	0
SUPPORT.3	n.a.	++	+	-	0	0
MONITOR.1	n.a.	+	+	0	+	0
MONITOR.2	n.a.	++	++	-	+	0
MONITOR.3	n.a.	++	+++	--	+	-

= non-regulatory = intermediate ambition = higher ambition = preferred option

Given that the policy options in the different 'intervention areas' of the EED have limited interaction with each other, there is no substantial benefit in comparing them. However, it is important to understand whether the effectiveness of the options within each

intervention area outweighs the additional burden and cost, and impacts on subsidiarity and proportionality. The following sections, therefore, discuss this for each of the policy options.

7.1.1. Targets

Making the EU level energy efficiency target binding (TARGET.1) would contribute to its achievement, if only by raising its political importance to the same level as the GHG and renewables targets. This has no direct administrative and compliance cost, and little or no impact on subsidiarity and proportionality.

Indicative national benchmarks (TARGET.2) would further increase the effectiveness of the energy efficiency targets by bringing clarity about the expected level of national efforts, and would still not significantly impact on subsidiarity, as the national benchmarks would not be binding. Additional administrative and compliance cost would also be limited.

Mandatory national targets (TARGET.3) would be most effective, but would have a more substantial impact on subsidiarity and would not be coherent with the approach taken for renewables. It would also entail a somewhat higher administrative burden.

7.1.2. Energy savings obligations

Imposing a sub-target for measures in the transport sector under Article 7 (ESO.1) would be an effective way to stimulate Member States to achieve more energy savings in this sector. It would be coherent with existing policies for the transport sector and proportionate, given the importance of reducing transport GHG emissions. At the same time, it would result in a moderate increase of administrative burden and somehow higher compliance costs. It would also have an impact on subsidiarity, as it limits to some extent the freedom of Member States to decide in which sectors they would achieve the necessary energy savings.

Requiring Member States to put in place measures to combat energy poverty under Article 7 (ESO.2) would contribute to making the energy transition just and inclusive. Similarly, ESO.1 would have some impact on subsidiarity, administrative burden and compliance cost. It is considered proportionate, also in view of the need to address distributional impacts from a possible extension of the ETS in particular to buildings.

Excluding the possibility for Member States to count energy savings from measures promoting the use of fossil fuels (ESO.3) would be an effective way to contribute to the energy efficiency target. It would be coherent with other EU policies and have no administrative burden or compliance costs. However, similar to ESO.1 and ESO.2, it would have some impact on subsidiarity.

While being potentially very effective, the implementation of an EU-wide white certificate scheme (ESO.4) would, however, create a high additional administrative burden and high compliance costs to implement an EU-wide white certificate scheme. It would also raise coherence questions with respect to the interaction with an extended ETS to buildings and transport. Furthermore, it would also cause problems for subsidiarity, as an EU-wide scheme would require Member States to align their calculation methods and monitoring requirements.

7.1.3. EE1st principle

Providing further guidance to Member States and economic actors on the application of the EE1st principle (EE1st.1) would effectively address the lack of clarity and details on the use of the principle in specific contexts and provide some tools for proper cost-benefit analysis. As a voluntary measure, it would have little impact on administrative burden, compliance cost and subsidiarity.

Obliging Member States to provide the right conditions for enabling the application of the principle **(**EE1st.2), would ensure that the principle is applied in decisions where it could have the biggest impacts. At the same time, the accompanying reporting requirements would increase the administrative burden and there would be additional compliance costs.

Imposing compliance checks and requiring a monitoring structure (EE1st3) would be the most effective, but would have a stronger impact on subsidiarity and would entail significant additional costs, which may not be justified by the expected benefits.

7.1.4. Public buildings

Providing further guidance and necessary tools to national authorities to guide Member States towards renovation and uptake of energy efficiency requirements in building procurement and management practices (BUILD.1) would increase to some extent the rate and depth, and hence the effectiveness, of public building renovation at national level. At the same time, it would not have a major impact on subsidiarity or administrative burden.

Increasing the overall ambition through an increased annual target (BUILD.2a) and through a wider scope (BUILD.2b) would significantly increase the long-term energy savings in the public sector and contribute to faster decarbonisation of the public building stock. It would also increase administrative burden and costs of renovation, and impacts on subsidiarity. While extending the scope to all public buildings BUILD.2b remains cost-effective, doubling the renovation rate would trigger higher costs per renovation in Member States, where there is not a corresponding back-log in renovations..

Strengthen other requirements to achieve the necessary energy savings (BUILD.3) would increase the minimum standard of the renovated buildings, while it would remain cost-effective.

Deleting the alternative method in Article 5 (BUILD.4) would go even further by removing the option for Member States to use alternative measures to achieve equivalent savings, thereby forcing public bodies to undertake actual renovations. This would also lead to increased energy savings and multiple benefits. As such, it would further limit the flexibility of Member States and, when combined with the higher renovation rate, it could be less proportionate in view of the different situation in Member States.

7.1.5. Public procurement

Providing more guidance and tools to national authorities and procurement officials (PROCURE.1) would be somewhat effective in further guiding Member States towards the uptake of energy efficiency, and broader resource efficiency, requirements in procurement practices. It would have limited additional administrative and compliance cost and fully respect the subsidiarity and proportionality principles.

Extending the procurement obligation to all public bodies (PROCURE.2) would be more effective in spreading energy efficient procurement to all levels of government (e.g. regions, municipalities and other public bodies). This would result in additional administrative burden, but this is considered proportionate in view of the expected lower costs of use and the multiple benefits of the procured buildings, services and products.

7.1.6. Industry

Promoting a voluntary scheme for energy benchmarking (IND.1) would be somewhat effective depending on its uptake. However, compliance costs would only accrue to participating companies and it would have no impact on subsidiarity.

Ensuring that audit efforts are focussed on larger energy users (IND.2) should lead to proportionately higher energy savings. It would result in a substantial reduction in burden for businesses with a lower energy use, as well as simplifying the burden on public administrations, since they would have a simpler criterion to assess the need for audits as well as a smaller number of businesses to verify. The increased compliance costs for those businesses remaining under the scope of the provision would be expected to be paid back through increased uptake of cost-effective improvement measures.

Requiring businesses to implement a certain number of audit recommendations (IND.3) would be most effective in terms or achieved energy savings. However, it would require a verification mechanism, which could create a moderate additional burden. Moreover, it could be considered less proportionate as it would intervene directly in the business decision processes of companies.

7.1.7. Heating and Cooling

Promoting a voluntary scheme for energy benchmarking (HEAT.1) would be somewhat effective depending on its uptake. However, compliance costs would only accrue to participating companies and it would have no impact on subsidiarity.

Further strengthening definitions and obligations, and extending them to local levels (HEAT.2), would be effective in addressing remaining barriers in the heating and cooling sector. However, it would potentially cause significant additional administrative burden, in particular at local level. While this has an impact on subsidiarity, it is considered proportionate to the additional savings that could be achieved in this sector.

Requiring Member States to phase out fossil fuel boilers (HEAT.3) would be very effective in driving energy savings and lowering GHG emissions. However, it limits the freedom of Member States to choose the optimal mix of heating technologies given their national circumstance which risks not being proportional in certain Member States. It would also be less coherent with products legislation, and could lead to a fragmentation of the internal market.

7.1.8. Energy networks

Promoting a voluntary scheme for energy benchmarking (NET.1) would be somewhat effective depending on its uptake. However, compliance costs would only accrue to participating companies and it would have no impact on subsidiarity.

Developing a common definition of energy losses and requiring reporting by system operators (NET.2) would be more effective as it would facilitate a common

understanding in the sector and the exchange of best practices. At the same time, it would result in an additional burden for trade associations and system operators, and have some impact on subsidiarity as it would force a harmonisation of definitions.

Requiring National Regulatory Authorities (NRAs) to monitor and incentive energy efficiency investments by system operators (NET.3) would be most effective in driving the sector to higher energy efficiency. However, it would require a significant effort from NRAs, and would intervene more strongly in the national framework for grid management. Nevertheless, it is still considered proportionate due to the strong impact it would have on grid efficiency.

7.1.9. Transport

Requiring Member States to require urban areas over 1 million inhabitants to establish an urban mobility plan covering transport energy efficiency (TRANS.1) would increase effectiveness by ensuring that specific attention is paid to energy consumption in the transport sector and that relevant measures to improve energy efficiency are taken in urban contexts. However, this would impose additional requirements on local authorities, which could be burdensome in the absence of previous experience or lack of information on energy consumption in local transport, and there would be additional compliance costs. It has to be noted, however, that some experience has been gained via the activities of the Covenant of Mayors.

Requiring Member States to set a date for the end of sales of new internal combustion engine cars (TRANS.2) would be effective because it would lead relatively quickly to a ban of combustion engines and the deployment of more energy efficient solutions. However, it would run the risk of overlap with existing (and to be revised) rules, including Euro 7, CO_2 emission standards and AFID, and may hamper the free movement of vehicles in the internal market. It could therefore be considered disproportionate.

7.1.10. Support measures

Providing further guidance and support in view of Member States' actions, e.g. on awareness raising (SUPPORT.1), is useful and would extend the existing approach. It would result in a short-term increase of administrative burden, as the different information campaigns, knowledge exchanges or support schemes would have to be set up, but this is expected to be cost-effective in the medium term due to increased energy savings.

Strengthening the requirements for energy services and qualification and certification schemes (SUPPORT.2) would improve the framework for greater uptake of energy performance contracting. It would result in some additional administrative burden for Member States, but this is expected to be limited. It would require more action by Member States but this is considered to be proportionate.

Stricter requirements for energy performance contracting, assessment of barriers and establishment of project development assistance mechanisms (SUPPORT.3) would be more effective in facilitating energy savings, but would entail additional administrative burden as Member States would have to make more efforts to create incentives to stimulate further investments. As such, it would have a stronger impact on subsidiarity.

7.1.11. Monitoring and reporting

Expanding the use of surveys, studies and other sources of analytical data (MONITOR.1) would not in itself lead to improved energy performance, but would allow a better assessment of the effectiveness of implemented measures. It would have limited additional administrative burden and impact on subsidiarity.

Strengthening the existing monitoring and reporting requirements regarding Article 7 and building renovations (MONITOR.2) would ensure a more reliable achievement of the different provisions, but would also result in higher administrative burden for businesses and public authorities. However, it would lead to a better understanding of the impact of energy efficiency measures and hence increased savings, and is therefore considered proportionate.

Requiring additional monitoring and reporting requirements on public procurement and energy performance contracting (MONITOR.3) would further improve the effectiveness but would further increase administrative burden. Whether this is proportionate depends on the balance between increased cost and savings achieved due to a better understanding of the impacts of relevant measures.

7.2. Conclusion

In view of this analysis, the options TARGET.2 (binding national targets), ESO.4 (EU wide white certificate scheme), BUILD.4 (deleting alternative method), IND.3 (require implementation of audit recommendations), HEAT.4 (banning fossil fuel boilers), NET.3 (stricter requirements on NRAs) and TRANS.2 (banning internal combustion engines) are considered too intrusive or burdensome to be proposed for the preferred option.

For SUPPORT.3 (stricter requirements for EPC, addressing barriers and PDA) and MONITOR.3 (additional monitoring and reporting), it is less clear whether the benefits outweigh the increased burden.

This analysis points to a preferred option consisting of a combination of policy measures as outlined in the next section.

8. PREFERRED OPTION

When proposing its updated 2030 greenhouse gas emissions reduction of at least 55%[102], the European Commission also described the actions across all sectors of the economy that would complement national efforts to achieve the increased ambition. A number of impact assessments have been prepared to support the envisaged revisions of key legislative instruments.

Against this background, this impact assessment has analysed the various options through which a revision of the EED could effectively and efficiently contribute to the delivery of the updated target as part of a wider “Fit for 55” policy package.

Methodological approach

[102] Communication on Stepping up Europe’s 2030 climate ambition - Com(2020)562

Drawing conclusions about preferred options from this analysis requires tackling two methodological issues.

First, as often the case in impact assessment analysis, ranking options may not be straightforward as it may not be possible to compare options through a single metric and no option may clearly dominate the others across relevant criteria. Ranking then requires an implicit weighting of the different criteria that can only be justifiably established at the political level. In such cases, an impact assessment should wean out as many inferior options as possible while transparently provide the information required for political decision- making. This is what this report does for the possible revision of the EED.

Secondly, the 'Fit for 55' package involves a high number of interlinked initiatives underpinned by individual impact assessments. Therefore, there is a need to ensure coherence between the preferred options of various impact assessments.

Policy interactions

Given the complex interdependence across policy tools and the interplay with the methodological issue outlined above, no simultaneous determination of a preferred policy package is thus possible. A sequential approach was therefore necessary.

First, the common economic assessment[103,104] underpinning the "Communication on Stepping up Europe's 2030 climate ambition" looked at the feasibility of achieving a higher climate target and provided insights into the efforts that individual sectors would have to make. It could not, however, discuss precise sectoral ambitions or detailed policy tools. Rather, it looked at a range of possible pathways/scenarios to explore the delivery of the increased climate ambition. It noted particular benefits in deploying a broad mix of policy instruments, including strengthened carbon pricing, increased regulatory policy ambition and the identification of the investments to step up the climate ambition.

An update of the pathway/scenario focusing on a combination of carbon pricing and medium intensification of regulatory measures in all sectors of the economy, while also reflecting the COVID-19 pandemic and the National Energy and Climate Plans, confirmed these findings.

Taking this pathway and the Communication on Stepping up Europe's 2030 climate ambition as central reference, individual impact assessments for all 'Fit for 55' initiatives were then developed with a view to provide the required evidence base for the final step of detailing an effective, efficient and coherent 'Fit for 55' package.

At the aggregate level, these impact assessments provide considerable reassurances about the policy indications adopted by the Commission in the Communication on Stepping up Europe's 2030 climate ambition. This concerns notably a stronger and more comprehensive role of carbon pricing, energy efficiency and renewable energy policies, and the instruments supporting sustainable mobility and transport. These would be complemented by a carbon border adjustment mechanism and phasing out free allowances. This would allow reducing, in a responsible manner, the risk of carbon leakage. It would also preserve the full scope of the Effort Sharing Regulation for achieving the increased climate target.

Various elements of the analyses also suggest that parts of the revenues of a strengthened and extended ETS should be used to counter any undesirable distributional impacts such

[103] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020SC0176
[104] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020SC0331

a package would entail (between and within Member States). While the best way to do this is still to be determined, this would seem a superior alternative to foregoing the relevant measures altogether or simply disregarding the uneven nature of their distributional impacts. Under both these alternatives, the eventual success of any package proposed would be at risk.

Preferred policy option

Preliminarily assuming this fact and the analysis above as the framework for the aggregate 'Fit for 55' package, the specific analysis carried out in this impact assessment comes to the following main conclusions as regards the key elements of the preferred policy option for the revision of the EED:

1) **EU energy efficiency target**

As already indicated in the CTP, the EU energy efficiency target should be increased in the range of 36-37% for 2030 for final energy to achieve the overall 55% GHG target for 2030. The target should be a binding target at EU level (TARGET.1).

2) **Benchmarks for national energy efficiency contributions**

To achieve the overall climate ambition in an optimal manner, it would be desirable for Member States to be guided towards the level of ambition needed to achieve the EU energy efficiency target in a fair manner. In view of this, the assessment points to indicative national benchmarks for Member States' contributions, based on a formula that takes into account a range of criteria related to Member States' national circumstances (TARGET.2)[105]. While in response to the PC, 36% of stakeholders favoured indicative national targets and 47% favoured binding national targets, indicative benchmarks are more aligned with the subsidiarity principle.

Combining a binding EU-level energy efficiency target with national indicative contributions would be fully coherent with the other climate and energy targets, and is in line with the approach followed in REDII and the Governance Regulation.

3) **Energy savings obligations (Article 7)**

The level of annual energy savings would be increased to approximately 1.5% per year in line with the outcomes of the CTP IA.

Moreover, Member States would be required achieve a certain amount of savings in the transport sector (ESO.1) and amongst energy poor households (ESO.2), and would no longer be able to count energy savings from measures promoting the use of fossil fuels (ESO.3). These measures were supported by around 60% of the PC respondents.

4) **Other elements of the preferred option**

The other elements of the preferred option would aim at providing further incentives to increase Member States' ambition and efforts, to address remaining barriers and to improve the understanding of the EED's impact. This would cover:

[105] The Commission is currently developing such a formula in line with what is in place for the REDII.

a) **Energy Efficiency First:** Further guidance on the application of the EE1st principle (EE1st.1) and a new article (building upon the Governance Regulation), with an obligation for Member States to ensure its application, while minimising administrative burden (EE1st.2). This was supported by around half of the PC respondents.

b) **Exemplary role of the public sector:** Further guidance for authorities in support of building renovation (BUILD.1). Expanded scope for renovations to cover all public buildings, while maintaining the same renovation rate of 3% (BUILD.2b), improved monitoring and undated renovation standards to nearly zero energy buildings (BUILD.3) and the removal of alternative measures (BUILD.4).

   Further guidance to authorities, including on circularity and GPP aspects (PROCURE.1). Extend public procurement provisions to all public administration levels (PROCURE.2).

   A large majority of stakeholders, including public authorities, supported the strengthening of the requirements for public buildings renovation and procurement.

c) **Industry:** Focus energy audits on larger energy users and require energy management systems for largest users (IND.1 and IND.2).

d) **Heating and cooling**: Benchmarking (HEAT.1), improved definitions and strengthened obligations for cost-benefit analysis and local cooling and heating planning (HEAT.2).

e) **Energy networks:** Benchmarking (NET.1), enhanced definition of losses and reporting (NET.2).

f) **Transport**: Include energy efficiency elements in line with the EE1st principle and the Sustainable and Smart Mobility Strategy, including, for example, in urban mobility policy planning (TRANS.1).

g) **Support measures:** Strengthening provisions on skills, energy services and financing mechanisms, consumer empowerment, addressing split incentives and the alleviation of energy poverty (SUPPORT.1; SUPPORT.2; and possibly SUPPORT.3).

h) **Monitoring and reporting**: Reinforcement of requirements (MONITOR.1; MONITOR.2 and possibly MONITOR.3), building on the integrated approach under the Governance Regulation.

The above elements would strengthen the EED and help ensure that, also with the support of the EPBD (to be revised by the end of 2021) and other parts of EU policies and measures, it continues to ensure that energy efficiency makes the necessary contribution towards a more ambitious GHG target, as defined in the CTP. Because of this, it would also be complementary to, and fully consistent with, the strengthening of other legislative initiatives that contribute to the same objective, in particular the RED II, the ETS, and the forthcoming revision of the EPBD.

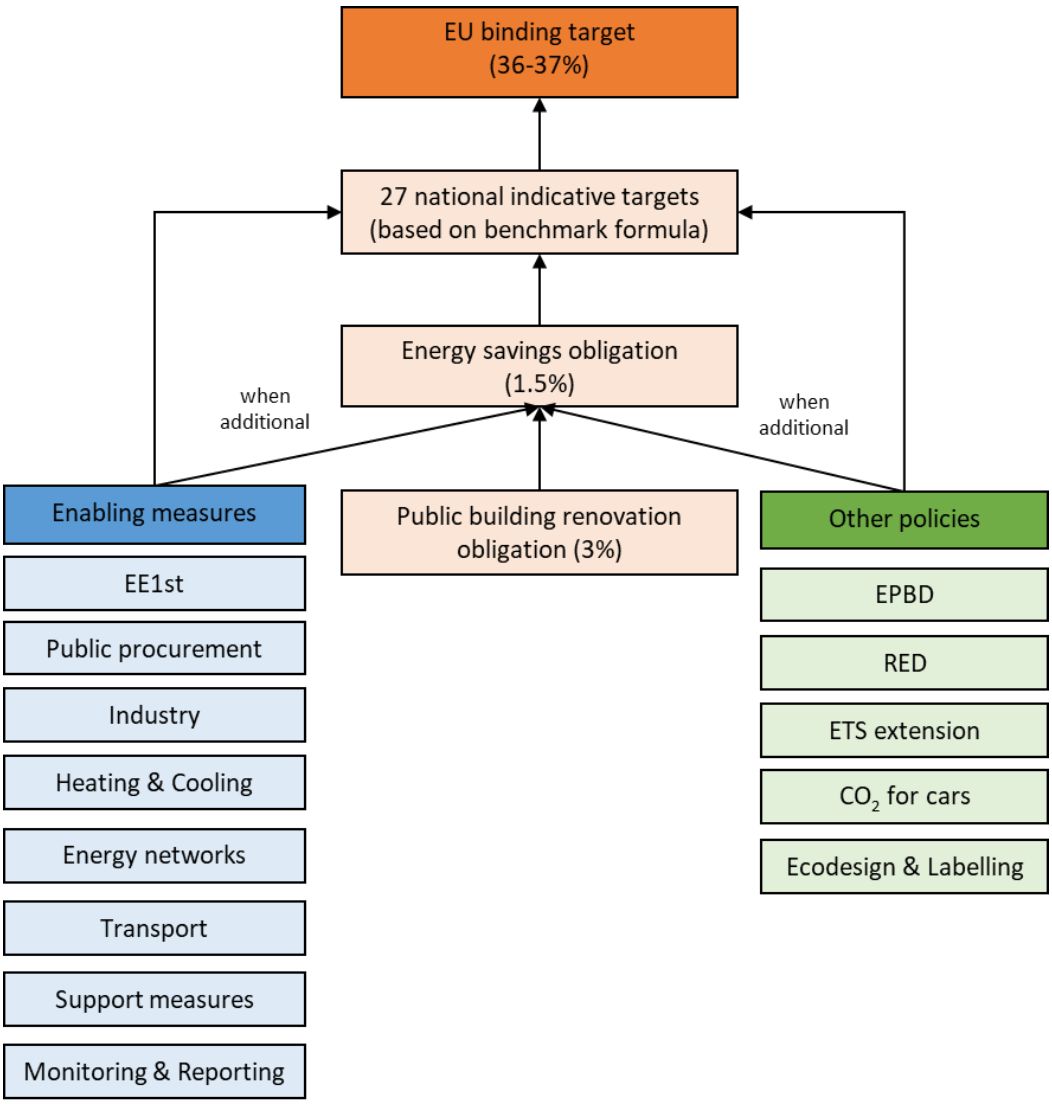
Administrative burden of the preferred policy option

The administrative burden arising from information requirements of the individual measures of the preferred policy option is estimated in **Error! Reference source not found.**. The results show that, overall, there would be an estimated net increase in administrative burden of €5.5 million per year. The burden on the private sector is increased by €0.3 million per year, and there is an increase in the burden for the public sector of €5.2 million per year.

Internal coherence of the measures within the preferred policy option

The preferred policy option is based on a clear hierarchy of measures, with the binding EU level target on top, supported by the indicative national benchmarks that would add up to the EU target, and all other measures contributing to its achievement. Figure 21 provides an overview of these interlinkages.

Figure 21 Interlinkages between elements of the EED and other instruments



The Member States' obligation to achieve 1.5% annual energy savings would constitute an important contribution to reaching their national indicative benchmark. While this obligation is estimated to deliver around 50% of the overall EU target, this will differ per Member State, depending amongst others on their indicative benchmark and the robustness of national energy savings measures.

As regards the EE1st principle, the preferred option aims to stimulate its implementation but the nature of the principle, which is to ensure that energy efficiency measures are properly taken into account during decision making, does not guarantee that energy savings will be achieved, for example when such measures are not cost-effective.

It is important to underline that the public building renovation target of 3% contributes fully to the 1.5% energy savings obligation. At the same time, other measures that Member States can take in the public sector such as on street lighting, water management or public transport, also contribute where they are additional to EU level standards (as per the Article 7 provisions).

Finally, the preferred option leaves a large amount of flexibility to the Member States how to fulfil the proposed binding targets i.e. for annual energy savings and the building renovation rate. For the former, the only requirement is to achieve a limited amount of savings in the transport sector and among energy poor households, while for the latter Member States can freely choose which buildings to renovate.

Investments underpinning the preferred policy option

Increased GHG ambition entails significant investments in energy efficiency and renewable energy. Against this background, the preferred policy option aims at facilitating energy efficiency investments, reducing their perceived risks, increasing the effectiveness in the use of public funding and helping mobilise private financial resources[106], in line with the priorities identified in the European Semester, National Energy and Climate Change Plans (NECPs), and Just Transition and Recovery Plans.

Ensuring coherence in the finalisation of the package

The final step of the sequential approach outlined above for the coherent design of the 'Fit for 55' proposals will be carried out on the basis of the analysis of this and the other impact assessment reports. The choices left open for policy-makers will be taken, measures fine-tuned and calibrated, and overall coherence ensured. Until that stage, all indications of preferred measures are to be considered preliminary as preserving overall effectiveness, efficiency and coherence may require adjustments as the final package takes shape.

Overall coherence was already established by the Climate Target Plan, which clearly showed that action in all policy areas under the 'Fit for 55' package is necessary to achieve the 2030 targets. Therefore, stronger energy efficiency measures are crucial to reach results, to increase Member States' ambition, to address the identified weaknesses in the current framework and to mitigate the possible undesirable effects of other policy initiatives.

In particular, a possible extension of the ETS to the buildings and transport sectors, and the resulting increase in energy prices may have social impacts, especially on low-income households. Support measures to promote energy efficiency, such as the strengthening of Article 7 by obliging Member States to address vulnerable, energy poor,

[106] This will be achieved mainly through non-regulatory measures (see, for example, the section on *'Attracting private investment and stimulating green loan financing'* in the Renovation Wave strategy for a more elaborate discussion) and strengthening of the provisions on financing, energy services, qualification and certification, and audits.

or low-income households, will help to alleviate this. In fact, strong energy efficiency measures would be necessary to avoid excessive distributional effects due to the ETS extension.

At the same time, such an extension could affect the effectiveness of the EED, notably as regards Article 7, which is expected to deliver around 50% of the total savings estimated to come from the EED. To enable effective synergies of such an extended ETS with the EED, it should be ensured that Member States may only count the energy savings under Article 7 from energy efficiency measures (which are measured and verified), and not from the reduced energy use as a result of a carbon price. This would be in line with the additionality requirement[107], and be consistent with the preferred options under the ETS and for CO_2 vehicle standards.

While an extended ETS could enhance additional energy savings, carbon pricing alone cannot resolve the well-known barriers to the take up of energy efficiency measures in these sectors. In view of this, the energy saving measures, such as those promoted under Article 5 or Article 7 (i.e. through energy efficiency obligation schemes or alternative policy measures), and under the EPBD will remain vital to ensure that cost-effective energy efficiency measures are implemented at end-user level.

The interaction between the approach to energy efficiency and renewables shows broad coherence, reflecting the fact that stronger efforts on energy efficiency are necessary for a cost effective deployment of renewable energy in view of meeting both energy and climate targets. This is particularly the case for heating and cooling planning, whereby the EED sets the framework for identifying the energy efficiency and renewable energy potential, and requires the Members States to implement policies and measures to exploit this potential. These policies and measures directly support the achievement of the heating and cooling sector target under the RED.

The further inclusion of transport measures under Article 7 would stimulate Member States to take further action on transport. As such, there would not be a regulatory overlap but rather synergies with the measures of the Sustainable and Smart Mobility Strategy, as the EED would establish an obligation while leaving it to Member States what measures they would like to use for achieving the reduction in energy use in transport.

Finally, the Commission has started the review of the EPBD with a view to come forward with a proposal towards the end of 2021. While at this point in time it is not possible to prejudge the outcome of that review, the preferred option respects the specific role of the EPBD in setting cost-optimal energy performance requirements, while strengthening the EED provisions pertaining to buildings (Article 5), in particular for public procurement (Article 6), provides the necessary horizontal framework for action.

[107] Member States must fulfil the additionality requirement as set out in Annex V(2) EED. Energy savings need to be additional to those that would have occurred in any event without the activity of the obligated, participating or entrusted parties. To determine the savings that can be claimed as additional, Member States have to show how energy use and demand would evolve in the absence of the policy measure in question by taking into account energy consumption trends, changes in consumer behaviour, technological progress and changes caused by other measures implemented at EU and national level.

A complementary document to the full set of individual impact assessments looking at the effectiveness, efficiency and coherence of the final package will accompany the "Fit for 55" proposal.

9. HOW WILL ACTUAL IMPACTS BE MONITORED AND EVALUATED?

Monitoring and evaluation of progress towards the policy objectives can be done using monitoring tools under existing instruments or existing Eurostat data, and through other means, including the Governance Regulation (see also section 1.4).

The mechanism embedded in the Governance Regulation is based on the integrated National Energy and Climate Plans, covering ten-year periods starting from 2021 to 2030, regular progress reports by the Member States and integrated monitoring arrangements by the Commission. This will allow the Commission to assess the progress made at Union level towards meeting the objectives of the Energy Union, in particular as regards the 2030 targets for renewable energy and energy efficiency. Member States also have the obligation to report on their progress towards alleviating energy poverty.

Regarding the specific policy objectives, it is expected that monitoring will take place as follows:

Table 16 Monitoring of objectives

Objectives	**Monitoring tools**
Objective 1: Increase effort by Member States to achieve a 36-37% energy efficiency target **Key indicators:** FEC; PEC; number of public buildings renovated annually (i.e. rate of renovation); energy savings achieved due to public building renovation (i.e. depth of renovation); annual energy savings under article 7; contribution of energy efficiency measures to alleviation of energy poverty;	Member States' biennial reports in accordance with the Governance Regulation. From that information it is possible to infer progress towards the overall EU energy efficiency target. This also includes information on: - Cumulative amount of energy savings achieved over the period 2021-2030 under Article 7 (energy saving obligations); - Total floor area renovated under Article 5 (public buildings); - Measures to utilise energy efficiency potentials of gas and electricity infrastructure (EE 1st). ESTAT collects annual energy consumption data per Member State and key economic sectors. EU Building Stock Observatory[108] EU Energy Poverty Observatory[109]
Objective 2: Reinforce the EED to better address market barriers and failures. **Key indicators:** Increase of the use, and size, of	Governance regulation, under which Member States have the obligation to report on: - Market-based instruments that incentivise energy efficiency improvements, including but not limited to energy taxes, levies and allowances; - Policy and measures to promote energy services in the public sector;

[108] https://ec.europa.eu/energy/topics/energy-efficiency/energy-efficient-buildings/eu-bso_en
[109] https://www.energypoverty.eu/

energy performance contracts in the public sector; Level and impact of investments in energy efficiency measures; Savings achieved through energy audits;	- Measures to remove regulatory and non-regulatory barriers that impede the uptake of energy performance contracting and other energy efficiency service models; - The use of Union funds, in the area of energy efficiency at national level. The Commission will undertake regular studies on the impact of specific articles of the EED, for example as regards Article 7 on energy savings obligations or Article 8 on energy audits. The JRC undertakes regular assessments of market developments in key areas such as energy services companies and financing measures[110]. Investments in energy efficiency under EU financial programmes, including InvestEU, NextGenerationEU, European Strategic Investment Funds, EIB facilities, ELENA technical assistance facility. DEEP database[111] Odyssee/Mure database[112]
Objective 3: Improve understanding of impacts of energy efficiency measures taken by Member States **Key indicators:** see above-mentioned indicators; impacts of public procurement on energy savings.	Monitoring tools indicated above. Policy Assessment Tool[113], EED Concerted Action[114]

[110] See for example: https://ec.europa.eu/jrc/en/energy-efficiency/eed-support
[111] https://deep.eefig.eu/
[112] https://www.odyssee-mure.eu/
[113] (Draft) Technical assistance study to develop a tool for assessing energy efficiency policies and measures; Fraunhofer, 2020
[114] https://www.ca-eed.eu/Homepage

EUROPEAN
COMMISSION

Brussels, 14.7.2021
SWD(2021) 623 final

PART 2/2

COMMISSION STAFF WORKING DOCUMENT

IMPACT ASSESSMENT REPORT

Accompanying the

Proposal for a Directive of the European Parliament and of the Council

on energy efficiency (recast)

{COM(2021) 558 final} - {SEC(2021) 558 final} - {SWD(2021) 624 final} - {SWD(2021) 625 final} - {SWD(2021) 626 final} - {SWD(2021) 627 final}

Annex A Procedural information

Lead DG, Decide Planning/CWP references

DG ENER, PLAN/2020/6834, Commission work programme 2021 (COM(2020) 690 final) Annex I. 1.e.

Organisation and timing

The review of the EED was announced in the European Green Deal Communication in December 2019.

An Inter Service Steering Group was established which involved the following DGs: SG, AGRI, BUDG, CLIMA, COMP, CNECT, EASME, ECFIN, ENV, ESTAT, FISMA, GROW, JRC, JUST, LS, MOVE, REGIO, RTD, TAXUD, TRADE.

Five meetings were held, which took place on 17 June 2020, 7 October 2020, 10 December 2020, 19 February 2021 and 2 March 2021.

Consultation of the RSB

A meeting with the RSB took place on 14 April 2021.

On 19 April 2021, the RSB issued a negative opinion. An improved Impact Assessment has been submitted on 29 April, fully addressing the recommendations provided by the Board in its first opinion. Table 1 shows the RSB recommendations and the changes made to respond to them.

Table 1: How RSB recommendations of 19 April 2021 have been addressed

RSB recommendation	How the IA report has been amended
(1) The report should clearly define the scope of the initiative. It should specify how it aligns with the greenhouse gas reduction targets of the Climate Law, and how it follows or differs from the CTP modelling scenarios. On this basis, the report should make clear what are the open policy choices that this impact assessment aims to inform. The report should explain how the other 'Fit for 55' initiatives may affect the scope, choices or impacts of this initiative.	As a result of the Board's important recommendation, **Section 1.5** on the revision of the EED as part of the 'Fit for 55' package has been enhanced to make clear that the overall target (and consequently the level of the obligations, including Article 7) is taken from the CTP modelling. Moreover, the contribution to the 55% GHG target and the link with the CTP IA has been clarified still in **section 1.5**, but also in sections **5.1** on what the baseline from which options are assessed is, **5.3** from options to scenarios that build on the Climate Target Plan, **6.1** on how the assessment is carried out, **6.2** on the summary of quantitative results and in a new **Annex D** on key findings of CTP and how they are fine-tuned in the "Fit for 55" IAs. The report now explains that the open policy choices mainly relate to the package of measures necessary for energy efficiency to contribute optimally to the

	achievement of the 55% GHG reduction target. The possible effect of other 'Fit for 55' initiatives has been further elaborated in sections **1.3** on the role of the EED and interlinkages with key related legislation, **1.5** on the revision of the EED as part of the 'Fit for 55' package and **8** on the preferred option, in particular as regards the interaction with an extended ETS for buildings and transport.
(2) The report should better explain the framework character of the EED and provide a clearer picture (especially in the options description) of where it supports separate pieces of (EU and national) sectoral legislation and how, and where it adds additional elements.	Section 1.3 on the role of the EED and interlinkages with key related legislation has been modified to address the comment made by the Board to better explain the role of the EED in view of other policy instruments, with further details provided in **Annex F** on the main elements of the EED, **Annex J** on the energy saving obligation and **Annex M** on the interaction with other policy areas and legislation. Following the recommendation of the Board and in light of the under-developed elements in the in the first submission, the Impact Assessment now clarifies that the EED aims to enhance energy efficiency by using various mechanisms, through the action of the Member States, to deliver increased energy savings and energy efficiency above what would be achieved through minimum performance standards and pricing measures alone.
(3) The intervention logic of the initiative needs significant improvement.	The intervention logic has been significantly improved by restructuring the problem definition and underlying drivers, updating and simplifying the objectives and better linking it with the policy options (sections **2** on the problem definition, **4** on the objectives and **5** on what the available policy options are). **Section 2** now explains in a detailed way that, if no action is taken, a large share of energy efficiency and energy saving potential would remain unexploited, largely due to market and regulatory failures, which prevent cost-effective energy efficiency investments and actions from taking place. As a result, unless higher levels of energy efficiency are achieved, GHG emissions would be higher for a given unit of output, important co-benefits would not be realised[1] and the EU would not meet its 55% GHG emission reduction target in a cost-effective manner as shown by the CTP IA. **Section 4** has been modified to clarify what the general objective of this initiative is, namely the need to revise the EED to further promote energy efficiency and energy savings to contribute optimally to the cost-effective achievement of the EU 55% GHG reduction ambition for 2030, by achieving a 36-37% energy efficiency target as shown in the Climate Target Plan. Moreover, it also streamlines the specific objectives, which are currently

[1] For example monetary savings, better societal acceptance, more effective use of resources, improved health, reduced energy poverty, etc. See also www.combi-project.eu

	three. **Section 5** has been substantially revised and restructured to address better and in a clearer way the problems and drivers outlined in **section 2**, with the aim to further substantiate the need to improve the EED across many areas. The broad set of potential measures identified based on the evaluation outcomes, the assessment of the final NECPs, the support study, and the results of stakeholder meetings and the open public consultation, have been further developed and better described.
(4) The report should clarify the precise content of the considered options. It should better link the measures listed under particular options to the identified problems. The various proposed choices, for example for target levels, should be better justified on the basis of modelling, expert opinions, stakeholder suggestions or any available evidence underpinning the feasibility of the proposals and ambition levels.	**Section 5.2** on the description of the policy options has been completely rewritten to address the Board's concerns and to strengthen the link to the problem definition, taking better account of available evidence, the evaluation, workshops and public consultation responses. The description of the policy measures has been expanded, e.g. to justify the levels chosen, and some more detailed policy measures have been deleted.
(5) On the basis of better defined options, the report should improve substantially the qualitative or quantitative assessment of the considered individual measures and better link these to the high-level results of the modelling. This should also help to identify the more critical measures from the less important ones.	**Section 6** on the impacts of scenarios and policy options, and in particular **section 6.3** on the assessment of policy options, has been substantially modified in particular to improve the assessment and to identify the more important options from less important ones. Based on this, **section 7** on how the options compare has been substantially changed to improve the comparison of policy options.
(6) Options regulating heating and cooling, should be better justified from a subsidiarity and proportionality perspective. As most actions in this area are to be conducted locally, with little or no spill-over effects, the report should clarify the value added of harmonisation at EU level, especially when going beyond setting overall targets but also imposing specific measures.	The description of the heating and cooling options has been greatly expanded and the underlying reasons for addressing this sector has been more detailed in **section 5.2** on the description of policy options. The assessment of these options in **section 6.3.7** on the assessment of heating and cooling has been modified to better reflect subsidiarity and proportionality impacts.
(7) Given that one of the objectives of the initiative relates to energy poverty, the report should strengthen the impact analysis of the proposed measures in this respect. It should reflect diverse levels of	To address the Board's important recommendation, energy poverty has been addressed as part of the possible policy options under Article 7 in **section 5.2** on the description of policy options, providing evidence for the link between energy efficiency (and the EED) and energy poverty (**Annex L** specifically on the impacts of energy

income and energy prices across Member States. While measures to eliminate energy poverty are by virtue of subsidiarity in the hands of Member States, the report should clearly present the impacts of increased energy efficiency targets on energy poverty levels.	poverty) and assessment of the proposed measures (**section 6.3**). An important basis for actions at EU level is the fact that 61% of respondents in the Public Consultation voiced to a high degree of importance the request for a specific share of EU measures to address energy poverty.
(8) The report should better reflect the views of different stakeholder groups, including dissenting and minority views throughout the report, including on the problem definition, construction of options and the choice of the preferred option(s).	Views of stakeholder have been better reflected in the problem definition, policy options and assessment of options. This has been done throughout **sections 2** on the problem definition, **5.2** on the description of policy options, **6.3** on the assessment of policy options, **7** on how the options compare and **8** on the preferred option.
(9) The report should improve the presentation of the estimated costs and benefits of the preferred option(s) and include a more comprehensive overview in Annex 3. As far as possible, the report should quantify the expected increase in administrative burden.	The report has been up-dated to include further quantification of impacts and cater for the recommendation of the Board suggesting that an improved presentation is needed. This is why efforts have been made to increase and improve the qualitative assessment of the various measures. As regards the administrative burden, the comments have been addressed based on the available data, which allowed for a qualitative rather than a quantitative assessment.
(10) The methodological section (in the annex), including methods, key assumptions, and baseline, should be harmonised as much as possible across all 'Fit for 55' initiatives. Key methodological elements and assumptions should be included concisely in the main report under the baseline section and the introduction to the options. The report should refer explicitly to uncertainties linked to the modelling. Where relevant, the methodological presentation should be adapted to this specific initiative.	**Sections 5.1** on the baseline from which options are assessed and **6.2** on the summary of quantitative results have been revised to improve how the key methodological elements and assumptions are addressed. A harmonised **Annex D** on key findings of CTP and how they are fine-tuned in the "Fit for 55" IAs has been added also to this report, as well as to the other IAs part of the package.

On 28 May 2021, the RSB issued a positive opinion with reservations on the resubmitted Impact Assessment. The recommendations provided by the Board have been fully addressed in the current Impact Asssessment. Table 2 shows the RSB recommendations and the changes made to respond to them.

Table 2 How RSB recommendations of 28 May 2021 have been addressed

RSB recommendation	**How the IA report has been amended**

(1) The report does not sufficiently justify the need for specific sectoral energy savings obligations. Their added-value to the global savings obligation and other Fit for 55 initiatives is unclear.	For both transport and vulnerable consumers, extra text has been added to point 2 of **section 5.2** describing why specific sectoral action is desirable and reasonable. This also provides explanation of why this provides added value and discusses the possible level.
(2) The report does not sufficiently justify the introduction of further measures at the EU level for heating and cooling.	Clarifications have been made to the text in **section 5.2** describing the options, in particular HEAT.2, to provide greater clarity on the measures. The text assessing subsidiarity of the options in **section 6.3.7.4** has been expanded and strengthened.
(3) The report does not provide clear evidence of the need for and added-value of the transport options. It is unclear how mandatory mobility planning for certain urban areas would be in line with the subsidiarity principle.	**Part 9** of **section 5.2** has been further elaborated to provide a more detailed explanation of the merits of the measure and the energy saving potential.
(4) The choice and feasibility of the preferred options for buildings needs further clarification. The subsidiarity assessment of the two public procurement options is deficient.	Text has been added to **point 4** of **section 5.2** to better explain the minimum EPBD requirements and clarify that the NZEB standards is already de-facto the standard for renovations and is achievable The scoring for PROCURE.2 has been reassessed. This led to an increase in the coherence score and a decrease in the sustainability and proportionality score.
(5) The interplay between the measures included in the preferred options is unclear. Administrative burdens, compliance costs and circular economy impacts remain insufficiently assessed.	A new **Annex N** has been inserted which contains a thorough assessment of the possible change in net administrative burden as a result of the simplification of certain elements and the additional impacts of other elements for all measures of the preferred option. This is based upon the Better Regulation assessment tool. Extra text has been included in **section 8** describing the measures of the preferred option and how they work as a package. This also explains the interplay with the EE1st principle and the flexibility available to Member States when choosing how to achieve the overall target. Extra text has been included in **Annex M** explaining the interactions between Energy Efficiency measures and the circular economy and illustrating how accelerating energy saving replacement may impact this.
General	Stakeholder views have been better disaggregated on the basis of 4 categories (public authorities, business, civil society and citizens) for a number of key public consultation questions. The baseline has been reintroduced to each element of **section 5.2** and **6.3** as well as in all the tables of **section 6.3**.

Evidence, sources and quality

The aim of this Impact Assessment is to support a legislative proposal amending the EED to address any remaining ambition gap to the EU energy efficiency target of 32.5% for 2030 and in view of a higher climate ambition for 2030, which would require more efforts in energy efficiency.

It builds on the impact assessment carried out for the comprehensive plan to increase the EU 2030 climate target to at least 50% and towards 55% in a responsible way. That impact assessment indicated how climate and energy policies would interact to achieve an increased greenhouse gas emissions reduction target. It provided information on a coherent set of changes required for the existing 2030 climate and energy framework - the ETS Directive, the Effort Sharing Regulation and the Land Use, Land Use Change and Forestry Regulation, the Renewable Energy Directive and the Energy Efficiency Directive.

In addition, findings of the evaluation of the EED have helped to identify the measures needed to address the objectives.

Other central sources are the Member States' NECPs and the Commission's assessment, the 2020 Progress Report and the work of the Task Force on Mobilising Efforts to Reach the EU Energy Efficiency Targets for 2020. Reports from the Joint Research Centre have also been of importance.

A large amount of external expertise has fed into the preparation of this impact assessment. A specific expert group meeting was held in November 2019 at which outlain ideas of the available options were presented and expert's opinions invited.

Many dedicated reports have been produced assessing specific aspects of the legislation and its effects. Some key ones are referenced in this document and a wider set are referenced in the support study carried out in its preparation. Other relevant reports and research is cited.

That support study provided the bulk of the evidence used to support the identification and choice of measures, their organisation into options packages and assessing their likely impacts.

Annex B Stakeholder consultation

1. Synthesis of consultation activities

This Annex provides a synopsis of the stakeholder consultation carried out as part of the back-to-back ex-post evaluation and impact assessment of the Energy Efficiency Directive (EED).

2. Consultation strategy and objectives

The stakeholder consultation followed the strategy, objectives and steps laid out in the **consultation strategy** for the review and revision of the Energy Efficiency Directive[2].

The **overall objective** of the consultation was to identify the shortcomings associated with the current provisions of the EED and ways to strengthen, if necessary, elements of the EED to deliver on the Commission proposal to increase the EU's greenhouse gas emission reduction target for 2030 to at least 55%.[3]

In order to achieve this objective, the consultation strategy laid out that the EED Review needed to **cover the following elements**:

(1) An **ex-post evaluation** of those elements of the EED that were not revised in 2018; and

(2) An **impact assessment** for the revision of the EED.

The consultation strategy underscored the need for a comprehensive consultation, as the EED had not been evaluated since its adoption in 2012, except for the articles revised in 2018 in the context of the Clean Energy for All Europeans package.

"Flexible" elements of the consultation strategy such as direct interviews and calls for ad-hoc contributions were used throughout the process to corroborate findings and address upcoming issues identified during the more formal consultation stages such as the feedback to the Roadmap/Inception Impact Assessment.

3. Consultation activities

a. Stakeholder groups and consultation tools

The consultation strategy identified the following **stakeholder groups** and assessed their level of interest:

- **European public actors**: European Parliament, Committee of the Regions, Economic and Social Committee (high interest);

[2] ARES reference or link.

[3] The Communication on the Climate Target Plan, adopted on 17 September 2020, puts forward an emissions reduction target of at least net 55% by 2030 as a balanced, realistic, and prudent pathway to climate neutrality by 2050. It also highlights that, to achieve this level of greenhouse gas emission reductions, there is a need to significantly step up energy efficiency efforts. See COM/2020/562 final.

- **National authorities** responsible for the implementation of the EED in Member States (e.g. ministries of energy or economy and other competent authorities, including potentially at regional and local level) (high interest);
- **Interest groups** affected by the implementation of the EED such as companies, including small and medium-sized enterprises, regional and local public bodies, private organisations and industry associations, several of the European social partners, NGOs (high interest);
- **Wider interest groups** who may have an interest in implementation of the EED including civil society and academia (moderate interest).

Several **tools for engaging stakeholders** were used to ensure a successful consultation on both ex-post evaluation and identification of further policy options for the Impact Assessment. They included:

- The **Consultation on the evaluation roadmap**/inception impact assessment;
- **Nine stakeholder workshops** on specific topics and articles and one **EED Expert** group meeting;
- Targeted stakeholder consultations including **evaluation questionnaires and interviews**; and
- The **Open Public Consultation (OPC)**.

Table 3: Alignment of tools and stakeholders

	European public actors	National authorities	Core interest groups	European social partners	Wider interest groups
Roadmap consultation	✓	✓	✓	✓	✓
Stakeholder workshops		✓	✓	✓	
Evaluation questionnaires & interviews	✓	✓	✓	✓	
Open public consultation		✓	✓	✓	✓

Due to the comprehensive communication strategy, all stakeholder groups could be reached. Consultation activities were tailored to deliver analytically separate insights into the evaluation of the existing *acquis* and the impact assessment.

The received feedback was analysed based on a mixed-method design, applying qualitative and quantitative analysis. This comprised qualitative content analysis, delivering read-outs of stakeholder positions. Computer-aided text analysis (CATA) based on MaxQda software allowed for an additional coding of feedback to track salience of the topics. Quantitative data gathered in the consultations on the Roadmap/Inception Impact Assessment and the Open Public Consultation were analysed with MS Excel and IBM SPSS statistical software.

The following section presents a detailed description of these consultation activities and their return.

b. Consultation feedback

i. Roadmap/Inception Impact Assessment

The evaluation roadmap (Roadmap)[4] was published on 3 August 2020 and was available for feedback until 21 September 2020. It received 189 replies. 99 stakeholders annexed supplementary statements and information to their replies. The largest number of replies (67) were received from Belgium, followed by France (20 replies) and Germany (19 replies). 15 replies were anonymous, which did not allow tracking the geographic location of contributors. The group of Business Associations was the largest to reply (80 replies), followed by Companies (36 replies) and NGOs (26 replies). Section II presents the detailed read-out of the consultation results.

ii. Stakeholder Workshops and EED Expert Group

Nine dedicated stakeholder meetings were organised virtually in the period from September to October 2020 with targeted stakeholder groups on specific topics to ensure focussed discussion (Table 4). The outcome of discussions contributed to both processes – evaluation and the impact assessment for revising the EED.

Table 4: Overview of EED stakeholder workshops

No.	Topic	Number of participants	Date
1	Heating and Cooling and Article 14	97	10.09.2020
2	Energy Efficiency in Networks and Article 15	78	16.09.2020
3	Financing and Article 20	61	17.09.2020
4	Energy Efficiency in the Public Sector and Articles 5, 6 and 18	61	06.10.2020
5	General Issues and Energy Efficiency Targets	71	07.10.2020
6	Energy Audits and Article 8	59	08.10.2020
7	Energy Efficiency in Specific Sectors	65	19.10.2020
8	Energy Consumers and Articles 12 and 19	44	21.10.2020
9	Energy Services and Skills Articles 16 and 18	50	22.10.2020

Workshops were split in two parts to cover ex-post evaluation aspects and possible solutions for improvements of the EED and were guided by questions sent in advance to participants.

[4] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12552-EU-energy-efficiency-directive-EED-evaluation-and-review

A dedicated EED expert group meeting was held on 10 November 2020. The meeting aimed to seek feedback on the preliminary findings of the evaluation of the EED framework and to discuss identified policy options for amending the EED. Over 100 participants attended the expert group.

iii. Evaluation questionnaires and direct interviews

Targeted questionnaires on relevant topics of the EED were sent to national authorities and other stakeholders in advance of dedicated workshops to seek more detailed feedback. In total 14 questionnaires were prepared covering the various EED articles, general issues and four sector specific sectors - agriculture, water, ICT, transport. Table 5 below presents an overview of the number of responses and feedback received from stakeholders.

Table 5: Feedback response overview to evaluation questionnaires

Article /topic	Questionnaire responses	Additional feedback*
Targeted articles of the EED		
Article 1&3	21	-
Article 5	19	-
Article 6	15	-
Article 8	25	4
Article 12	11	2
Article 14	12	16
Article 15	5	2
Article 16	9	1
Article 18	21	-
Article 19	10	2
Sector-specific issues		
General issues	30	8
Agriculture and water	5	1
ICT	5	-
Transport	8	-

* This includes position papers and other notes received via email from stakeholders that were not presented in the questionnaire format.

The consultation activities included **direct interviews** as a follow up on dedicated issues.

Stakeholders were proposed to decide whether they would like to participate in interviews to illustrate their contributions through the questionnaire and the workshops. In total eight interviews were conducted. The purpose of the interviews was to validate and clarify matters, and to gather additional information and details where necessary. Summary of the interviews were prepared for the reporting exercise.

iv. Public consultation

An internet based public consultation targeted a broad stakeholder audience. The consultation was launched on 17 November 2020 and lasted until 9 February 2021. The questions of the consultation addressed aspects concerning the ex-post evaluation and option for the revision of the EED and specific modification of individual articles. The questions were formulated on basis of the Commission Better Regulation guidelines[5].

To ensure that the results of this consultation informed the two parallel processes of ex-post evaluation and impact assessment at both general and expert level, the survey contained two parts:

- Part I with questions of a general nature covering both the evaluation and impact assessment. The first sub-section contained questions assessing whether the EED framework and relevant provisions are efficient, effective, and coherent with the broader EU legislative framework covering energy efficiency policy. The second sub-section investigated the most appropriate policy options to be considered for the EED revision as part of the impact assessment, which could allow addressing the insufficient level of ambition in the National Energy and Climate Plans and also delivering on the higher energy efficiency contribution for 2030 to reach the GHG emissions reductions target of at least 55%.
- Part II was of a technical nature on specific articles dedicated to experts.

The consultation received 344 replies, often accompanied by additional position papers. Replies came from 26 Member States and three non-EU countries (Norway, Switzerland, and the UK). Replies were submitted in 17 languages. The largest group of respondents covered business associations (132 replies), individual businesses and companies (92 replies), followed by NGOs (34 submissions). 21 respondents submitted replies as individual citizen. 24 public authorities replied, including 13 national authorities from 12 Member States (Cyprus, Czech Republic, Estonia, Finland, France, Italy, Lithuania, Luxembourg, Netherlands, Norway, Spain, and Sweden).

c. Stakeholder input concerning the Impact Assessment

i. Roadmap/Inception Impact Assessment

The feedback retrieved in the consultation on the Roadmap/Inception Impact Assessment overall aligns with the feedback on the evaluation of the existing EED provisions: The present EED is overall regarded to be a workable policy instrument, which however is not deploying its full potential. Along this line, many stakeholders argued for an increased level of ambition regarding energy efficiency targets and asking for a stronger role of binding measures in their feedback to the consultation on the Roadmap/Inception Impact Assessment. Besides commenting on energy efficiency targets (69 mentions),

[5] https://ec.europa.eu/info/sites/info/files/better-regulation-guidelines-evaluation-fitness-checks.pdf

heating and cooling (37 mentions) and buildings (31 mentions) received the broadest attention.

Further to these overall comments, respondents provided detailed suggestions for revising dedicated articles of the EED. This concerned the topics and articles shown in Table 6.

Table 6: Stakeholder recommendations for changing EED provisions

Articles	Number of contributions with revision suggestions
1 &3 (objectives and targets):	10
5 (exemplary role of public bodies' buildings):	24
6 (public procurement):	5
7 (energy efficiency obligations):	23
8 (energy audits):	14
9-11 (metering and billing):	6
14 & 15 (energy transformation, heating and cooling):	31
16 & 17 (qualifications and training):	4
18 (energy services):	4
20 (financing):	7

Stakeholders strongly focussed their comments and suggestions for improvement on the aspects of heating and cooling as well as on energy efficiency action in the public sector (buildings and procurement). The **main results** of the Roadmap/Inception Impact Assessment feedback are:

- Stakeholders were largely positive about stepping up the ambition on energy efficiency to match the higher climate target. Many stakeholders acknowledged the need for updating and aligning the 2030 energy efficiency targets to reflect the more ambitious GHG emissions reduction objective.
- Regarding the formulation of targets, some replies cautioned against fixing absolute targets for fear of curbing economic growth or limiting flexibility of the energy markets.
- Some stakeholders stressed the need to strengthen governance arrangements through a clearer alignment of the EU objectives for GHG, renewable energy and energy efficiency as well as further sectorial regulation as announced in the European Green Deal. The alignment with other policies is a recurring topic in many stakeholder replies. Many stakeholders pointed out that energy efficiency should be looked at from the perspective of the energy system.
- A majority of stakeholders supported the revision of the EED. Support for policy option 3 (Revision of the EED) was more widespread among respondents than support for policy option 2 (Non-regulatory measures). However, many stakeholders noted that both options were not mutually exclusive. Regarding the policy options laid out in the Roadmap, a large share of stakeholders implicitly or explicitly supported a revision of the EED, including proposing regulatory measures.
- The overall view was that a future revision of the EED should comprise regulatory

and non-regulatory measures. Heating & cooling, buildings, as well as system efficiency and renewable energies, have been widely raised as key issues. In addition, the provisions concerning the public sector (Articles 5 and 6) received a large number of feedback.

d. Stakeholder Workshops and EED Expert Group

i. Stakeholder workshops

The second half of each stakeholder workshop addressed forward-looking elements to gather input for the revision of the EED. Table 7 and Table 8 sum up the key findings of the workshops.

Table 7: Summary of key workshop findings on specific EED provisions (forward-looking)

Article/ Workshop topic	Stakeholder input for impact assessment
14 (heating and cooling)	• Many participants consider that the EED is not capturing the existing heating and cooling potential to the fullest. • Several participants argued for more ambitious measures to capture heat integration into the energy system, address waste heat (data centres and supermarkets), consider system efficiency and renewable district heating, the latter potentially through dedicated targets. • Energy efficiency first as a principle should be further strengthened. • The CBA has been lacking on the implementation side, a follow-up is needed. • Municipalities need support in designing and implementing heating and cooling networks. • Further linking to financing, Article 7 EED and to the EPBD/building efficiency should be considered.
15 (energy transformation)	• Participants suggested strengthening the energy efficiency first-principle to incentivise further local optimisation of grids.
20 (financing)	• Participants suggested that national energy efficiency funds should base their agreements on performance guarantees (either energy performance contracts or other contracts). • Art. 18 and 19 EED could be used to follow up on barriers relating to energy efficiency finance and be used to back up art. 20 EED.
5, 6, 18 (Public sector)	• Participants suggested to not only considering the rate of renovation but also its depth and follow-up in terms of energy management and monitoring. • Reinforcing the link between Article 5 and 18 might be important. Furthermore, participants argued that there is a need to provide assistance to local authorities to increase their capacity to enter in procurement with ESCOs and to support them with project aggregation. • Several national good practice measures exist that deserve looking into. • Another issue to consider is extending the scope to other public sector levels. In such a case, there would be a need for more guidance and support through TA or one-stop-shops.
12, 19 (empowering consumers)	• Participants suggested providing incentives for energy efficiency renovation while at the same time addressing the criterion of cost neutrality. • Several national good practices were highlighted that deserve further looking into.
16, 18 (energy services and qualification)	• There is a need to strengthen the focus on technical competences and further capacity development in the future. Some attention should be given to a possible value added through more uniform competences and schemes across the EU • There is a need for awareness raising and in relation to Article 18 EED. There is a need for the right skills and the right skills of technical competencies. Still issues to be solved in relation to state aid.
8 (audits)	• Some participants argued that the EED provisions should be enlarged to encourage up-take of energy audit recommendations.

Article/ Workshop topic	Stakeholder input for impact assessment
	• Participants agreed that mechanisms have to be established, which guarantee the implementation of the audits' findings. • Participants were split in their opinion whether obligatory audits or follow-up incentives deliver stronger impacts in terms of energy savings. • Illustrating non-energy benefits to companies that should be identified in audits might lead to additional up-take of audits.

Table 8: Summary of key workshop findings on overall EED framework and specific sectors (forward-looking)

Article/ Workshop topic	Findings regarding impact assessment
1&3 (targets)	• Many participants argued for higher energy efficiency targets to align with the overall GHG ambition of the European Green Deal. • Several participants argued that strengthening and more clearly spelling out the "Energy efficiency first principle" could be helpful to trigger energy savings across the whole chain of energy provision. • In an updated EED, the links to renewable energies (via addressing primary energy consumption), EPBD and environmental aspects (e.g. water use) could be further deepened.
Sectors (transport, ICT, agriculture and waste)	• Many participants argued that the sector-specific legislation should be kept with the sectors. However, there might be a need for an over-spanning energy efficiency intake, such as introducing the "energy efficiency first" principle across the sectors. • Concerning ICT, the discussion among stakeholders showed that the inclusion of ICT is more comprehensive than addressing only data centres and requires further looking into. • Regarding agriculture and water, options for further addressing these sectors were seen in e.g. in waste water treatment facilities and heat recovery. Participants overall agreed on the need to further look into how synergies in water sector and the energy efficiency area could be improved and mutually reinforce each other.

The stakeholder workshops led to the identification of further options to enhance the individual articles of the EED. The **main findings** of the stakeholder workshops were:

- Participants supported a higher ambition and overall update of the EED provisions;
- In line with the results of the evaluation, the workshops allowed to identify further options for updating the EED's provisions;
- Regarding heating and cooling as well as supply side efficiency, applying the "energy efficiency first-principle" could be a good way forward to address the existing untapped potential; introducing this principle into further sectorial legislation might help to address sectors such as agriculture, water and ICT.
- Public sector renovation was confirmed to be of central importance. Extending the scope of EED provisions to other levels of government (local and regional), considering renovation depth and linking to energy service providers seem promising;
- Renovation incentives and provision of finance is key to backing up many requirements of the EED, thereby leading to an approach combining obligations and supporting financial incentives;
- Training and qualifications remain important and need to be stepped up. This would support further development of energy service markets in all Member States;

- Energy audits are important, but a follow-up on their findings is not sufficiently addressed in the present EED.
- Good practice examples exist throughout the Member States, which deserve further looking into. This highlights the need to promote further exchange between governments and actors at national level.

ii. EED Expert group

A dedicated EED expert group meeting was held on 10 November 2020 attended by over 100 participants. The meeting aimed to seek feedback on the preliminary findings of the evaluation of the EED framework and to discuss identified policy options for amending the EED. The **main findings** of the expert group were:

- The importance of a higher ambition and the binding nature of the energy efficiency targets;
- The need to consider the costs and benefits of energy efficiency measures;
- The need to consider interlinkages with other legislation;
- The importance to contribute to the Green Deal initiatives, notably the Renovation Wave and the Strategy for Energy System Integration;
- The importance of heating and cooling – notably by a stronger implementation follow-up with policies based on the comprehensive assessments;
- The importance of increasing energy performance contracting and facilitating; and
- The need for wider use of energy management systems.

iii. Evaluation questionnaires and direct interviews

The 14 evaluation questionnaires and direct interviews covered Articles 1&3, 5, 6, 8, 12, 14, 15, 16, 18, 19 and 20 EED. They gave not only insights on the evaluation of the present Directive but also delivered valuable insights for further improving the EED. The feedback received[6] strongly aligns with the feedback obtained in the workshops and the EED expert group.

Main findings regarding the further development of the EED:

- Respondents assessed the EED to be relevant and clearly creating EU added value. However, while the Directive was effective, they confirmed views voiced in the other consultation channels that the EED's potential is not exploited to the fullest and that further ambition is needed in view of more ambitious GHG targets.

- Regarding public sector buildings, an additional focus on the local level, notably regarding schools and hospitals might address large untapped saving potentials.

- Article 8 on energy audits could be strengthened by requesting follow-up activities to implement the findings of the audits. Linking to overall schemes (energy management systems) and financial incentives might be interesting.

[6] See document Report Technical Assistance for an Ex-Post Evaluation and Impact Assessment of the Review of the Directive 2021/27/EU on Energy Efficiency. Analysis of Stakeholder Feedback.

- Provisions on consumer empowerment (Article 12 EED) might need follow-up in terms of guidelines on transposition and further sharing of good practices at Member State level.

- An update of the provisions on heating and cooling as well as supply-side efficiency should address synergies and overlaps with other EU legislation, notably on renewable energies and building efficiency. Addressing waste heat and cooling is seen as high remaining potential in this field.

- The increased technical complexity of deep renovations asks for an update of qualification and accreditation. Likewise, existing barriers that limit the impact of energy service markets should be addressed by turning provisions of Article 18 EED legally binding. Issues addressed relate to public procurement rules, clear provisions for minimum qualifications of service providers, further reinforcement in relation to quality assurance and accreditation systems, data collection, reporting, monitoring and quality checks.

- Regarding Article 19 EED, the questionnaires returned several suggestions, comprising the empowerment of tenants, minimum energy performance standards for renovation, and the empowerment of local public authorities.

e. Public consultation

An internet based public consultation (PC) targeted a broad stakeholder audience. The consultation was launched on 17 November 2020 and lasted until 9 February 2021. The questions of the consultation addressed aspects concerning the ex-post evaluation and forward looking options for modification of the EED. A comprehensive read-out of the 344 replies to the PC is published separately.

Regarding the feedback on the revision and update of the EED, the following points can be pointed out:

- A clear majority of stakeholders (86% of respondents, n=332) agreed that energy efficiency should play a key role in delivering a higher climate ambition for 2030 and in view of the EU achieving carbon neutrality by 2050.
- Regarding the instruments to be considered to underpin an increased effort in energy efficiency, participants stressed a stronger focus on life-cycle efficiency and circularity, a stronger focus on consumer empowerment (awareness-raising and behavioural change) and making the “Energy Efficiency First” principle a compulsory test in relevant legislative and investment planning decisions. Equally strong was the support for a stronger focus on implementation and enforcement of the existing legislation. 190 out of 285 respondents agreed that the EED should be strengthened by introducing new measures and stricter requirements.
- Regarding targets, stakeholders assessed the level of the 2020 objective as appropriate, but advocate a higher target for 2030 (115 of 200 replies). The largest group (53%) favours binding targets, including at national level (47%).
- Stakeholders see additional energy efficiency efforts needed most in following sectors: Buildings (76%), heating & cooling (63%) as well as transport (62%), followed by industry (52%) and ICT (40%).
- Feedback suggests that there is a need to address the public sector in a more comprehensive and stringent manner. 67% of replies take the view that it is too

easy to evade the public purchasing requirements (total of 49 respondents). 73% out of 165 respondents support expanding scope of Article 6 EED to include all levels of public administration.

- Regarding Article 7 EED and its contribution to higher energy efficiency efforts, the current level of ambition of Article 7(1) on energy savings is considered too low by 100 out of 194 replies. Further 72 see the level as adequate. In turn, 104 stakeholders assess the increase of the energy saving obligation for 2021-2030 to be "very important", 42 as "important" and 14 as "somewhat important" (n=202).
- Regarding Article 8 EED 123 respondents (61%) supported changing the rules, which oblige enterprises that are not small or medium-sized to carry out an energy audit every four years to learn about their energy consumption profile and identify energy saving opportunities. The consultation feedback showed strong support for relating the audits to depend on the energy consumption rather than the size or ownership and the obligation to implement certain measures identified in the audits. Participants showed strong support for including recommendations for renewable energies and resource efficiency in the audits.
- Stakeholders were asked to assess additional options to make Article 14 and its related Annexes more effective. The option "Planning and permitting of infrastructure generating waste heat or cold should take into consideration geographical proximity of a potential demand (heat sink) for this energy" received the highest number of positive scores (69 strongly agreeing, 53 agreeing, 27 somewhat agreeing out of n=168 respondents). This is followed up by the option to oblige Member States to better ensure that cost and benefits of more efficient heating and cooling are taken into account.
- Regarding the functioning of energy service markets, 58% of the 147 respondents favoured strengthening requirements on independent market intermediaries as a means to increase trust and facilitate the use of energy services.

f. Summary regarding findings for a further revision of the EED

All categories of stakeholders identified in the stakeholder mapping participated in various consultation activities, therefore the outcomes of the consultation process were of substantial help in the analysis and the formulation of the policy proposal. As with the evaluation of the EED, the staged approach of consultation helped to cross-validate and deepen points raised by stakeholders in various rounds of consultation.

Stakeholders' opinions regarding a potential strengthening of several provisions of the Energy Efficiency Directive can be summarised as follows:

- Stakeholders largely agree that a strengthening of the EED is possible and adequate to align to the increased ambition of the European greenhouse gas objectives.

- The increased level of ambition can be implemented by updating and revising the provisions of the EED under review, notably energy efficiency in public buildings, support for building renovation as well as heating and cooling.

- Stakeholders contributed many suggestions for improving the present provisions of the EED, often based on existing experiences and good practices.

- Stakeholder input delivered many suggestions for further fields of action (e.g. waste heat, data centres, synchronisation with EU *acquis* on renewable energies and energy efficiency in buildings).

- A large group of stakeholders voiced support for expanding the update of the EED by revising energy efficiency targets (Articles 1 & 3 EED) and energy efficiency obligation schemes (Article 7 EED).

Annex C Who is affected and how?

1. Summary of costs and benefits

I. Overview of Benefits (total for all provisions) – Preferred Option		
Description	***Amount***	***Comments***
Direct benefits		
Energy savings	Compared to REF: €23.09 billion €'15/year Compared to MIX: €7.65 billion €'15/year	Average annual energy savings comparing MIX-MAX and REF scenarios. Of which: €5.42 billion/year in industry, €7.48 billion/year in Households, €6.64 billion/year in the Tertiary sector, €3.56 billion/year in Transport. Average annual energy savings comparing MIX-MAX and MIX scenarios. Of which: €0.32 billion/year in industry, €2.08 billion/year in Households, €2.38 billion/year in the Tertiary sector, €0.03 billion/year in Transport.
Disutility costs	Compared to MIX: €6.35 billion €'15/year	Average annual Disutility costs (e.g., cost of foregone energy services due to higher prices) lower in MIX-MAX than in MIX.
Compliance cost reductions from Article 8 simplification	€225 million per year	Mainly business is the beneficiary as a result of avoided energy audits for small energy consuming businesses. There is a small reduction in public administration costs due to there being less audits to monitor.
Indirect benefits		

Overall co-benefits for society	Based upon the COMBI project analysis these are expected to amount to around 50% of the value of the energy savings	The project assesses the co-benefits of energy savings on: human health; eco-systems: acidification, eutrophication, ozone exposure, crop loss; air pollution emissions; avoided GHG emissions; material footprint/resource impacts; energy cost savings/available income effect; productivity; gross employment/GDP; public budget; energy security. To the degree possible it aims to quantify them, but this is only feasible for a subset of the impacts.
Reduced air pollution emissions and other environmental impacts	Estimated 9% reduction	Extrapolated on the basis of overall level of energy savings using the modelling results for MIX compared to REF (8.4% reduction) as the starting point.

II. Overview of costs – Preferred option							
		Citizens/Consumers		Businesses		Administrations	
		One-off	Recurrent	One-off	Recurrent	One-off	Recurrent
Overall targets	Direct costs	Household investments €63.3 billion €'15 (Average annual investments comparing MIX-MAX and REF)	N/A	Industry investments €6.52 billion €'15 Tertiary investments €13.8 billion €'15 (Average annual investments comparing MIX-MAX and REF)	N/A	Setting up schemes	Monitoring and reporting
	Indirect costs	N/A	Disutility costs compared to REF: 12.02 billion €'15/year	N/A	N/A	N/A	N/A
Public buildings	Direct costs	N/A	N/A	N/A	N/A	Estimated at €8.8 billion per year through bottom up calculations. Includes all renovation costs, not only costs related to energy efficiency. Most of the renovation cost relate to keeping a building	
	Indirect costs	N/A	N/A	N/A	N/A		N/A

						at use at a certain standard.	
Public procurement	Direct costs	N/A	N/A	N/A	N/A	N/A	Additional effort for drafting tender documents
	Indirect costs	N/A	N/A	N/A	N/A	N/A	N/A

Annex D Key CTP findings input to the "fit for 55" IAs

Key findings of CTP

The Climate Target Plan and its underpinning impact assessment are the starting point for the initiatives under Fit for 55 package.

The plan concluded on the feasibility - from a technical, economic and societal point of view - of increasing the EU climate target to 55% net reductions by 2030. It also concluded that all sectors need to contribute to this target.

In particular, with energy supply and use responsible for 75% of emissions, the plan put forward ambition ranges for renewables and energy efficiency which in a cost-efficient manner correspond to the increased climate target. The climate target plan also established that this raise in climate and energy ambition will require a full update of the current climate and energy policy framework in a coherent manner.

As under the current policy framework, the optimal policy mix should combine, at the EU and national levels, strengthened economic incentives (carbon pricing) with updated regulatory policies, notably in the field of renewables, energy efficiency and sectoral policies such as CO2 car standards. It should also include the enabling framework (R&D policies, financial support, etc.).

While sometimes working in the same sectors, the policy tools vary in the way they enable the achievement of the increased climate target. The economic incentives provided by strengthened and expanded emissions trading would contribute to the cost-effective delivery of emissions reductions. The regulatory policies, such as RED, EED, and CO2 standards for vehicles aim at addressing market failures and other barriers to decarbonisation, but also create an enabling framework for investment, which supports cost-effective achievement of climate target by reducing perceived risks, increasing the efficient use of public funding and helping to mobilise and leverage private capital. The regulatory policies also pave the way for the future transition needed to achieve the EU objective of the climate-neutrality. Such a sequential approach from the CTP to the Fit for 55 initiatives was necessary in order to ensure coherence among all initiatives and a collective delivery of the increased climate target.

The final calibration between the different instruments is to be made depending, *inter alia* on the decision on the extension of ETS beyond the maritime sector and its terms.

Table 9 below shows the summary of all key CTP findings:

Table 9: Key CTP findings.

POLICY CONCLUSIONS IN THE CTP	
GHG emissions reduction	• 55% reduction (w.r.t. 1990) • Agreed by the European Council in December 2020 • Agreed by the legislator in the Climate Law
ETS	• Corresponding targets need to be set in the EU ETS and the Effort Sharing Regulation to ensure that in total, the economy wide 2030 greenhouse gas emissions reduction target of at least 55% will be met.

	• Increased climate target requires strengthened cap of the existing EU ETS and revisiting the linear reduction factor. • Further expansion of scope is a possible policy option. • EU should continue to regulate at least intra-EU aviation emissions in the EU ETS and include at least intra-EU maritime transport in the EU ETS. • For aviation, the Commission will propose to reduce the free allocation of allowances, increasing the effectiveness of the carbon price signal in this sector, while taking into account other policy measures.
ESR	• Corresponding targets need to be set in the Effort Sharing Regulation and under the EU ETS, to ensure that in total, the economy wide 2030 greenhouse gas emissions reduction target of at least 55% will be met.
LULUCF	• Sink needs to be enhanced. • Agriculture forestry and land use together have the potential to become rapidly climate-neutral by around 2035 and subsequently generate removals consistent with trajectory to become climate neutral by 2050.
CO_2 standards for cars	• Transport policies and standards will be revised and, where needed, new policies will be introduced. • The Commission will revisit and strengthen the CO_2 standards for cars and vans for 2030. • The Commission will assess what would be required in practice for this sector to contribute to achieving climate neutrality by 2050 and at what point in time internal combustion engines in cars should stop coming to the market.
Non-CO_2 emissions	• The energy sector has reduction potential by avoiding fugitive methane emissions. The waste sector is expected to strongly reduce its emissions already under existing policies. Turning waste into a resource is an essential part of a circular economy. Under existing technology and management options, agriculture emissions cannot be eliminated but significantly reduced while ensuring food security is maintained in the EU. Policy initiative have been included in the Methane Strategy.
Renewables	• 38-40% share needed to achieve increased climate target cost-effectively. • Renewable energy policies and standards will be revised and, where needed, new policies will be introduced. • Relevant legislation will be reinforced and supported by the forthcoming Commission initiatives on a Renovation Wave, an Offshore Energy strategy, alternative fuels for aviation and maritime as well as a Sustainable and Smart Mobility Strategy. • EU action to focus on cost-effective planning and development of renewable energy technologies, eliminating market barriers and providing sufficient incentives for demand for renewable energy, particularly for end-use sectors such as heating and cooling or transport either through electrification or via the use of renewable and low-carbon fuels such as advanced biofuels or other sustainable alternative fuels. • The Commission to assess the nature and the level of the existing, indicative heating and cooling target, including the target for district heating and cooling, as well as the necessary measures and

	calculation framework to mainstream further renewable and low carbon based solutions, including electricity, in buildings and industry. • An updated methodology to promote, in accordance with their greenhouse gas performance, the use of renewable and low-carbon fuels in the transport sector set out in the Renewable Energy Directive. • A comprehensive terminology for all renewable and low-carbon fuels and a European system of certification of such fuels, based notably on full life cycle greenhouse gas emissions savings and sustainability criteria, and existing provisions for instance in the Renewable Energy Directive. • Increase the use of sustainably produced biomass and minimise the use of whole trees and food and feed-based crops to produce energy through inter alia reviewing and revisiting, as appropriate, the biomass sustainability criteria in the Renewable Energy Directive,
Energy Efficiency	• Energy efficiency policies and standards will be revised and, where needed, new policies will be introduced. • Energy efficiency improvements will need to be significantly stepped up to around 36% in terms of final energy consumption[7]. • Achievement of a more ambitious energy efficiency target and closure of the collective ambition gap of the national energy efficiency contributions in the NECPs will require actions on a variety of fronts. • Renovation Wave will launch a set of actions to increase the depth and the rate of renovations at single building and at district level, switch fuels towards renewable heating solutions, diffuse the most efficient products and appliances, uptake smart systems and building-related infrastructure for charging e-vehicles, and improve the building envelope (insulation and windows). • Action will be taken not only to better enforce the Energy Performance of Buildings Directive, but also to identify any need for targeted revisions. • Establishing mandatory requirements for the worst performing buildings and gradually tightening the minimum energy performance requirements will also considered.

The modelling work in CTP

In the CTP, the increase of efforts needed for the GHG 55% target was illustrated by policy scenarios (developed with model PRIMES) showing increased ambition (or stringency) of climate, energy and transport policies and, consequently, leading to a significant investment challenge.

The first key lesson from the CTP exercise was that while the tools are numerous and have a number of interactions (or even sometimes trade-offs) a **complete toolbox of climate, energy and transport policies is needed** for the increased climate target as all sectors would need to contribute effectively towards the GHG 55% target.

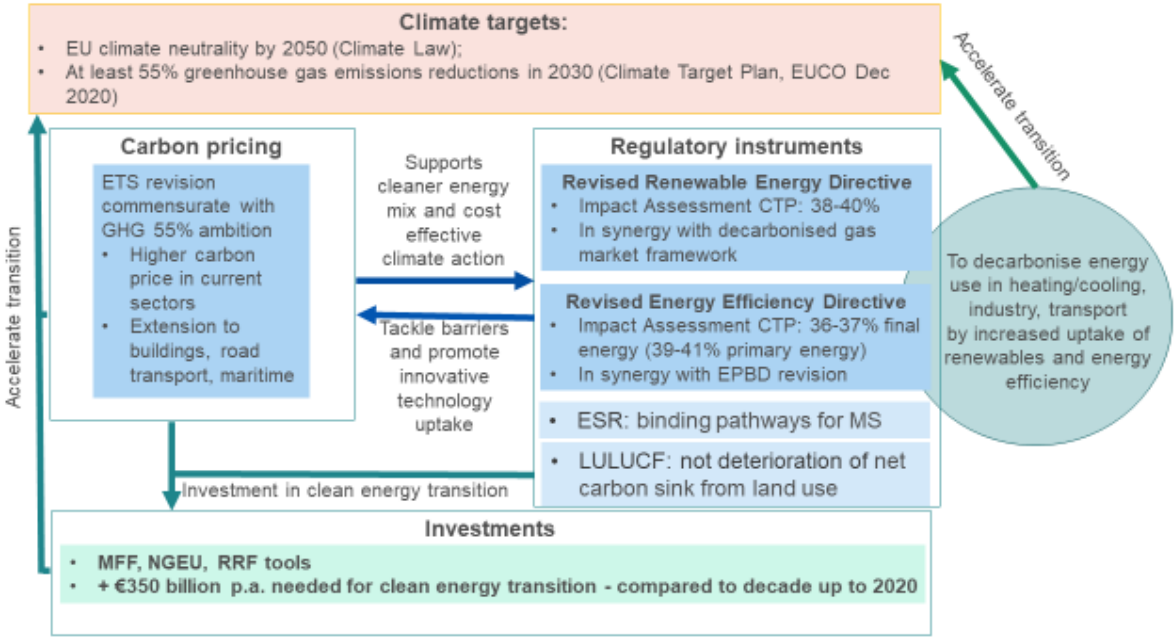
[7] The Impact Assessment identifies a range of 35.5 % - 36.7 depending on the overall design of policy measures underpinning the new 2030 target. This would correspond to a range of 39.2%- 40.6% in terms of primary energy consumption.

The second key lesson was that even though policy tools chosen in the CTP scenarios were different - illustrating in particular the fundamental interplay between the strength of the carbon pricing and intensity of regulatory measures - **the results achieved were convergent**. All CTP policy scenarios that achieved a 55% GHG target[8] showed very similar levels of ambition for energy efficiency, renewables (overall and on sectoral level) and GHG reductions across the sectors indicating also the cost-effective pathways.

The third lesson was that carbon pricing working hand in hand with regulatory measures helps avoid "extreme" scenarios of either:

- A very high carbon price (in absence of regulatory measures), which will translate into energy prices for all consumers as illustrated by the MIX-CP scenario;
- Very ambitious policies that might be rejected by Member States (e.g. very high energy savings or renewables obligations) because they would be too costly for economic operators as illustrated by the REG scenario.

Figure 1: interactions between different policy tools



<u>From CTP scenario to "Fit for 55" core scenarios</u>

With the 55% GHG target confirmed by EU leaders in the December 2020 EUCO Conclusions[9] and the 2021 Commission Work Programme[10] (CWP 2021) that puts forward the complete toolbox to achieve the increased climate target (so-called "Fit for 55" proposals), the fundamental set-up of the CTP analysis was confirmed. This set-up is still about the interplay between carbon pricing and regulatory measures as illustrated above, and the extension of the ETS is the central policy issue.

Some slight **updates were needed:**

[8] A 50% GHG target was also analysed
[9] https://www.consilium.europa.eu/media/47328/1011-12-20-euco-conclusions-fr.pdf
[10] COM(2020) 690 final

- In terms of the **Baseline** to reflect the most recent statistical data available, notably in terms of COVID impacts, fuller extent of NECPs; and
- **Scenario design** in order to align better with policy options as put forward in the CWP 2021[11].

As described above, the CTP policy scenarios are cost-effective pathways that capture all policies needed to achieve the increased climate target of 55% GHG reductions. This fundamental design remains robust and the CTP scenarios thus become "Fit for 55" policy scenarios.

Some of the CTP scenarios can, however, be discarded:

- **CPRICE** assuming no intensification of energy policies and relying primarily on carbon price is no longer relevant as the REDII and the EED revisions are part of the 2021 CWP;
- 50% GHG scenario (**MIX-50**) is no longer relevant since the proposal of the increased climate target is for 55% GHG.

This leaves the following CTP scenarios still relevant as "Fit for 55" core scenarios ensuring the achievement of the overall 55% GHG reduction ambition with similar levels of renewable energy and energy efficiency deployment as in CTP:

- **REG** (relying only on intensification of energy and transport policies in absence of carbon pricing beyond the current ETS sectors);
- **MIX** (relying on both carbon price signal extension to road transport and buildings) and intensification of energy and transport policies;

In addition, one more "Fit for 55" core scenario was added:

- **MIX-CP** illustrates a lower ambition revision of energy policies (and CO2 standards for vehicles), with a strong role for carbon price signals (as in MIX also extended to road transport and buildings). MIX-CP scenario is in some ways similar to CPRICE scenario of CTP, but reflects a revision to the EED and RED.

Finally, the **ALLBNK**[12] scenario is not part of core scenarios for this IA. The ambition level of the **ALLBNK** scenario, which represents the widest scope of GHG emissions is being assessed in the context of the impact assessments on aviation and maritime emissions.

<u>Changes in the scenario results</u>

[11] Importantly, all "Fit for 55" core scenarios reflect the Commission Work Programme (CWP) 2021 in terms of elements foreseen therein and their scheduling. This is why 2021 CWP proposals listed in the first Quarter are built in to all "Fit for 55" scenarios, whereas assumptions are made about legislative proposals submitted together with REDII revision and expected to be submitted later on - by Quarter 4 2021. On the energy side, the subsequent proposals are: the revision of the EPBD, the proposal for Decarbonised Gas Markets and the proposal for reducing methane emissions in the energy sector. In this way, core scenarios represent key policies needed to deliver the increased climate target.

[12] In the CTP analysis ALLBNK was the most ambitious scenario because of a wider scope of the GHG target[12] and thus comparable to higher than 55% GHG target for effort in the current scope. This scenario is no longer part of core scenarios even though it remains pertinent for initiatives dealing with aviation and maritime sectors.

These elements of revision described above lead to only a few changes in scenario results compared to CTP scenarios – with the most relevant one for this impact assessment being the increase of RES ambition in the transport sector as illustrated by the RES-T share. The cost-effective pathways in terms of renewables deployment and necessary energy savings remain the same. This is the result of very ambitious national policies on advanced biofuels specifically or RES-T in general (as explained above) put forward in the NECPs as well as the final ambition of the REfuel initiatives adopted in XX[13]. Table below shows the comparison of key scenario results.

Table 10 Comparison of key scenario results; Source PRIMES

Results for 2030	**CTP 55GHG scenarios range** **(REG, MIX, CPRICE, ALLBNK)**	**Fit for 55 core scenarios range** **(REG, MIX, MIX-CP)**
Overall net GHG reduction (w.r.t. 1990)	55%	55%
Overall RES share	38-40%	38-39 [upper end currently being fine-tuned to 40]%
RES-E	64-67%	62-63%
RES-H&C	39-42%	38-41%
RES-T	22-26%	26-27%
FEC EE	36-37%	35-37%
PEC EE	39-41%	38-39%
GHG reduction on the supply side (w.r.t. 2015)	67-73%	57-59%
GHG reduction in residential sector (w.r.t. 2015)	61-65%	56-58%
GHG reduction in services sector (w.r.t. 2015)	54-61%	52-54%
GHG reduction in industry (w.r.t. 2015)	21-25%	33-34%
GHG reduction in transport (w.r.t. 2015)	16-18%	19-22%
Investments magnitude, excluding transport	€401-438 billion /year	€393-422 billion /per year
Energy system costs (excluding auction payments and disutilities) as % of GDP	10.9-11.1%	11.0-11.3%

[13] References when available

Annex E Analytical methods

Methodological chapter on common analytical framework for revision of ESR, ETS, LULUCF, RED and EED Impact Assessments

1. Introduction

Aiming at covering the entire GHG emissions from the EU economy, and combining horizontal and sectoral instruments, the various pieces of legislation under the "Fit for 55" package strongly interlink, either because they cover common economic sectors (e.g. buildings sector is currently addressed by energy efficiency and renewables polices but would be also falling in the scope of extended ETS) or by the direct and indirect interactions between these sectors (e.g. electricity supply sector and final demand sectors using electricity).

As a consequence, it is crucial to ensure consistency of the analysis across all initiatives. For this purpose, the impact assessments underpinning the "Fit for 55" policy package are using a collection of integrated modelling tools covering the entire GHG emissions of the EU economy.

These tools are used to produce a common Baseline and a set of core scenarios reflecting internally coherent policy packages aligned with the revised 2030 climate target, key policy findings of the CTP (see Annex D) and building on the Reference Scenario 2020, a projection of the evolution of EU and national energy systems and GHG emissions under the current policy framework[14] [xxx cross reference to the REF2020 publication xxx]. These core scenarios serve as a common analytical basis for use across different "Fit for 55" policy initiatives, and are complemented by specific variants as well as additional tools and analyses relevant for the different initiatives.

This Annex describes the tools used to produce the common baseline (the Reference Scenario 2020) and the core policy scenarios, the key assumptions underpinning the analysis, and the policy packages reflected in the core policy scenarios.

2. Modelling tools for assessments of policies

a. Main modelling suite

The main model suite used to produce the scenarios presented in this impact assessment has a successful record of use in the Commission's energy, transport and climate policy assessments. In particular, it has been used for the Commission's proposals for the Climate Target Plan[15] to analyse the increased 2030 mitigation target, the Sustainable and Smart Mobility Strategy[16], the Long Term Strategy[17] as well as for the 2020 and 2030 EU's climate and energy policy framework.

The PRIMES and PRIMES-TREMOVE models are the core elements of the modelling framework for energy, transport and CO_2 emission projections. The GAINS model is used for non-CO_2 greenhouse gas emission projections, the GLOBIOM-G4M models for

[14] The "current policy framework" includes EU initiatives adopted as of end of 2019 and the national objectives and policies and measures as set out in the final National Energy and Climate Plans.

[15] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020SC0176

[16] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020SC0331

[17] https://ec.europa.eu/clima/sites/clima/files/docs/pages/com_2018_733_analysis_in_support_en_0.pdf

projections of LULUCF emissions and removals and the CAPRI model is used for agricultural activity projections.

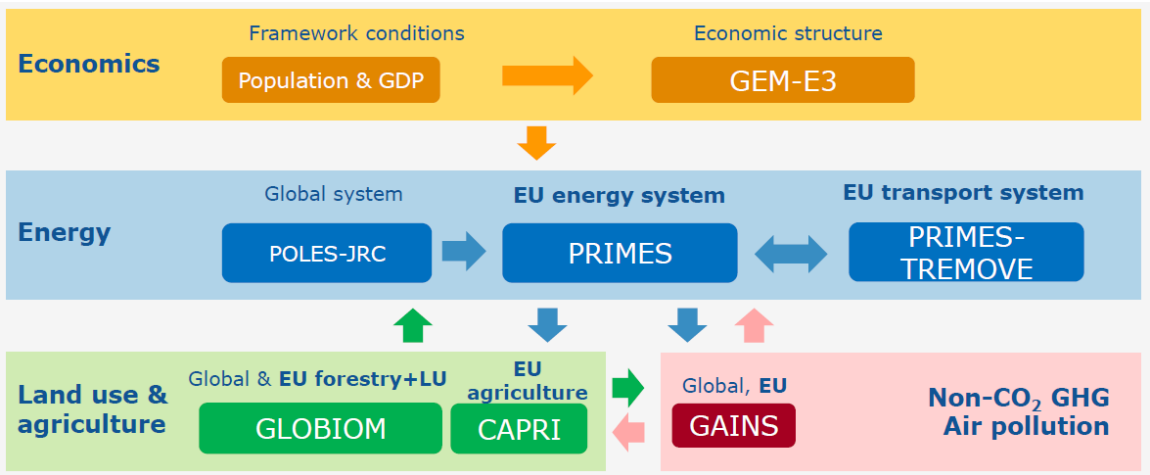
The model suite thus covers:

- **The entire energy system** (energy demand, supply, prices and investments to the future) and **all GHG emissions and removals** from the EU economy.
- **Time horizon:** 1990 to 2070 (5-year time steps).
- **Geography:** individually all EU Member States, EU candidate countries and, where relevant the United Kingdom, Norway, Switzerland and Bosnia and Herzegovina.
- **Impacts:** energy system (PRIMES and its satellite model on biomass), transport (PRIMES-TREMOVE), agriculture, waste and other non-CO2 emissions (GAINS), forestry and land use (GLOBIOM-G4M), atmospheric dispersion, health and ecosystems (acidification, eutrophication) (GAINS).

The modelling suite has been continuously updated over the past decade. Updates include the addition of a new buildings module in PRIMES, improved representation of the electricity sector, more granular representation of hydrogen (including cross-border trade[18]) and other innovative fuels, improved representation of the maritime transport sector, as well updated interlinkages of the models to improve land use and non-CO_2 modelling. Most recently a major update was done of the policy assumptions, technology costs and macro-economic assumptions in the context of the Reference scenario 2020 update.

Figure 2 shows how the models are linked with each other in such a way to ensure consistency in the building of scenarios. These inter-linkages are necessary to provide the core of the analysis, which are interdependent energy, transport and GHG emissions trends.

Figure 2 Interlinkages between models



[18] While cross-border trade is possible, the assumption is that there are no imports from outside EU as the opposite would require global modelling of hydrogen trade.

b. *Energy: the PRIMES model*

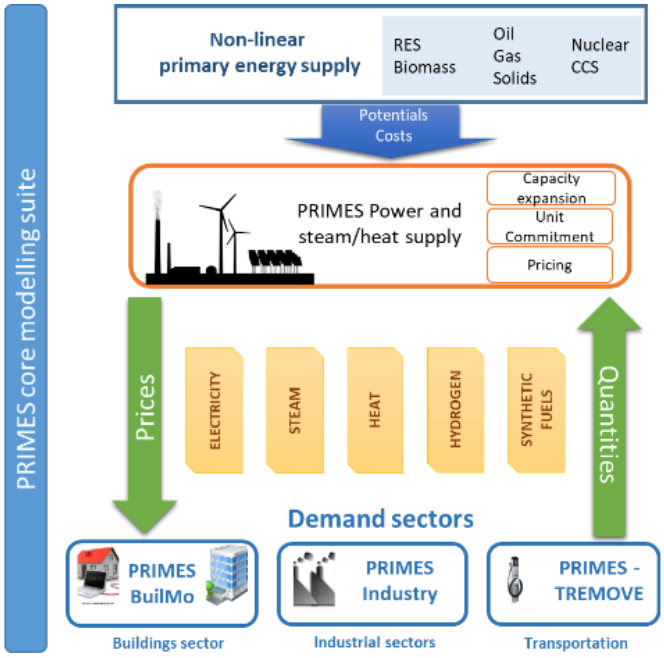
The PRIMES model (Price-Induced Market Equilibrium System)[19] is a large scale applied energy system model that provides detailed projections of energy demand, supply, prices and investment to the future, covering the entire energy system including emissions. The distinctive feature of PRIMES is the combination of behavioural modelling (following a micro-economic foundation) with engineering aspects, covering all energy sectors and markets. Figure 3 shows a schematic representation of the PRIMES model.

The model has a detailed representation of policy instruments related to energy markets and climate, including market drivers, standards, and targets by sector or overall. It simulates the EU Emissions Trading System. It handles multiple policy objectives, such as GHG emissions reductions, energy efficiency, and renewable energy targets, and provides pan-European simulation of internal markets for electricity and gas.

The model covers the horizon up to 2070 in 5-year interval periods and includes all Member States of the EU individually, as well as neighbouring and candidate countries.

PRIMES offer the possibility of handling market distortions, barriers to rational decisions, behaviours and market coordination issues and it has full accounting of costs (CAPEX and OPEX) and investment on infrastructure needs.

Figure 3: Schematic representation of the PRIMES model



PRIMES is designed to analyse complex interactions within the energy system in a multiple agent – multiple markets framework. Decisions by agents are formulated based on microeconomic foundation (utility maximization, cost minimization and market equilibrium) embedding engineering constraints and explicit representation of technologies and vintages, thus allowing for foresight for the modelling of investment in all sectors.

[19] More information and model documentation: https://e3modelling.com/modelling-tools/primes/

PRIMES allows simulating long-term transformations/transitions and includes non-linear formulation of potentials by type (resources, sites, acceptability etc.) and technology learning.

It includes a detailed numerical model on biomass supply, namely PRIMES-Biomass, which simulates the economics of current and future supply of biomass and waste for energy purposes. The model calculates the inputs in terms of primary feedstock of biomass and waste to satisfy a given demand for bio-energy and provides quantification of the required capacity to transform feedstock into bioenergy commodities. The resulting production costs and prices are quantified. The PRIMES-Biomass model is a key link of communication between the energy system projections obtained by the core PRIMES energy system model and the projections on agriculture, forestry and non-CO_2 emissions provided by other modelling tools participating in the scenario modelling suite (CAPRI, GLOBIOM/G4M, GAINS).

It also includes a simple module which projects industrial process GHG emissions.

PRIMES is a private model maintained by E3Modelling[20], originally developed in the context of a series of research programmes co-financed by the European Commission. The model has been successfully peer-reviewed, last in 2011[21]; team members regularly participate in international conferences and publish in scientific peer-reviewed journals.

Sources for data inputs

A summary of database sources, in the current version of PRIMES, is provided below:

- Eurostat and EEA: Energy Balance sheets, Energy prices (complemented by other sources, such IEA), macroeconomic and sectoral activity data (PRIMES sectors correspond to NACE 3-digit classification), population data and projections, physical activity data (complemented by other sources), CHP surveys, CO_2 emission factors (sectoral and reference approaches) and EU ETS registry for allocating emissions between ETS and non ETS
- Technology databases: ODYSSEE-MURE[22], ICARUS, Eco-design, VGB (power technology costs), TECHPOL – supply sector technologies, NEMS model database[23], IPPC BAT Technologies[24]
- Power Plant Inventory: ESAP SA and PLATTS
- RES capacities, potential and availability: JRC ENSPRESO[25], JRC EMHIRES[26], RES ninja[27], ECN, DLR and Observer, IRENA
- Network infrastructure: ENTSOE, GIE, other operators
- Other databases: EU GHG inventories, district heating surveys (e.g. from COGEN), buildings and houses statistics and surveys (various sources, including ENTRANZE project[28], INSPIRE archive, BPIE[29]), JRC-IDEES[30], update to the EU Building stock Observatory[31]

[20] E3Modelling (https://e3modelling.com/) is a private consulting, established as a spin-off inheriting staff, knowledge and software-modelling innovation of the laboratory E3MLab from the National Technical University of Athens (NTUA).

[21] SEC(2011)1569 : https://ec.europa.eu/energy/sites/ener/files/documents/sec_2011_1569_2.pdf
[22] https://www.odyssee-mure.eu/
[23] Source: https://www.eia.gov/outlooks/aeo/info_nems_archive.php
[24] Source: https://eippcb.jrc.ec.europa.eu/reference/
[25] Source: https://data.jrc.ec.europa.eu/collection/id-00138
[26] Source: https://data.jrc.ec.europa.eu/dataset/jrc-emhires-wind-generation-time-series
[27] Source: https://www.renewables.ninja/
[28] Source: https://www.entranze.eu/

c. *Transport: the PRIMES-TREMOVE model*

The PRIMES-TREMOVE transport model projects the evolution of demand for passengers and freight transport, by transport mode, and transport vehicle/technology, following a formulation based on microeconomic foundation of decisions of multiple actors. Operation, investment and emission costs, various policy measures, utility factors and congestion are among the drivers that influence the projections of the model. The projections of activity, equipment (fleet), usage of equipment, energy consumption and emissions (and other externalities) constitute the set of model outputs.

The PRIMES-TREMOVE transport model can therefore provide the quantitative analysis for the transport sector in the EU, candidate and neighbouring countries covering activity, equipment, energy and emissions. The model accounts for each country separately which means that the detailed long-term outlooks are available both for each country and in aggregate forms (e.g. EU level).

In the transport field, PRIMES-TREMOVE is suitable for modelling *soft measures* (e.g. eco-driving, labelling); *economic measures* (e.g. subsidies and taxes on fuels, vehicles, emissions; ETS for transport when linked with PRIMES; pricing of congestion and other externalities such as air pollution, accidents and noise; measures supporting R&D); *regulatory measures* (e.g. CO_2 emission performance standards for new light duty vehicles and heavy duty vehicles; EURO standards on road transport vehicles; technology standards for non-road transport technologies, deployment of Intelligent Transport Systems) and *infrastructure policies for alternative fuels* (e.g. deployment of refuelling/recharging infrastructure for electricity, hydrogen, LNG, CNG). Used as a module that contributes to the PRIMES model energy system model, PRIMES-TREMOVE can show how policies and trends in the field of transport contribute to economy-wide trends in energy use and emissions. Using data disaggregated per Member State, the model can show differentiated trends across Member States.

The PRIMES-TREMOVE has been developed and is maintained by E3Modelling, based on, but extending features of, the open source TREMOVE model developed by the TREMOVE[32] modelling community. Part of the model (e.g. the utility nested tree) was built following the TREMOVE model.[33] Other parts, like the component on fuel consumption and emissions, follow the COPERT model.

Data inputs

The main data sources for inputs to the PRIMES-TREMOVE model, such as for activity and energy consumption, comes from EUROSTAT database and from the Statistical

---

[29]Source: http://bpie.eu/
[30] Source: https://ec.europa.eu/jrc/en/potencia/jrc-idees
[31] Source: https://ec.europa.eu/energy/en/eubuildings
[32] Source: https://www.tmleuven.be/en/navigation/TREMOVE
[33] Several model enhancements were made compared to the standard TREMOVE model, as for example: for the number of vintages (allowing representation of the choice of second-hand cars); for the technology categories which include vehicle types using electricity from the grid and fuel cells. The model also incorporates additional fuel types, such as biofuels (when they differ from standard fossil fuel technologies), LPG, LNG, hydrogen and e-fuels. In addition, representation of infrastructure for refuelling and recharging are among the model refinements, influencing fuel choices. A major model enhancement concerns the inclusion of heterogeneity in the distance of stylised trips; the model considers that the trip distances follow a distribution function with different distances and frequencies. The inclusion of heterogeneity was found to be of significant influence in the choice of vehicle-fuels especially for vehicles-fuels with range limitations.

Pocketbook "EU transport in figures[34]. Excise taxes are derived from DG TAXUD excise duty tables. Other data comes from different sources such as research projects (e.g. TRACCS project) and reports.

In the context of this exercise, the PRIMES-TREMOVE transport model is calibrated to 2005, 2010 and 2015 historical data. Available data on 2020 market shares of different powertrain types have also been taken into account.

d. Maritime transport: PRIMES-maritime model

The maritime transport model is a specific sub-module of the PRIMES and PRIMES-TREMOVE models aiming to enhance the representation of the maritime sector within the energy-economy-environment modelling nexus. The model, which can run in stand-alone and/or linked mode with PRIMES and PRIMES-TREMOVE, produces long-term energy and emission projections, until 2070, separately for each EU Member-State.

The coverage of the model includes the European intra-EU maritime sector as well as the extra-EU maritime shipping. The model covers both freight and passenger international maritime. PRIMES-maritime focuses only on the EU Member State, therefore trade activity between non-EU countries is outside the scope of the model. The model considers the transactions (bilateral trade by product type) of the EU-Member States with non-EU countries and aggregates these countries in regions. Several types and sizes of vessels are considered.

PRIMES-maritime features a modular approach based on the demand and the supply modules. The demand module projects maritime activity for each EU Member State by type of cargo and by corresponding partner. Econometric functions correlate demand for maritime transport services with economic indicators considered as demand drivers, including GDP, trade of energy commodities (oil, coal, LNG), trade of non-energy commodities, international fuel prices, etc. The supply module simulates a representative operator controlling the EU fleet, who offers the requested maritime transport services. The operator of the fleet decides the allocation of the vessels activity to the various markets (representing the different EU MS) where different regulatory regimes may apply (e.g. environmental zones). The fleet of vessels disaggregated into several categories is specific to cargo types. PRIMES maritime utilises a stock-flow relationship to simulate the evolution of the fleet of vessels throughout the projection period and the purchasing of new vessels.

PRIMES-maritime solves a virtual market equilibrium problem, where demand and supply interact dynamically in each consecutive time period, influenced by a variety of exogenous policy variables, notably fuel standards, pricing signals (e.g. ETS), environmental and efficiency/operational regulations and others. The PRIMES maritime model projects energy consumption by fuel type and purpose as well as CO_2, methane and N_2O and other pollutant emissions. The model includes projections of costs, such as capital, fuel, operation costs, projections of investment expenditures in new vessels and negative externalities from air pollution.

The model serves to quantify policy scenarios supporting the transition towards carbon neutrality. It considers the handling of a variety of fuels such as fossil fuels, biofuels (bioheavy[35], biodiesel, bio-LNG), synthetic fuels (synthetic diesel, fuel oil and gas, e-ammonia and e-methanol) produced from renewable electricity, hydrogen produced from renewable electricity (for direct use and for use in fuel cell vessels) and electricity for

[34] Source: https://ec.europa.eu/transport/facts-fundings/statistics_en

[35] Bioheavy refers to bio heavy fuel oil.

electric vessels. Well-to-Wake emissions are calculated thanks to the linkage with the PRIMES energy systems model which derives ways of producing such fuels. The model also allows to explore synergies with Onshore Power Supply systems. Environmental regulation, fuel blending mandates, GHG emission reduction targets, pricing signals and policies increasing the availability of fuel supply and supporting the alternative fuel infrastructure are identified as drivers, along fuel costs, for the penetration of new fuels. As the model is dynamic and handles vessel vintages, capital turnover is explicit in the model influencing the pace of fuel and vessel substitution.

Data inputs

The main data sources for inputs to the PRIMES-maritime model, such as for activity and energy consumption, comes from EUROSTAT database and from the Statistical Pocketbook "EU transport in figures[36]. Other data comes from different sources such as research projects (e.g. TRACCS project) and reports. PRIMES-maritime being part of the overall PRIMES model is it calibrated to the EUROSTAT energy balances and transport activity; hence the associated CO_2 emissions are assumed to derive from the combustion of these fuel quantities. The model has been adapted to reflect allocation of CO_2 emissions into intra-EU, extra-EU and berth, in line with data from the MRV database.[37] For air pollutants, the model draws on the EEA database.

In the context of this exercise, the PRIMES-maritime model is calibrated to 2005, 2010 and 2015 historical data.

e. Non-CO_2 GHG emissions and air pollution: GAINS

The GAINS (Greenhouse gas and Air Pollution Information and Simulation) model is an integrated assessment model of air pollutant and greenhouse gas emissions and their interactions. GAINS brings together data on economic development, the structure, control potential and costs of emission sources and the formation and dispersion of pollutants in the atmosphere.

In addition to the projection and mitigation of non-CO greenhouse gas emissions at detailed sub-sectorial level, GAINS assesses air pollution impacts on human health from fine particulate matter and ground-level ozone, vegetation damage caused by ground-level ozone, the acidification of terrestrial and aquatic ecosystems and excess nitrogen deposition of soils.

Model uses include the projection of non-CO_2 GHG emissions and air pollutant emissions for the EU Reference scenario and policy scenarios, calibrated to UNFCCC emission data as historical data source. This allows for an assessment, per Member State, of the (technical) options and emission potential for non-CO_2 emissions. Health and environmental co-benefits of climate and energy policies such as energy efficiency can also be assessed.

The GAINS model is accessible for expert users through a model interface[38] and has been developed and is maintained by the International Institute of Applied Systems Analysis[39]. The underlying algorithms are described in publicly available literature. GAINS and its predecessor RAINS have been peer reviewed multiple times, in 2004, 2009 and 2011.

---

[36] Source: https://ec.europa.eu/transport/facts-fundings/statistics_en

[37] https://mrv.emsa.europa.eu/#public/eumrv

[38] Source: http://gains.iiasa.ac.at/models/

[39] Source: http://www.iiasa.ac.at/

Sources for data inputs

The GAINS model assesses emissions to air for given externally produced activity data scenarios. For Europe, GAINS uses macroeconomic and energy sector scenarios from the PRIMES model, for agricultural sector activity data GAINS adopts historical data from EUROSTAT and aligns these with future projections from the CAPRI model. Projections for waste generation, organic content of wastewater and consumption of F-gases are projected in GAINS in consistency with macroeconomic and population scenarios from PRIMES. For global scenarios, GAINS uses macroeconomic and energy sector projections from IEA World Energy Outlook scenarios and agricultural sector projections from FAO. All other input data to GAINS, i.e., sector- and technology- specific emission factors and cost parameters, are taken from literature and referenced in the documentation.

f. Forestry and land-use: GLOBIOM-G4M

The Global Biosphere Management Model (GLOBIOM) is a global recursive dynamic partial equilibrium model integrating the agricultural, bioenergy and forestry sectors with the aim to provide policy analysis on global issues concerning land use competition between the major land-based production sectors. Agricultural and forestry production as well as bioenergy production are modelled in a detailed way accounting for about 20 globally most important crops, a range of livestock production activities, forestry commodities as well as different energy transformation pathways.

GLOBIOM covers 50 world regions / countries, including the EU27 Member States.

Model uses include the projection of emissions from land use, land use change and forestry (LULUCF) for EU Reference scenario and policy scenarios. For the forestry sector, emissions and removals are projected by the Global Forestry Model (G4M), a geographically explicit agent-based model that assesses afforestation, deforestation and forest management decisions. GLOBIOM-G4M is also used in the LULUCF impact assessment to assess the options (afforestation, deforestation, forest management, and cropland and grassland management) and costs of enhancing the LULUCF sink for each Member State.

The GLOBIOM-G4M has been developed and is maintained by the International Institute of Applied Systems Analysis[40].

Sources for data inputs

The main market data sources for GLOBIOM-EU are EUROSTAT and FAOSTAT, which provide data at the national level and which are spatially allocated using data from the SPAM model[41]. Crop management systems are parameterised based on simulations from the biophysical process-based crop model EPIC. The livestock production system parameterization relies on the dataset by Herrero et al[42]. Further datasets are incorporated, coming from the scientific literature and other research projects.

GLOBIOM is calibrated to FAOSTAT data for the year 2000 (average 1998 - 2002) and runs recursively dynamic in 10-year time-steps. In the context of this exercise, baseline

[40] Source : http://www.iiasa.ac.at/

[41] See You, L., Wood, S. (2006). An Entropy Approach to Spatial Disaggregation of Agricultural Production, Agricultural Systems 90, 329–47 and http://mapspam.info/ .

[42] Herrero, M., Havlík, P., et al. (2013). Biomass Use, Production, Feed Efficiencies, and Greenhouse Gas Emissions from Global Livestock Systems, Proceedings of the National Academy of Sciences 110, 20888–93.

trends of agricultural commodities are aligned with FAOSTAT data for 2010/2020 and broadly with AGLINK-COSIMO trends for main agricultural commodities in the EU until 2030.

The main data sources for G4M are CORINE, Forest Europe (MCPFE, 2015)[43], countries' submissions to UNFCCC and KP, FAO Forest Resource Assessments, and national forest inventory reports. Afforestation and deforestation trends in G4M are calibrated to historical data for the period 2000-2013.

g. Agriculture: CAPRI

CAPRI is a global multi-country agricultural sector model, supporting decision making related to the Common Agricultural Policy and environmental policy and therefore with far greater detail for Europe than for other world regions. It is maintained and developed in a network of public and private agencies including the European Commission (JRC), Universities (Bonn University, Swedish University of Agricultural Sciences, Universidad Politécnica de Madrid), research agencies (Thünen Institute), and private agencies (EuroCARE), in charge for use in this modelling cluster). The model takes inputs from GEM-E3, PRIMES and PRIMES Biomass model, provides outputs to GAINS, and exchanges information with GLOBIOM on livestock, crops, and forestry as well as LULUCF effects.

The CAPRI model provides the agricultural outlook for the Reference Scenario, in particular on livestock and fertilisers use, further it provides the impacts on the agricultural sector from changed biofuel demand. It takes into account recent data and builds on the 2020 EU Agricultural Outlook[44]. Depending on the need it may also be used to run climate mitigation scenarios, diet shift scenarios or CAP scenarios.

Cross checks are undertaken ex-ante and ex-post to ensure consistency with GLOBIOM on overlapping variables, in particular for the crop sector.

Sources for data inputs

The main data source for CAPRI is EUROSTAT. This concerns data on production, market balances, land use, animal herds, prices, and sectoral income. EUROSTAT data are complemented with sources for specific topics (like CAP payments or biofuel production). For Western Balkan regions a database matching with the EUROSTAT inputs for CAPRI has been compiled based on national data. For non-European regions the key data source is FAOSTAT, which also serves as a fall back option in case of missing EUROSTAT data. The database compilation is a modelling exercise on its own because usually several sources are available for the same or related items and their reconciliation involves the optimisation to reproduce the hard data as good as possible while maintaining all technical constraints like adding up conditions.

In the context of this exercise, the CAPRI model uses historical data series at least up to 2017, and the first simulation years (2010 and 2015) are calibrated on historical data.

[43] MCPFE (2015). Forest Europe, 2015: State of Europe's Forests 2015. Madrid, Ministerial Conference on the Protection of Forests in Europe: 314.

[44] EU Agricultural Outlook for markets, income and environment 2020-2030, https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/agricultural-outlook-2020-report_en.pdf

3. *Assumptions on technology, economics and energy prices*

In order to reflect the fundamental socio-economic, technological and policy developments, the Commission prepares periodically an EU Reference Scenario on energy, transport and GHG emissions. The scenarios assessment used for the "Fit for 55" policy package builds on the latest "EU Reference 2020 scenario" (REF2020). [xxx link to publication xxx]

The main assumptions related to economic development, international energy prices and technologies are described below.

a. Economic assumptions

The modelling work is based on socio-economic assumptions describing the expected evolution of the European society. Long-term projections on population dynamics and economic activity form part of the input to the energy model and are used to estimate final energy demand.

Population projections from Eurostat[45] are used to estimate the evolution of the European population, which is expected to change little in total number in the coming decades. The GDP growth projections are from the Ageing Report 2021[46] by the Directorate General for Economic and Financial Affairs, which are based on the same population growth assumptions.

Table 11. Projected population and GDP growth per MS

	Population			GDP growth	
	2020	2025	2030	2020-'25	2026-'30
EU27	447.7	449.3	449.1	0.9%	1.1%
Austria	8.90	9.03	9.15	0.9%	1.2%
Belgium	11.51	11.66	11.76	0.8%	0.8%
Bulgaria	6.95	6.69	6.45	0.7%	1.3%
Croatia	4.06	3.94	3.83	0.2%	0.6%
Cyprus	0.89	0.93	0.96	0.7%	1.7%
Czechia	10.69	10.79	10.76	1.6%	2.0%
Denmark	5.81	5.88	5.96	2.0%	1.7%
Estonia	1.33	1.32	1.31	2.2%	2.6%
Finland	5.53	5.54	5.52	0.6%	1.2%
France	67.20	68.04	68.75	0.7%	1.0%
Germany	83.14	83.48	83.45	0.8%	0.7%
Greece	10.70	10.51	10.30	0.7%	0.6%

[45] EUROPOP2019 population projections https://ec.europa.eu/eurostat/web/population-demography-migration-projections/population-projections-data

[46] The 2021 Ageing Report : Underlying assumptions and projection methodologies https://ec.europa.eu/info/publications/2021-ageing-report-underlying-assumptions-and-projection-methodologies_en

Hungary	9.77	9.70	9.62	1.8%	2.6%
Ireland	4.97	5.27	5.50	2.0%	1.7%
Italy	60.29	60.09	59.94	0.3%	0.3%
Latvia	1.91	1.82	1.71	1.4%	1.9%
Lithuania	2.79	2.71	2.58	1.7%	1.5%
Luxembourg	0.63	0.66	0.69	1.7%	2.0%
Malta	0.51	0.56	0.59	2.7%	4.1%
Netherlands	17.40	17.75	17.97	0.7%	0.7%
Poland	37.94	37.57	37.02	2.1%	2.4%
Portugal	10.29	10.22	10.09	0.8%	0.8%
Romania	19.28	18.51	17.81	2.7%	3.0%
Slovakia	5.46	5.47	5.44	1.1%	1.7%
Slovenia	2.10	2.11	2.11	2.1%	2.4%
Spain	47.32	48.31	48.75	0.9%	1.6%
Sweden	10.32	10.75	11.10	1.4%	2.2%

Beyond the update of the population and growth assumptions, an update of the projections on the sectoral composition of GDP was also carried out using the GEM-E3 computable general equilibrium model. These projections take into account the potential medium- to long-term impacts of the COVID-19 crisis on the structure of the economy, even though there are inherent uncertainties related to its eventual impacts. Overall, conservative assumptions were made regarding the medium-term impacts of the pandemic on the re-localisation of global value chains, teleworking and teleconferencing and global tourism.

b. International energy prices assumptions

Alongside socio-economic projections, EU energy modelling requires projections of international fuel prices. The 2020 values are estimated from information available by mid-2020. The projections of the POLES-JRC model – elaborated by the Joint Research Centre and derived from the Global Energy and Climate Outlook (GECO[47]) – are used to obtain long-term estimates of the international fuel prices.

The COVID crisis has had a major impact on international fuel prices[48]. The lost demand cause an oversupply leading to decreasing prices. The effect on prices compared to pre-COVID estimates is expected to be still felt up to 2030. Actual development will depend on the recovery of global oil demand as well as supply side policies[49].

Table 12 shows the international fuel prices assumptions of the REF2020 and of the different scenarios and variants used in the "Fit for 55" policy package impact assessments.

[47] https://ec.europa.eu/jrc/en/geco
[48] IEA, Global Energy Review 2020, June 2020
[49] IEA, Oil Market Report, June 2020 and US EIA, July 2020.

Table 12: International fuel prices assumptions

in $'15 per boe	2000	‘05	‘10	‘15	‘20	‘25	‘30	‘35	‘40	‘45	‘50
Oil	38.4	65.4	86.7	52.3	39.8	59.9	80.1	90.4	97.4	105.6	117.9
Gas (NCV)	26.5	35.8	45.8	43.7	20.1	30.5	40.9	44.9	52.6	57.0	57.8
Coal	11.2	16.9	23.2	13.1	9.5	13.6	17.6	19.1	20.3	21.3	22.3
in €'15 per boe	2000	2005	‘10	‘15	‘20	‘25	‘30	‘35	‘40	‘45	‘50
Oil	34.6	58.9	78.2	47.2	35.8	54.0	72.2	81.5	87.8	95.2	106.3
Gas (NCV)	23.4	31.7	40.6	38.7	17.8	27.0	36.2	39.7	46.6	50.5	51.2
Coal	9.9	15.0	20.6	11.6	8.4	12.0	15.6	16.9	18.0	18.9	19.7

Source: Derived from JRC, POLES-JRC model, Global Energy and Climate Outlook (GECO)

c. Technology assumptions

Modelling scenarios on the evolution of the energy system is highly dependent on the assumptions on the development of technologies - both in terms of performance and costs. For the purpose of the impact assessments related to the “Climate Target Plan” and the “Fit for 55” policy package, these assumptions have been updated based on a rigorous literature review carried out by external consultants in collaboration with the JRC[50].

Continuing the approach adopted in the long-term strategy in 2018, the Commission consulted on the technology assumption with stakeholders in 2019. In particular, the technology database of the main model suite (PRIMES, PRIMES-TREMOVE, GAINS, GLOBIOM, and CAPRI) benefited from a dedicated consultation workshop held on 11th November 2019. EU Member States representatives also had the opportunity to comment on the costs elements during a workshop held on 25th November 2019. The updated technology assumptions are published together with the EU Reference Scenario 2020.

4. The existing 2030 framework: the EU Reference Scenario 2020

a. The EU Reference Scenario 2020 as the common baseline

The EU Reference Scenario 2020 (REF2020) provides projections for energy demand and supply, as well as greenhouse gas emissions in all sectors of the European economy under the current EU and national policy framework. It embeds in particular the EU legislation in place to reach the 2030 climate target of at least 40% compared to 1990, as well as national contributions to reaching the EU 2030 energy targets on Energy efficiency and Renewables under the Governance of the Energy Union. It thus gives a detailed picture of where the EU economy and energy system in particular would stand in terms of GHG emission if the policy framework were not updated to enable reaching the

[50] JRC118275

revised 2030 climate target to at least -55% compared to 1990 proposed under the Climate Target Plan[51].

The Reference Scenario serves as the common baseline shared by all the initiatives of the "Fit for 55" policy package to assess options in their impact assessments:

- updating the Effort Sharing Regulation,
- updating the Emission Trading System,
- revision of the Renewables Energy Directive,
- revision of the Energy Efficiency Directive,
- revision of the Regulation setting CO2 emission performance standards for cars and light commercial vehicles,
- review of the LULUCF EU rules.

b. Difference with the CTP "BSL" scenario

The REF2020 embeds some differences compared to the baseline used for the CTP impact assessment. While the technology assumptions (consulted in a workshop held on 11th November 2019) were not changed, the time between CTP publication and the publication of the "Fit for 55" package allowed updating some other important assumptions:

- GDP projections, population projections and fossil fuel prices were updated, in particular to take into account the impact of the COVID crisis through an alignment with the 2021 Ageing Report[52] and an update of international fossil fuel prices notably on the short run.
- While the CTP baseline aimed at reaching the current EU 2030 energy targets (on energy efficiency and renewable energy), the Reference Scenario 2020, used as the baseline for the "Fit for 55" package, further improved the representation of the National Energy Climate Plans (NECP). In particular it aims at reaching the national contributions to the EU energy targets, and not at respecting these EU targets themselves.

c. Reference scenario process

The REF2020 scenario has been prepared by the European Commission services and consultants from E3Modelling, IIASA and EuroCare, in coordination with Member States experts through the Reference Scenario Experts Group.

It benefitted from a stakeholders consultation (on technologies) and is aligned with other outlooks from Commission services, notably DG ECFIN's Ageing Report 2021 (see section a), as well as, to the extent possible, the 2020 edition of the EU Agricultural Outlook 2020-2030 published by DG AGRI in December 2020[53].

d. Policies in the Reference scenario

The REF2020 also takes into account the still-unfolding effects of the COVID-19 pandemic, to the extent possible at the time of the analysis. According to the GDP

[51] COM/2020/562 final

[52] The 2021 Ageing Report : Underlying assumptions and projection methodologies https://ec.europa.eu/info/publications/2021-ageing-report-underlying-assumptions-and-projection-methodologies_en

[53] https://ec.europa.eu/info/news/eu-agricultural-outlook-2020-30-agri-food-sector-shown-resilience-still-covid-19-recovery-have-long-term-impacts-2020-dec-16_en

assumptions of the Ageing Report 2021, the pandemic is followed by an economic recovery resulting in moderately lower economic output in 2030 than pre-COVID estimates.

The scenario is based on existing policies adopted at national and EU level at the beginning of 2020. In particular, at EU level, the REF2020 takes into account the legislation adopted in the Clean Energy for All European Package[54]. At national level, the scenario takes into account the policies and specific targets, in particular in relation with renewable energy and energy efficiency, described in the final National Energy and Climate Plans (NECPs) submitted by Member States at the end of 2019/beginning of 2020.

The REF2020 models the policies already adopted, but not the target of net-zero emissions by 2050. As a result, there are no additional policies introduced driving decarbonisation after 2030. However, climate and energy policies are not rolled back after 2030 and several of the measures in place today continue to deliver emissions reduction in the long term. This is the case, for example, for products standards and building codes and the ETS Directive (progressive reduction of ETS allowances is set to continue after 2030).

Details on policies and measures represented in the REF2020 can be found in the dedicated publication [xxx reference to EU Reference 2020 scenario xxx].

e. Reference Scenario 2020 key outputs

For 2030, the REF2020 scenario mirrors the main targets and projections submitted by Member States in their final NECPs. In particular, aggregated at the EU level, the REF2020 projects a 33.2% share of renewable energy in Gross Final Energy Consumption. Final energy consumption is 823 Mtoe, which is 29.6% below the 2007 PRIMES Baseline.

In the REF2020, GHG emissions from the EU in 2030 (including all domestic emissions & intra EU aviation and maritime) are 43.8% below the 1990 level. A carbon price of 30 EUR/tCO_2eq. in 2030 drives emissions reduction in the ETS sector. Table 13 shows a summary of the projections for 2030. A detailed description of the REF2020 can be found in a separate report published by the Commission[55].

Table 13: REF2020 summary energy and climate indicators.

EU 2030	**REF2020**
GHG reductions (incl. Domestic emissions & intra EU aviation and maritime) vs 1990	-43.8%
RES share	33.2%
PEC energy savings	-32.7%
FEC energy savings	-29.6%
Environmental impacts	
GHG emissions reduction in current ETS sectors vs 2005	-48.2%
GHG emissions reduction in current non-ETS sectors vs 2005	-30.7%
Energy system impacts	

[54] COM(2016) 860 final.
[55] Link to reference.

GIC (Mtoe)	1224.2
- Solid fossil fuels	9.3%
- Oil	31.9%
- Natural gas	22%
- Nuclear	11%
- Renewables	25.8%
Final Energy Demand (Mtoe)	822.6
RES share in heating & cooling	32.8%
RES share in electricity	58.5%
RES share in transport	21.2%
Economic and social impacts	
System costs (excl. auction payment) (average 2021-30) as % of GDP	10.9%
Investment expenditures (incl. transport) average annual (2021-30) vs (2011-20) (bn€)	285
EU ETS carbon price (€/ton, 2030)	30
Energy- expenditures (excl. transport) of households as % of total consumption	7.0%

Source: PRIMES model

The system costs (excluding ETS carbon-related payments) reaches close to 11% of the EU's GDP on average over 2021-2030. This cost[56] is calculated ex-post with a private sector perspective applying a flat 10% discount rate[57] over the simulation period up to 2050 to compute investment-related annualized expenditures.

By 2050, final energy consumption is projected at around 790 Mtoe and approximately 74% of the European electricity is generated by renewable energy sources. GHG emissions in the EU are projected to be about 60% lower than in 1990: the REF2020 thus falls short of the European goal of climate neutrality by 2050.

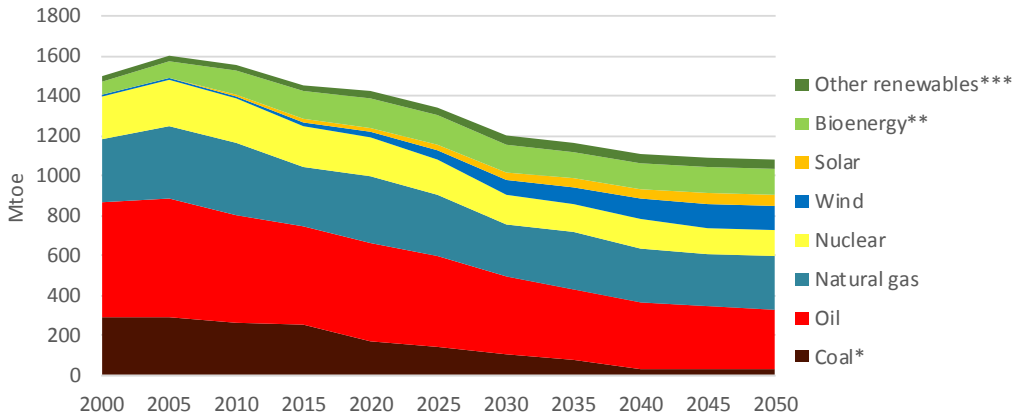
Focusing on the energy system, REF2020 shows that in 2030 fuel mix would still be dominated by fossil fuels. While the renewables grow and fossil fuels decline by 2050, the substitution is not sufficient for carbon neutrality. It also has to be noted that there is no deployment of e-fuels that are crucial for achievement of carbon neutrality as analysed in the Long Term Strategy[58] and in the CTP.

[56] Energy system costs for the entire energy system include capital costs (for energy installations such as power plants and energy infrastructure, energy using equipment, appliances and energy related costs of transport), energy purchase costs (fuels + electricity + steam) and direct efficiency investment costs, the latter being also expenditures of capital nature. For transport, only the additional capital costs for energy purposes (additional capital costs for improving energy efficiency or for using alternative fuels, including alternative fuels infrastructure) are covered, but not other costs including the significant transport related infrastructure costs e.g. related to railways and roads. Direct efficiency investment costs include additional costs for house insulation, double/triple glazing, control systems, energy management and for efficiency enhancing changes in production processes not accounted for under energy capital and fuel/electricity purchase costs. Energy system costs are calculated ex-post after the model is solved.

[57] See the EU Reference Scenario 2020 publication for a further discussion on the roles and levels of discount rates in the modelling, which also represent risk and opportunity costs associated with investments.

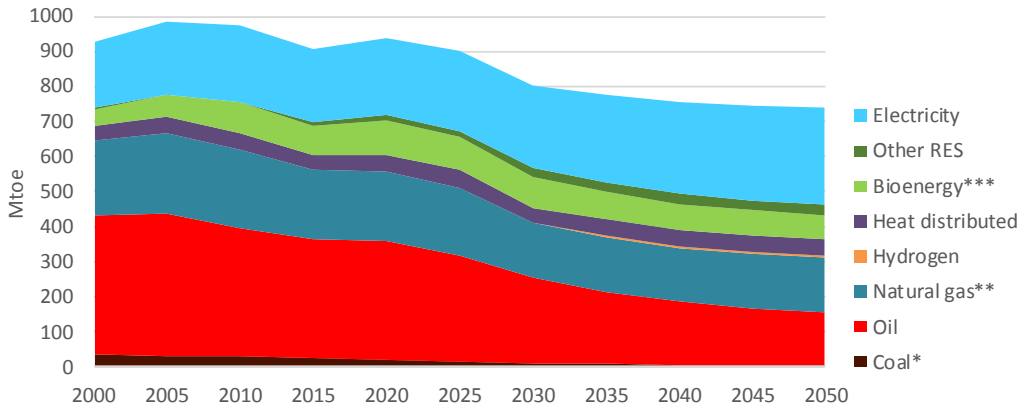
[58] COM(2018) 773

Figure 4: Fuel mix evolution of the Reference Scenario 2020



Source: Eurostat, PRIMES model

Figure 5: Share of energy carriers in final energy consumption in the Reference Scenario 2020

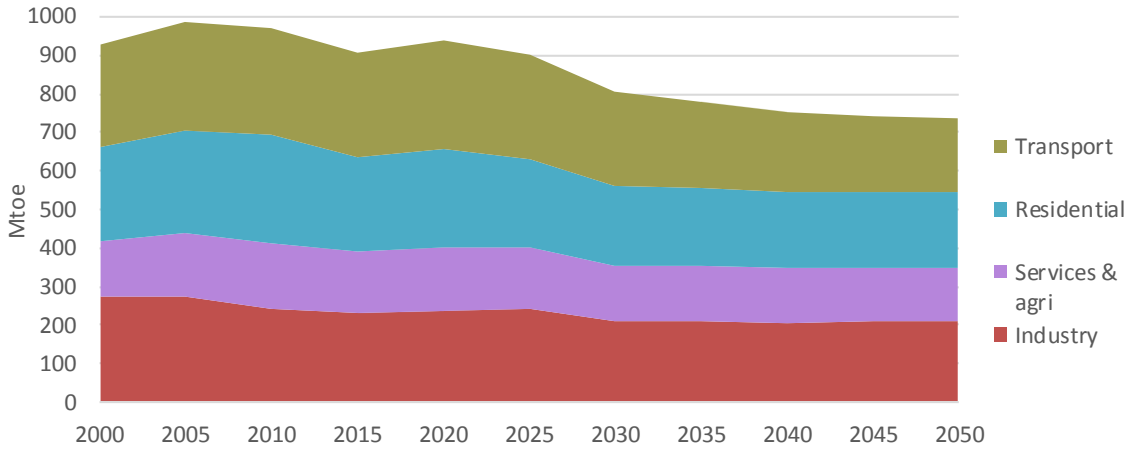


*Note: * includes peat and oil shale; ** includes manufactured gases, *** includes waste*

Source: Eurostat, PRIMES model

Coal use in power generation decrease by 62% by 2030 and almost completely disappear by 2050. Also demand for oil sees a significant decrease of 54% over the entire period – the most important in absolute terms. Electricity generation grows by 24% by 2050.

Figure 6: Final energy demand by sector in the Reference Scenario 2020



Source: Eurostat, PRIMES model

Despite continued economic growth, final energy demand decreases by 18% between 2015 and 2050 (already by 2030 it decreases by more than 8%).

5. Scenarios for the "Fit for 55" policy analysis

a. From the CTP scenarios to "Fit for 55" core scenarios

In the Climate Target Plan (CTP) impact assessment, the increase of efforts needed for the GHG 55% target was illustrated by policy scenarios (developed with the same modelling suite as the scenarios done for the "Fit for 55" package) showing increased ambition (or stringency) of climate, energy and transport policies and, consequently, leading to a significant investment challenge.

The first key lesson from the CTP exercise was that while the tools are numerous and have a number of interactions (or even sometimes trade-offs) a **complete toolbox of climate, energy and transport policies is needed** for the increased climate target as all sectors would need to contribute effectively towards the GHG 55% target.

The second key lesson was that even though policy tools chosen in the CTP scenarios were different - illustrating in particular the fundamental interplay between the strength of the carbon pricing and intensity of regulatory measures - **the results achieved were convergent**. All CTP policy scenarios that achieved a 55% GHG target[59] showed very similar levels of ambition for energy efficiency, renewables (overall and on sectoral level) and GHG reductions across the sectors indicating also the cost-effective pathways.

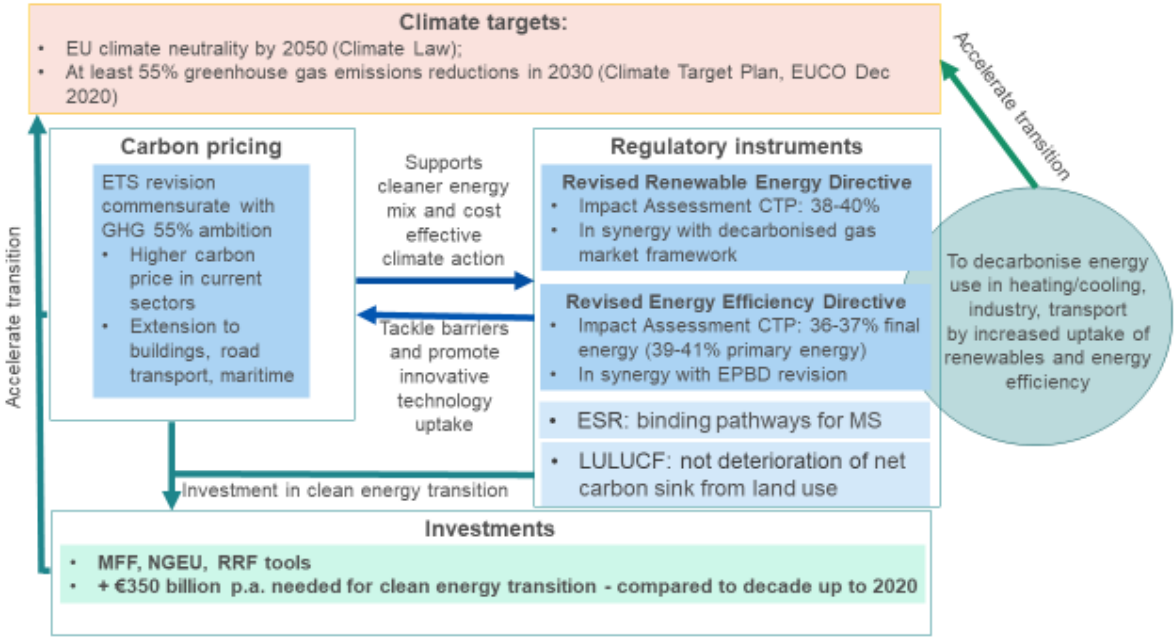
The third lesson was that carbon pricing working hand in hand with regulatory measures helps avoid "extreme" scenarios of either:

- a very high carbon price (in absence of regulatory measures) that will translate into increased energy prices for all consumers,
- very ambitious policies that might be difficult to be implemented (e.g. very high energy savings or renewables obligations) because they would be costly for economic operators or represent very significant investment challenge.

Figure 7 below illustrates the interactions between different policy tools relevant to reach the EU's climate objectives.

Figure 7: Interactions between different policy tools

[59] A 50% GHG target was also analysed



With the 55% GHG target confirmed by EU leaders in the December 2020 EUCO Conclusions[60] and the 2021 Commission Work Programme[61] (CWP 2021) that puts forward the complete toolbox to achieve the increased climate target (so-called "Fit for 55" proposals), the fundamental set-up of the CTP analysis was confirmed. This set-up is still about the interplay between carbon pricing and regulatory measures as illustrated above, and the extension of the ETS is the central policy question.

As described above, the policy scenarios of the CTP assessment are cost-effective pathways that capture all policies needed to achieve the increased climate target of 55% GHG reductions. This fundamental design remains robust and the CTP scenarios were thus used as the basis to define the "Fit for 55" policy scenarios.

In the context of the agreed increased climate target of a net reduction of 55% GHG compared to 1990, the 50% GHG scenario (CTP MIX-50) explored in the CTP has been discarded since no longer relevant. The contribution of extra EU aviation and maritime emissions in the CTP ALLBNK scenario was assessed in the respective sector specific impact assessments and was not retained as a core scenario. This leaves the following CTP scenarios in need of further revisions and updates in the context of preparing input in a coherent manner for the set of IAs supporting the "Fit for 55" package, ensuring the achievement of the overall net 55% GHG reduction ambition with similar levels of renewable energy and energy efficiency deployment as in CTP:

- CTP REG (relying only on intensification of energy and transport policies in absence of carbon pricing beyond the current ETS sectors);
- CTP MIX (relying on both carbon price signal extension to road transport and buildings and intensification of energy and transport policies);
- CTP CPRICE (relying chiefly on carbon price signal extension, and more limited additional sectoral policies).

[60] https://www.consilium.europa.eu/media/47328/1011-12-20-euco-conclusions-fr.pdf
[61] COM(2020) 690 final

b. Scenarios for the "Fit for 55"package

Based on the Climate Target Plan analysis, some **updates were needed** though for the purpose of the "Fit for 55" assessment, in terms of:

- **Baseline**:
  - to reflect the most recent statistical data available, notably in terms of COVID impacts,
  - to capture the objectives and policies put forward by Member States in the NECPs, which were not all available at the time of the CTP analysis,

The baseline used in the Fit for 55 package is thus the "Reference Scenario 2020", as described in section 4.

- **Scenario design** in order to align better with policy options as put forward in the CWP 2021 and respective Inception Impact Assessments[62].

As a consequence, the three following core policy scenarios were defined to serve as common policy package analysis across the various initiatives of the "Fit for 55" policy assessments:

- **REG**: an update of the CTP REG case (relying only on very strong intensification of energy and transport policies in absence of carbon pricing beyond the current ETS sectors).
- **MIX**: reflecting an update of the CTP MIX case (relying on both carbon price signal extension to road transport and buildings and strong intensification of energy and transport policies). With its uniform carbon price (as of 2025), it reflects either an extended and fully integrated EU ETS or an existing EU ETS and new ETS established for road transport and buildings with emission caps set in line with cost-effective contributions of the respective sectors.
- **MIX-CP**: representing a more carbon price driven policy mix, combining thus the general philosophy of the CTP CPRICE scenario with key drivers of the MIX scenario albeit at a lower intensity. It illustrates a revision of the EED and RED but limited to a lower intensification of current policies in addition to the carbon price signal applied to new sectors.
  Unlike MIX, this scenario allows to separate carbon price signals of "current" and "new" ETS. The relative split of ambition in GHG reductions between "current" ETS and "new ETS" remains, however, close in MIX-CP to the MIX scenario leading to differentiated carbon prices between "current" ETS and "new" ETS[63].

These three "Fit for 55" core policy scenarios have been produced starting from the Reference Scenario 2020 and thus use the same updated assumptions on post-COVID economics and international fuel prices.

Table 14 provides an overview of the policy assumptions retained in the three core policy scenarios. It refers in particular to different scopes of emissions trading system ("ETS"):

---

[62] Importantly, all "Fit for 55" core scenarios reflect the Commission Work Programme (CWP) 2021 in terms of elements foreseen. This is why assumptions are made about legislative proposals to be made later on - by Quarter 4 2021. On the energy side, the subsequent proposals are: the revision of the EPBD, the proposal for Decarbonised Gas Markets and the proposal for reducing methane emissions in the energy sector. For transport they refer to the revision of the TEN-T Regulation and the revision of the ITS Directive. In addition, other policies that are planned for 2022 are also represented in a stylised way in these scenarios, similar to the CTP scenarios. In this way, core scenarios represent all key policies needed to deliver the increased climate target.

[63] This is a feature not implemented in the CTP CPRICE scenario.

- “current+”: refers to the current ETS extended to cover also national and international intra-EU maritime emissions[64]: this scope applies to all scenarios,
- “new”: refers to the new ETS for buildings and road transport emissions: this scope applies in MIX and MIX-CP up to 2030,
- “large”: refers to the use of emissions trading systems covering the “current” scope ETS, intra-EU maritime, buildings and road transport (equivalent to “current+” + “new”): this scope applies in MIX and MIX-CP after 2030.

The scenarios included focus on emissions within the EU, including intra-EU navigation and intra-EU aviation emissions. The inclusion or not of extra-EU navigation and extra-EU maritime emissions is assessed in the relevant sector specific Impact Assessments.

[64] For modelling purposes “national maritime” is considered as equal to “domestic navigation”, i.e. also including inland navigation.

Table 14: Scenario assumptions description (scenarios produced with the PRIMES-GAINS-GLOBIOM modelling suite)

<table>
<tr><th>Scenario</th><th>REG</th><th>MIX</th><th>MIX-CP</th></tr>
<tr><td rowspan="3">Brief description: ETS</td><td rowspan="3">Extension of “current” ETS to also cover intra-EU maritime navigation[65]

Strengthening of “current+” ETS in line with -55% ambition</td><td colspan="2">By 2030: 2 ETS systems:
- one “current+” ETS (current extended to intra-EU maritime)
- one “new” ETS applied to buildings and road transport

After 2030: both systems are integrated into one “large” ETS</td></tr>
<tr><td rowspan="2">Relevant up to 2030: the 2 ETSs are designed so that they have the same carbon price, in line with -55% ambition</td><td>Relevant up to 2030: “current+” ETS reduces emissions comparably to MIX</td></tr>
<tr><td>Lower regulatory intervention resulting in higher carbon price than in MIX, notably in the “new” ETS</td></tr>
<tr><td>Brief description: sectoral policies</td><td>High intensity increase of EE, RES, transport policies versus Reference</td><td>Medium intensity increase of EE, RES and transport policies versus Reference</td><td>Lower intensity increase of EE and RES policies versus Reference.

Transport policies as in MIX (except related to CO2 standards)</td></tr>
<tr><td>Target scope</td><td colspan="3">EU27</td></tr>
</table>

[65] “Intra-EU navigation” in this table includes both international intra-EU and national maritime. Due to modelling limitations, energy consumption by “national maritime” is assumed to be the same as “domestic navigation”, although the latter also includes inland navigation.

Scenario	**REG**	**MIX**	**MIX-CP**
Aviation	Intra-EU aviation included, extra-EU excluded		
Maritime navigation	Intra-EU maritime included, extra-EU excluded		
Achieved GHG reduction of the target scope			
Including LULUCF	Around 55% reductions		
Excluding LULUCF	Around 53% reductions		
Assumed Policies			
Carbon pricing (stylised, for small industry, international aviation and maritime navigation may represent also other instruments than EU ETS such as taxation or CORSIA for aviation)			
Stationary ETS	Yes		
Aviation-Intra EU ETS	Yes		
Aviation - Extra EU ETS	Yes: mixture 50/50 carbon pricing (reflecting inclusion in the “current+” / “large” ETS, or taxation, or CORSIA) and carbon value (reflecting operational and technical measures); total equal to the carbon price of the “current+” (up to 2030) / “large” ETS		
Maritime-Intra EU ETS	Yes, carbon pricing equal to the price of the “current+” (up to 2030) / “large” EU ETS		

Scenario	REG	MIX	MIX-CP
Maritime-Extra EU ETS	As in MIX (but applied to the "current+" ETS)	Up to 2030: no carbon pricing. After 2030: 50% of extra-EU MRV[66] sees the "large" ETS price, while the remaining 50% sees a carbon value equal to the "large" ETS carbon price.	
Buildings and road transport ETS	No	Yes (in the "new" ETS up to 2030, and in the "large" ETS after 2030)	
CO_2 standards for LDVs and HDVs	CO_2 standards for LDVs and HDVs + Charging and refuelling infrastructure development (review of the Directive on alternative fuels infrastructure and TEN-T Regulation & funding), including strengthened role of buildings		
	High ambition increase	Medium ambition increase	Lower ambition increase
EE policies overall ambition	High ambition increase	Medium ambition increase	Lower ambition increase
EE policies in buildings	High intensity increase (more than doubling of renovation rates assumed)	Medium intensity increase (at least doubling of renovation rates assumed)	Lower intensity increase, no assumptions on renovation rates increases
EE policies in transport	High ambition increase	Medium intensity increase	As in MIX
RES policies overall ambition	High ambition increase	Medium intensity increase	Lower ambition increase except for transport (see below)

[66] 50% of all incoming and all outgoing extra-EU voyages

Scenario	**REG**	**MIX**	**MIX-CP**
RES policies in buildings + industry	Incentives for uptake of RES in heating and cooling	Incentives for uptake of RES in heating and cooling	No increase of intensity of policy (compared to Reference)
RES policies in transport and policies impacting transport fuels	Increase of intensity of policies to decarbonise the fuel mix (reflecting ReFuelEU aviation and FuelEU maritime initiatives). Origin of electricity for "e-fuels" under the aviation and shipping mandates: up to 2035 (inclusive) "e-fuels" (e-liquids, e-gas, hydrogen) are produced from renewable electricity, applying additionality principle. from 2040 onwards "e-fuels" are produced from "low carbon" electricity (i.e. nuclear and renewable origin). No application of additionality principle. CO_2 from biogenic sources or air capture.		
Taxation policies	Central option on energy content taxation of the ETD revision		
Additional non-CO_2 policies (represented by a carbon value)	Medium ambition increase		

c. *Quantitative elements and key modelling drivers*

Policies and measures are captured in the modelling analysis in different manners. Some are explicitely represented such as for instance improved product energy performance standards, fuel mandates or carbon pricing in an emission trading system. Others are represented by modelling drivers ("shadow values") used to achieve policy objectives.

The overall need for investment in new or retrofitted equipment depends on expected future demand and expected scrapping of installed equipment. The economic modelling of the competition among available investment options is based on:

- the investment cost, to which a "private" discount rate is applied to represent risk adverseness of the economic agents in the various sectors[67],
- fuel prices (including their carbon price component),
- maintenance costs as well as performance of installations over the potential lifetime of the installation,
- the relevant shadow values representing energy efficiency or renewable energy policies.

In particular, carbon pricing instruments impact economic decisions related to operation of existing equipment and to investment, in the different sectors where they apply. Table 15 shows the evolution of the ETS prices by 2030 in the Reference and core scenarios.

Table 15: ETS prices by 2030 in the difference scenarios (€2015/tCO2)

Scenarios	Carbon price "current" ETS sectors		Carbon price "new" ETS sectors	
	2025	2030	2025	2030
REF2020	27	30	0	0
REG	31	42	0	0
MIX	35	48	35	48
MIX-CP	35	52	53	80

The investment decisions are also taken considering foresight of the future development of fuel prices, including future carbon values[68] post 2030. Investment decisions take into account expectations about climate and energy policy developments, and this carbon value achieves in 2050 levels between €360/tCO2 (in REG, where energy policy drivers play comparatively a larger role) and €430/tCO2 (MIX-CP)[69].

[67] For more information on the roles and levels of discount rates applied per sector, see the EU Reference Scenario 2020 publication.

[68] Post 2030, carbon values should not be seen as a projected carbon price in emissions trading, but as a shadow value representing a range of policies to achieve climate neutrality that are as yet to be defined.

[69] The foresight and the discounting both influence the investment decisions. While in the modelling the discounting is actually applied to the investment to compute annualised fixed costs for the investment decision, its effect can be illustrated if applied to the future prices instead: for example, the average discounted carbon price in 2030 for the period 2030-2050 for renovation of houses and for heating equipment, applying a 12% discount rate, is €65 in the MIX scenario and €81 in the MIX CP scenario.

In complement to carbon pricing drivers, the modelling uses "shadow values" as drivers to reach energy policy objectives of policies and measures that represent yet to be defined policies in the respective fields: the so-called "energy efficiency value" and "renewable energy value", which impact investment decision-making in the model. These values are thus introduced to achieve a certain ambition on energy efficiency, for instance related to national energy efficiency targets and renewable energy targets in the NECPs as represented in the Reference Scenario 2020, or increased renovation rates in buildings and increased sector specific renewable energy ambition related to heating and cooling in the policy scenarios.

Table 16 shows average 2025-2035 values for the different scenarios. The values in REF2020 reflect the existing policy framework, to meet notably the national energy targets (both energy efficiency and renewable energy) as per the NECPs. They are typically higher in policy scenarios that are based on regulatory approaches than in scenarios that are more based on carbon pricing. The "energy efficiency value" and "renewable energy value" also interact with each other through incentivising investment in options which are both reducing energy demand and increasing the contribution of renewables, like heat pumps. This is for instance the case in the REG scenario, where the comparatively higher "energy efficiency value" complements the "renewable energy value" in contributing to the renewable energy performance of the scenario, notably through the highest heat pump penetration of all scenarios.

Table 16: Energy efficiency value and renewable energy value (averaged 2025-2035)

Scenarios	Average renewables shadow value	Average energy efficiency shadow value
	(€'15/ MWh)	(€'15/ toe)
REF2020	62	330
REG	121	1449
MIX	61	1052
MIX-CP	26	350

Specific measures for the transport system

Policies that aim at improving the efficiency of the transport system (corresponding to row "EE in Transport" in the Table 14), and thus reduce energy consumption and CO_2 emissions, are phased-in in scenarios that are differentiated in terms of level of ambition (low, medium, high ambition increase). All scenarios assume an intensification of such policies relative to the baseline. Among these policies, the CO_2 emission standards for vehicles are of particular importance. The existing standards[70], applicable from 2025 and

[70] The existing legislation sets for newly registered passengers cars, an EU fleet-wide average emission target of 95 gCO_2/km from 2021, phased in from 2020. For newly registered vans, the EU fleet-wide average emission target is 147 gCO_2 /km from 2020 onward. Stricter EU fleet-wide CO_2 emission targets, start to apply from 2025 and from 2030. In particular emissions will have to reduce by 15% from 2025 for both cars and vans, and by 37.5% and 31% for cars and vans respectively from 2030, as compared to 2021. From 2025 on, also trucks manufacturers will have to meet CO_2 emission targets. In particular, the EU fleet-wide average CO_2 emissions of newly registered trucks will have to reduce by 15% by 2025 and 30% by 2030, compared to the average emissions in the reference period (1 July 2019–30 June 2020). For cars, vans and trucks, specific incentive systems are also set to incentivise the uptake of zero and low-emission vehicles.

from 2030, set binding targets for automotive manufacturers to reduce emissions and thus fuel consumption and are included in the Reference Scenario.

Medium ambition increase

In this case, the following policy measures are considered that drive improvements in transport system efficiency and support a shift towards more sustainable transport modes, and lead to energy savings and emissions reductions:

- Initiatives to increase and better manage the capacity of railways, inland waterways and short sea shipping, supported by the TEN-T infrastructure and CEF funding;
- Gradual internalisation of external costs ("smart" pricing);
- Incentives to improve the performance of air navigation service providers in terms of efficiency and to improve the utilisation of air traffic management capacity;
- Incentives to improve the functioning of the transport system: support to multimodal mobility and intermodal freight transport by rail, inland waterways and short sea shipping;
- Deployment of the necessary infrastructure, smart traffic management systems, transport digitalisation and fostering connected and automated mobility;
- Further actions on clean airports and ports to drive reductions in energy use and emissions;
- Measures to reduce emissions and air pollution in urban areas;
- Pricing measures such as in relation to energy taxation and infrastructure charging;
- Revision of roadworthiness checks;
- Other measures incentivising behavioural change;
- Medium intensification of the CO_2 emission standards for cars, vans, trucks and buses (as of 2030), supported by large scale roll-out of recharging and refuelling infrastructure. This corresponds to a reduction in 2030 compared to the 2021 target of around 50% for cars and around 40% for vans.

Low ambition increase

In this case, the same policy measures as in the *Medium ambition increase* are included. However, limited increase in ambition for CO_2 emission standards for vehicles (passenger cars, vans, trucks and buses) as of 2030 is assumed, supported by the roll-out of recharging and refuelling infrastructure. This corresponds to a reduction in 2030 compared to the 2021 target of around 40% for cars and around 35% for vans.

High ambition increase

Beyond measures foreseen in the medium ambition increase case, the high ambition increase case includes:

- Further measures related to intelligent transport systems, digitalisation, connectivity and automation of transport - supported by the TEN-T infrastructure;
- Additional measures to improve the efficiency of road freight transport;
- Incentives for low and zero emissions vehicles in vehicle taxation;
- Increasing the accepted load/length for road in case of zero-emission High Capacity Vehicles;
- Additional measures in urban areas to address climate change and air pollution;
- Higher intensification of the CO_2 emission standards for cars, vans, trucks and buses (as of 2030) as compared to the medium ambition increase case, leading to lower CO_2 emissions and fuel consumption and further incentivising the deployment of zero- and low-emission vehicles, supported by the large scale roll-out of recharging and

refuelling infrastructure. This corresponds to a reduction in 2030 compared to the 2021 target of around 60% for cars and around 50% for vans.

Drivers of reduction in non-CO_2 GHG emissions

Non-CO_2 GHG emission reductions are driven by both the changes taking place in the energy system due to the energy and carbon pricing instruments, and further by the application of a carbon value that triggers further cost efficient mitigation potential (based on the GAINS modelling tool) in specific sectors such as waste, agriculture or industry.

Table 17: Carbon value applied to non-CO_2 emissions in the GAINS model (€2015/tCO_2)

Scenarios	Non-CO_2 carbon values	
	2025	2030
REF2020	0	0
REG	4	4
MIX	4	4
MIX-CP	5	10

d. Key results and comparison with Climate Target Plan scenarios

Table 18: Key results of the FF55 core scenarios analysis

2030 unless otherwise stated		REF	REG	MIX	MIX-CP
EU27	metric	2030	2030	2030	2030
Key results					
GHG emissions* reductions (incl. intra EU aviation and maritime, incl. LULUCF)	% reduction from 1990	45%	55%	55%	55%
GHG emissions* reductions (incl. intra EU aviation and maritime, excl. LULUCF)	% reduction from 1990	43.4%	53.0%	52.9%	52.9%
Overall RES share	%	33%	40%	38%	38%
RES-E share	%	59%	65%	65%	65%
RES-H&C share	%	33%	41%	38%	36%
RES-T share	%	21%	29%	28%	27%
PEC energy savings	% reduction from 2007 Baseline	33%	39%	39%	38%
FEC energy savings	% reduction from 2007 Baseline	30%	37%	36%	35%
Environmental impacts					
CO2 emissions reductions (intra-EU scope, excl. LULUCF), of which	(% change from 2015)	-30%	-43%	-42%	-42%
Supply side (incl. power generation, energy branch, refineries and district heating)	(% change from 2015)	-49%	-62%	-63%	-64%

Power generation	(% change from 2015)	-51%	-64%	-65%	-67%
Industry (incl. process emissions)	(% change from 2015)	-10%	-23%	-23%	-23%
Residential	(% change from 2015)	-32%	-56%	-54%	-50%
Services	(% change from 2015)	-36%	-53%	-52%	-48%
Agriculture energy	(% change from 2015)	-23%	-36%	-36%	-35%
Transport (incl. domestic and intra EU aviation and navigation)	(% change from 2015)	-17%	-22%	-21%	-21%
Non-CO2 GHG emissions reductions (excl. LULUCF)	(% change from 2015)	-22%	-32%	-32%	-33%
Reduced air pollution compared to REF	(% change)			-10%	
Reduced health damages and air pollution control cost compared to REF - Low estimate	(€ billion/year)			24.8	
Reduced health damages and air pollution control cost compared to REF - High estimate	(€ billion/year)			42.7	
Energy system impacts					
Gross Available Energy (GAE)	Mtoe	1,289	1,194	1,198	1,205
Primary Energy Intensity	toe/M€'13	83	75	76	76
Share of fuels in GAE					
- Solids share	%	9%	6%	5%	5%
- Oil share	%	34%	33%	33%	33%
- Natural gas share	%	21%	20%	20%	21%
- Nuclear share	%	10%	11%	11%	11%
- Renewables share	%	26%	31%	30%	30%
- Bioenergy share	%	13%	13%	12%	12%
- Other Renewables than bioenergy share	%	13%	18%	18%	18%
Gross Electricity Generation (TWh)	TWh	2,996	3,152	3,154	3,151
- Gas share	%	14%	12%	13%	14%
- Nuclear share	%	17%	16%	16%	16%
- Renewables share	%	59%	65%	65%	65%
Economic impacts					
Investment expenditures (excl. transport) (2021-30)	bn €'15/year	297	417	402	379
Investment expenditures (excl. transport) (2021-30)	% GDP	2.1%	3.0%	2.9%	2.7%
Additional investments to REF	*bn €'15/year*		*120*	*105*	*83*
Investment expenditures (incl. transport) (2021-30)	bn €'15/year	944	1068	1051	1028
Investment expenditures (incl. transport) (2021-30)	% GDP	6.8%	7.7%	7.6%	7.4%
Additional investments to REF	*bn €'15/year*		*124*	*107*	*84*
Additional investments to 2011-20	*bn €'15/year*	*285*	*408*	*392*	*368*
Energy system costs excl. carbon pricing and disutility (2021-30)	bn €'15/year	1518	1555	1550	1541
Energy system costs excl. carbon pricing and disutility (2021-30)	% GDP	10.9%	11.2%	11.2%	11.1%
Energy system costs incl. carbon	bn €'15/year	1535	1598	1630	1647

pricing and disutility (2021-30)					
Energy system costs incl. carbon pricing and disutility (2021-30)	% GDP	11.0%	11.5%	11.7%	11.8%
ETS price in current sectors (and maritime)	€/tCO2	30	42	48	52
ETS price in new sectors (buildings and road transport)	€/tCO2	0	0	48	80
Average Price of Electricity	€/MWh	158	156	156	157
Import dependency	%	54%	52%	53%	53%
Fossil fuels imports bill savings compared to REF for the period 2021-30	bn €'15		136	115	99
Energy-related expenditures related to buildings (excl. disutility)	% of private consumption	6.9%	7.5%	7.5%	7.4%
Energy-related expenditures related to transport (excl. disutility)	% of private consumption	18.1%	18.1%	18.3%	18.5%
GDP impacts		GEM-E3 range: -0.2% (with crowding out) to 0.52% (without crowding out) increase in 2030 compared to Reference			
Employment impacts		GEM-E3 range: -0.3% (with crowding out) to 0.36% (without crowding out) increase in 2030 compared to Reference			

*Note: *All scenarios achieve 55% net reductions in 2030 compared to 1990 for domestic EU emissions, assuming net LULUCF contributions of 255 Mt CO_2-eq. in 1990 and 225 Mt CO_2-eq. in 2030 and including national, intra-EU maritime and intra-EU aviation emissions.*

Source: PRIMES model, GAINS model

Table 19: Comparison with the CTP analysis

Results for 2030	CTP 55% GHG reductions scenarios range (REG, MIX, CPRICE, ALLBNK)	"Fit for 55" core scenarios range (REG, MIX, MIX-CP)
Overall net GHG reduction (w.r.t. 1990)*	55%	55%
Overall RES share	38-40%	38-40%
RES-E	64-67%	65%
RES-H&C	39-42%	36-41%
RES-T	22-26%	27-29%
FEC EE	36-37%	35-37%
PEC EE	39-41%	38-39%
CO_2 reduction on the supply side (w.r.t. 2015)	67-73%	62-64%
CO_2 reduction in residential sector (w.r.t. 2015)	61-65%	50-56%
CO_2 reduction in services sector (w.r.t. 2015)	54-61%	48-53%
CO_2 reduction in industry (w.r.t. 2015)	21-25%	23%

CO_2 reduction in intra-EU transport (w.r.t. 2015)	16-18%	21-22%
CO_2 reduction in road transport (w.r.t. 2015)	19-21%	24-26%
Non-CO_2 GHG reductions (w.r.t. 2015)	31-35%	32-33%
Investments magnitude, excluding transport (in bn€/per year)	401-438 bn/year	379-417 bn/per year
Energy system costs (excl. auction payments and disutilities) as share of GDP (%, 2021-2030)	10.9-11.1%	11.1-11.2%

*Note: *All scenarios achieve 55% net reductions in 2030 compared to 1990 for domestic EU emissions, assuming net LULUCF contributions of 255 Mt CO2-eq. in 1990 and 225 Mt CO2-eq. in 2030 and including national, intra-EU maritime and intra-EU aviation emissions (except the CTP ALLBNK that achieves 55% net reductions including also emissions from extra-EU maritime and aviation).*

Source: PRIMES model, GAINS model

Regarding results for Member States, this Annex is complemented by detailed modelling results at EU and MS level for the different core policy scenarios:

- Energy, transport and overall GHG (PRIMES model)
- Detailed on non-CO_2 emissions (GAINS model)
- LULUCF emissions (GLOBIOM model)
- Air pollution (GAINS model)

6. Policy scenarios variants for this impact assessment

The additional scenarios conceived for the impact assessment of energy efficiency policies are variants of the core scenarios. All the variants aim at achieving at least the 55% GHG emission reduction target by 2030 and reach climate neutrality by 2050.

The MIX-FLEX scenario variant builds on the MIX scenario, but energy efficiency effort are re-allocated across Member States as a result of mandatory targets per Member State.

MIX-MAX scenario builds on MIX scenario, but assumes the obligations to implement energy audits. This induces slightly higher energy savings in the industrial sectors compared to the MIX. The results shows that increased waste heat recovery in industry in MIX-MAX compared to MIX.

The REG-MAX scenario has the same assumptions about energy audits as MIX-MAX, but builds on REG, which by assumption assumed higher energy savings from waste heat recovery than MIX. This results in even higher levels of heat recovery than in MIX-MAX.

The REG-Cert scenario build on the REG scenario, but the price of the White Certificates (modelled as the shadow price of the energy efficiency improvement) is the same for all countries and all sectors. However, the cost of energy efficiency investments is lower in households compared to other sectors where White Certificates apply. This results in more investments for energy efficiency in households (*i.e.* renovation of the building envelope) compared to the standard REG. Similarly, to MIX-FLEX, REG-Cert has mandatory national targets for energy efficiency.

All scenarios assume increased energy savings. The design of the core policy scenarios MIX and REG has applied a simple proportionality rule for increasing energy efficiency policies relative to the Reference scenario. As these scenarios reflected the NECP's plans on energy efficiency, a simple proportional rule is used to increase energy efficiency effort in the core scenarios. The intensity of energy efficiency policies (in particular in the buildings sector) so that the marginal cost of increasing energy savings is a fixed proportion of the marginal cost of energy savings per Member State (as calculated by the PRIMES model) for the Reference scenario projection. In this manner, the core scenarios have preserved the points of view of the national plans about the volume of savings. However, the proportionality rule does not ensure cost-efficiency of the allocation of the overall energy efficiency effort across the Member States.

Using a model-based analysis, it is possible to calculate two distinct indicators useful to evaluate cost-efficiency of the effort allocation across the Member States. The first indicator is average costs of energy savings in the building sectors calculated by dividing total energy sector costs cumulatively over the period 2020-2030 in the core scenarios by the cumulative energy savings relative to the Reference scenario projection. The cost indicator measures two effects, namely the distance from savings' potential, given that marginal costs of savings increase when the volume of savings approaches the potential, and the unit costs of insulation and renovation works and services, which depend on economic conditions in the supply of renovation services. The second indicator measures total energy saving costs including renovation costs as a share of total income of households. The indicator differs across the Member States due to different income levels and to different energy consumption levels per unit of income. The income-related indicator is a measurement of equity regarding the effort of energy efficiency. One should combine the two indicators to evaluate cost-efficiency of the energy efficiency effort. The cost indicator measures economic performance and the income-related one measures social and economic feasibility. The aggregation of the two indicators into a

single one uses a Cobb-Douglas aggregation function with fixed elasticities, with higher elasticity value attributed to the cost indicator.

These criteria were used to increase energy efficiency costs in the scenario. Table 20 summarises the main specifications of the variant scenario.

Table 20 Short description of the variant scenario (core policy scenarios are reported for comparison).

Scenario name	**REF (option 1)**	**MIX-CP (option 3)**	**MIX (option 4)**	**MIX-Flex (option 5)**	**MIX-MAX (option 6)**	**REG (option 7)**	**REG-MAX (option 8)**	**REG-Cert (option 9)**
Core scenario as basis	Reference scenario	Core scenario	Core scenario	MIX	MIX	Core scenario	REG	REG
Targets and governance								
FEC Target (A) -Articles 1 and 3	-29.6%	-34.6%	-35.7%	-35.8%	-36.1%	-37%	-37.2%	-36.7%
Governance rule for FEC targets at national level	NECP and governance procedure as in current legislation	Indicative	Target at EU level and governance procedure to monitor MS performance	Binding by MS and enhanced governance procedure	Target at EU level and governance procedure to monitor MS performance	Target at EU level and governance procedure to monitor MS performance	Binding by MS and enhanced governance procedure	Binding by MS and enhanced governance procedure
Article 7 (B)	0.9%	1.4%	1.5%	1.5%	1.5%	1.6%	1.6%	1.6%
Building renovation rates(B)	Not applicable	Not applicable	Doubling renovation rates and increased depth (+15%)	Doubling renovation rates and increased depth (+15%)	More than doubling renovation rates and increased depth (+15%)	2.5 times higher renovation rates and increased depth (+20%)	More than 2.5 times higher renovation rates and increased depth (+20%)	2.5 times higher renovation rates and increased depth (+20%)
Novel policy instruments	NO	NO	NO	NO	NO	NO	NO	White certificates (C)
Changes in Articles of the EED								
Energy Efficiency First (D)	Not applicable	Moderate	Moderate	Moderate	High	Moderate	High	Moderate
Article 5	As currently legislated	Low increase in ambition	Moderate increase in ambition	Moderate increase in ambition	High increase in ambition	High increase in ambition	High increase in ambition	High increase in ambition
Article 6 (E)	As currently legislated	Moderate	Moderate	Moderate	High	Moderate	High	Moderate
Article 8 (F)	As currently legislated	Low increase in ambition	Moderate increase in ambition	Moderate increase in ambition	High increase in ambition	High increase in ambition	High increase in ambition and above REG for industry	High increase in ambition
New transport article	Not applicable	Included in transport sector policies	Included in transport sector policies	Included in transport sector policies	Included in transport sector policies	Included in transport sector policies	Included in transport sector policies	Included in transport sector policies
Article 14 (G)	NECP policies	Low increase	Medium ambition of dedicated	Medium ambition of dedicated	Medium ambition of dedicated	High ambition of dedicated	High ambition of dedicated	High ambition of dedicated

Scenario name	REF (option 1)	MIX-CP (option 3)	MIX (option 4)	MIX-Flex (option 5)	MIX-MAX (option 6)	REG (option 7)	REG-MAX (option 8)	REG-Cert (option 9)
		above REF	RES policies	RES policies	RES policies	RES policies	RES policies	RES policies
Article 15	As currently legislated	Low efficiency gains in grid infrastructure	Efficiency gains in grid infrastructure	Efficiency gains in grid infrastructure	Efficiency gains in grid infrastructure	Efficiency gains in grid infrastructure	Efficiency gains in grid infrastructure	Efficiency gains in grid infrastructure
Article 18 (H)	As currently legislated	Enhanced	Enhanced	Enhanced	Enhanced	Enhanced	Enhanced	Enhanced
Articles 12, 16, 20 and 24 (I)	As currently legislated	Enhanced	Enhanced	Enhanced	Enhanced	Enhanced	Enhanced	Enhanced
Policies under other legislation affecting energy efficiency directly or indirectly								
Price policies affecting energy efficiency indirectly	EU ETS carbon prices (ETS sectors only)	Extension of ETS to buildings and road transport	Extension of ETS to buildings and road transport	Extension of ETS to buildings and road transport	Extension of ETS to buildings and road transport	EU ETS carbon prices (ETS sectors only)	EU ETS carbon prices (ETS sectors only)	EU ETS carbon prices (ETS sectors only)
RES policies affecting energy efficiency indirectly	As in NECPs	Modest increase in ambition	Moderate ambition, incl. for heat pumps	Moderate ambition, incl. for heat pumps	Moderate ambition, incl. for heat pumps	High ambition, incl. for heat pumps	High ambition, incl. for heat pumps	High ambition, incl. for heat pumps
RES fuels mandates in transport	As currently legislated	No new obligation	Added RES fuel obligation	Added RES fuel obligation	Added RES fuel obligation	Added more ambitious RES fuel obligation	Added more ambitious RES fuel obligation	Added more ambitious RES fuel obligation
CO_2 standards in transport	As currently legislated	Low ambition increase	Medium ambition increase	Medium ambition increase	Medium ambition increase	High ambition increase	High ambition increase	High ambition increase
Ecodesign Directive	As currently legislated	Enhanced	Enhanced	Enhanced	Enhanced	Enhanced	Enhanced	Enhanced
Industrial Emissions Directive	As currently legislated	As currently legislated	Better enforcement	Better enforcement	Better enforcement	Maximum enforcement	Maximum enforcement	Maximum enforcement
Efficiency standards for data centres			YES	YES	YES	YES	YES	YES
EPBD	As currently legislated	As currently legislated	Better enforcement	Better enforcement	Better enforcement	Maximum enforcement	Maximum enforcement	Maximum enforcement
Energy performance of new buildings	As currently legislated	As currently legislated	Tightening of standards	Tightening of standards	Tightening of standards	Tightening of standards	Tightening of standards	Tightening of standards

Notes:

(A): Final energy consumption target in 2030 for the metric Europe 2020-2030, as % change of energy consumption from the projection of PRIMES 2007 for the respective year. A target on primary energy consumption is also considered but generally it is exceeded in the scenarios due to the increase in RES in the power sector and the extended coal phase-out in most Member States.

(B): The targets under Article 7 are calculated per scenario following an iterative approach; the intensity of drivers of energy efficiency improvement, notably bottom-up and economic measures, are adjusted to achieve the targets of the scenario and the Article 7 targets derives ex-post. The target of Article 7 is a metric of annual energy savings due to measures, eligible under Article 7, relative to average final energy consumption in 2016-2018 calculated as average and levelized energy savings in the period 2021-2030. Explicit targets for renovation of buildings are included in

scenarios, where applicable, as illustration of increased efforts in buildings resulting also from Article 7 measures. When included as explicit targets they are meant to trigger application of specific measures supporting an increase in renovation to reach the target, otherwise such additional measures do not apply. The metrics applied to renovation targets refer to the rate of building stock to renovate in a period and a threshold defining minimum deepness of renovation measured as % of energy savings.

(C): The White Certificate mechanism is a cap-and-trade system. The cap on energy consumptions are defined administratively and by assumption the certificates act as allowances to consume energy. The consumers purchase the certificates from auctions organised at a pan-European scale. The certificates are tradable among the Member States and the sectors subject to the regulation, which include houses, buildings and industry. Free allocation of allowances has not been considered in the analysis. The tradability of certificates is assumed to operate within perfect markets and thus the exchanges lead to a single price of White Certificates.

(D): The "Energy Efficiency First" policy measure is part of non-regulatory policy. By assumption, all MIX and REG scenarios include the corresponding institutional arrangements as conditions enabling faster uptake of energy efficiency options by consumers. This corresponds to the moderate ambition option. In scenarios assuming "high" intensity option, consumers slightly accelerate the replacement of old combustion equipment.

(E): Enforcing energy efficiency in public procurement is part of the non-regulatory policy included in all MIX and REG scenarios as enabling conditions, however without explicit identification regarding the impacts on energy efficiency in consumption.

(F): The measures under Article 8, such as audits, energy management systems, etc., are obligations which act as drivers towards high exploitation of waste heat recovery potential in industry and buildings and rational use of energy.

(G): Regarding district heating, both MIX and REG scenarios include a considerable increase in RES and heat pumps for district heating, also an expansion of DH coverage

(H): Measures improving services by ESCOs and their perception by consumers are of non-regulatory nature and are assumed to be present in the MIX and REG scenarios as conditions facilitating acceleration of renovation pace and increase in renovation deepness.

(I): The measures in Articles 12, 16, 20 and 24 are non-regulatory policies included in REG and MIX scenarios as enabling and facilitation drivers

7. Analysis of energy modelling results

a. Introduction

All the policy scenarios meet the target of 55% GHG emissions reduction in 2030, compared to 1990. The metric for the GHG target is the amount of emissions that includes domestic and intra-EU maritime and aviation and excludes LULUCF. As the latter is likely to reduce emissions by roughly 2%, a 53% GHG emissions reduction is an accepted threshold for the GHG target. All the policy scenarios reach climate neutrality by 2050, which corresponds to a reduction of net GHG emissions by 93%, as LULUCF emissions reduction cover the remaining part.

Figure 8 GHG total (Domestic & Intra-EU Maritime and Aviation) (% change to 1990).

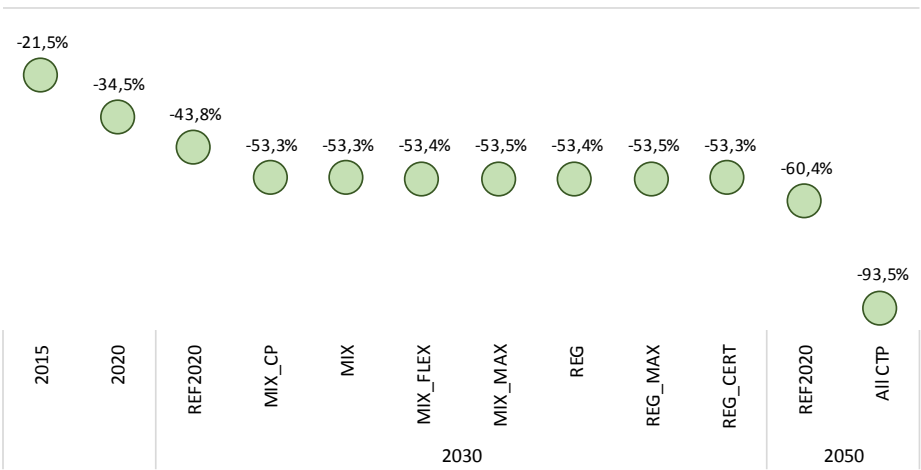


Table 21: Percentage change of GHG emissions from 2005 by sector.

	2030 vs 2005							
	REF	MIX-CP	MIX	MIX-FLEX	MIX-MAX	REG	REG-MAX	REG-CERT
Non-CO_2	-29%	-39%	-38%	-38%	-38%	-38%	-38%	-37%
Non-energy related CO_2	-22%	-35%	-33%	-33%	-34%	-31%	-31%	-32%
Residential	-48%	-61%	-65%	-66%	-65%	-66%	-66%	-68%
Tertiary	-44%	-54%	-56%	-56%	-56%	-56%	-57%	-57%
Industry	-38%	-46%	-47%	-47%	-48%	-49%	-49%	-51%
Transport	-19%	-23%	-23%	-24%	-23%	-24%	-24%	-23%
Energy Supply	-58%	-71%	-69%	-69%	-70%	-69%	-69%	-68%
Total	-40%	-50%	-50%	-50%	-50%	-50%	-50%	-50%
	2050 vs 2005							
	REF	MIX-CP	MIX	MIX-Flex	MIX-MAX	REG	REG-MAX	REG-CERT
Non-CO_2	-39%	-63%	-63%	-63%	-63%	-63%	-63%	-60%
Non-energy related CO_2	-44%	-108%	-107%	-108%	-107%	-106%	-106%	-98%
Residential	-62%	-100%	-100%	-100%	-100%	-99%	-99%	-99%
Tertiary	-55%	-91%	-91%	-91%	-92%	-91%	-91%	-92%
Industry	-58%	-98%	-98%	-98%	-98%	-98%	-98%	-98%
Transport	-39%	-93%	-94%	-94%	-94%	-94%	-94%	-94%
Energy Supply	-79%	-99%	-103%	-102%	-103%	-101%	-103%	-103%
Total	-57%	-92%	-93%	-93%	-94%	-93%	-93%	-92%

In all policy scenarios, the Green Deal strategy puts emphasis on performing emissions reduction in power generation to allow electrification of transport and heating reducing emissions. In fact, power and heat supply sectors achieve in 2030 the largest emissions reduction among all sectors. Until 2030, energy efficiency improvement in stationary energy uses (*i.e.* buildings and industry) is an important contributor to reduction of emissions with a larger effect than electrification in these sectors. However, in the long-term, emissions reduction from electrification is more effective and allows for deeper emissions abatement. By 2030, the emissions reduction is higher in buildings compared to industry (as expected given that industrial restructuring is probably more difficult than energy savings in buildings).

Regarding GHG emission reductions, the policy scenarios present small differences between them. The REG scenarios decrease emissions of the buildings sectors in 2030 slightly more than the MIX scenarios due to more ambitious energy efficiency policies. Industry and transport sectors behave similarly in the REG scenarios, whereas the power and heat supply sectors reduce emissions slightly less in the REG and MIX scenarios than in MIX-CP , due to a weaker ETS price signal.

b. Impacts on the Article 7 target

The target of Article 7 is a metric of annual energy savings due to measures, eligible under Article 7, calculated in the model as the percentage of average and levelized annual energy savings relative to 2020 in the period 2021-2030 over the average final energy consumption in 2016-2018. The ambition of the targets under Article 7 increases in all scenarios relative to the current legislation mirroring the increased ambition of the bottom-up and economic measures in the scenario design. The measures eligible under Article 7 include mainly measures to support investments on the renovation of the building envelope and the replacement of the heating and cooling equipment in the buildings sector, measures to trigger the modal shift (from private to public means) in the

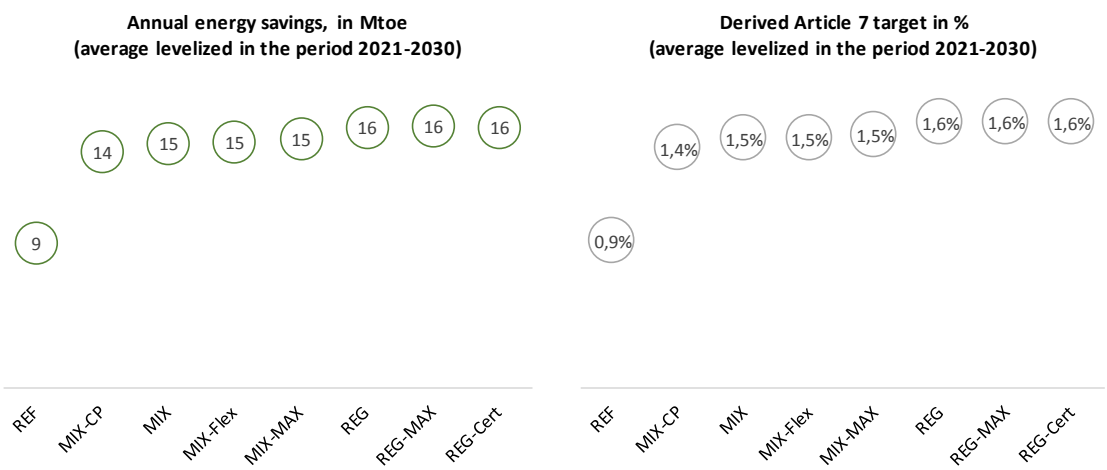
transport sector and measures to promote the uptake of direct energy management systems in the industrial sectors.

The model meets the targets under Article 7 by varying the associated shadow price (*i.e.*, the dual variable). Therefore, the target under Article 7 is calculated per scenario following an iterative approach. The dual variable associated with the energy efficiency target, representing the drivers of energy efficiency improvement (notably bottom-up and economic measures) is adjusted in each model iteration to achieve the target of the scenario. The dual variable associated with the target of Article 7 represent a variety of concrete policy measures, including subsidy to energy efficiency investment, penalties applying to enforce energy efficiency performance (for example on utilities having an obligation to carry out energy efficiency at the premises of their clients), and others. Therefore, it is a price signal affecting the energy efficiency decisions.

A long-list of policies and measures that induce energy efficiency improvement are considered in the iterative process, to ensure that only the energy savings from measures eligible under Article 7 are included for the calculation of the target. The list includes all the measures that are associated with other legislations (than the EED) and which in most cases are represented in the model in the form of standards. The scenarios take into account both the provisions of the Eco-design Directive regarding minimum energy performance standards and the building codes set out in the Energy Performance of Building Directive (EPBD).

The model calculates the amount of new energy savings in the 5-yr periods that are due to Article 7 and extrapolates the annual averages. Figure 9 shows the average annual savings from Article 7 in Mtoe and in percentage.

Figure 9: Article 7 ambition in Mtoe annual energy savings and %.



The Article 7 ambition in the REF scenario roughly represents the current legislation, and corresponds to 0.9% of annual energy savings relative to average final energy consumption in 2016-2018. MIX scenarios almost double the ambition (1.5%), while the highest is the ambition in the REG scenarios (1.6%).

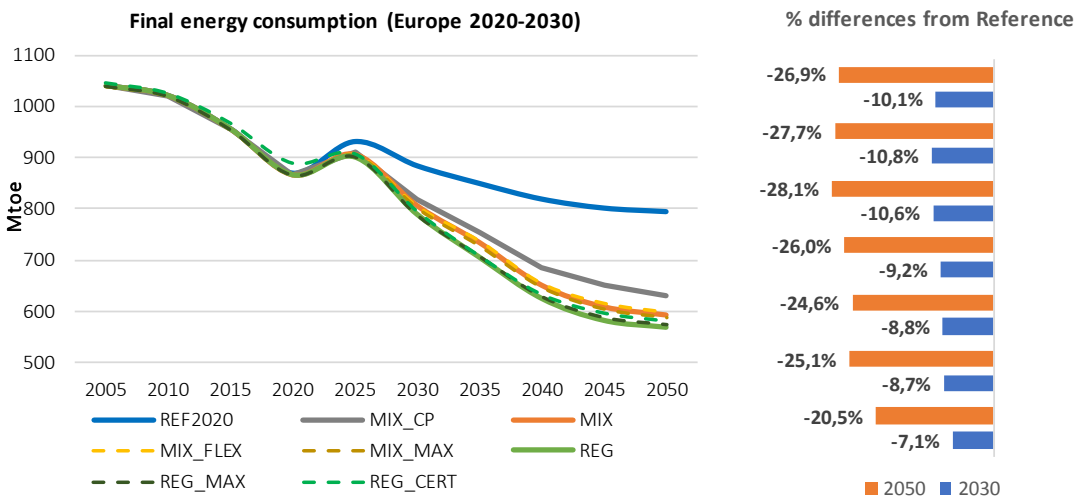
c. Impacts on final and primary energy consumption

In every scenario final energy consumption is significantly below the Reference scenario (*i.e.*, the projection based on the NECPs). The energy conservation effort has to increase significantly compared to the plans included in the NECPs. The REG scenarios include

more intense energy efficiency policies than in MIX and thus final energy consumption is lower; the difference is, however, only 1.3% in 2030. The MIX_CP has the highest final energy consumption among the policy scenarios as it includes a weaker energy efficiency ambition and the higher carbon prices incite lower energy efficiency improvement compared to the rest of scenarios. The scenarios performing high energy efficiency ambition decrease final energy consumption slightly compared to the corresponding core scenario. The difference of MIX-MAX from MIX is less than half percentage point, and the difference of REG-MAX from REG is even lower.

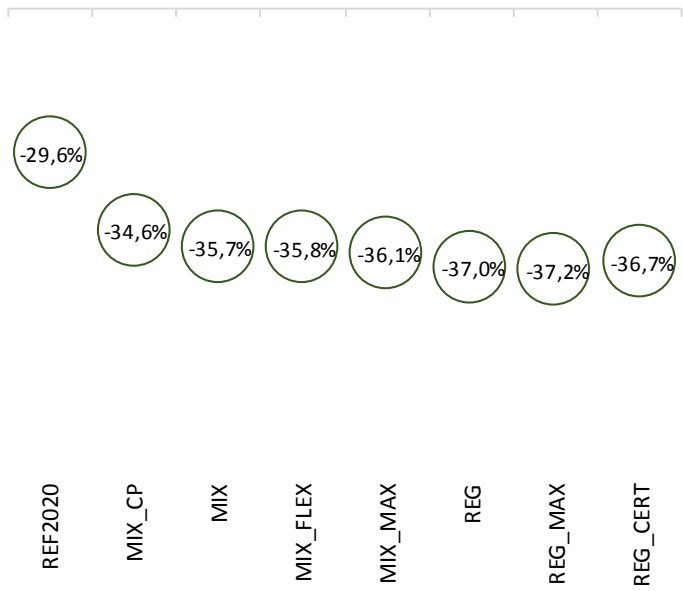
In the long term, low final energy consumption plays a fundamental role for reaching climate neutrality. The green gases deploying in the longer term, as needed to reach climate neutrality, are particularly inefficient and electricity-intensive and thus energy efficiency succeed to keep the green gas amounts as low as possible.

Figure 10: Final energy consumption outlook



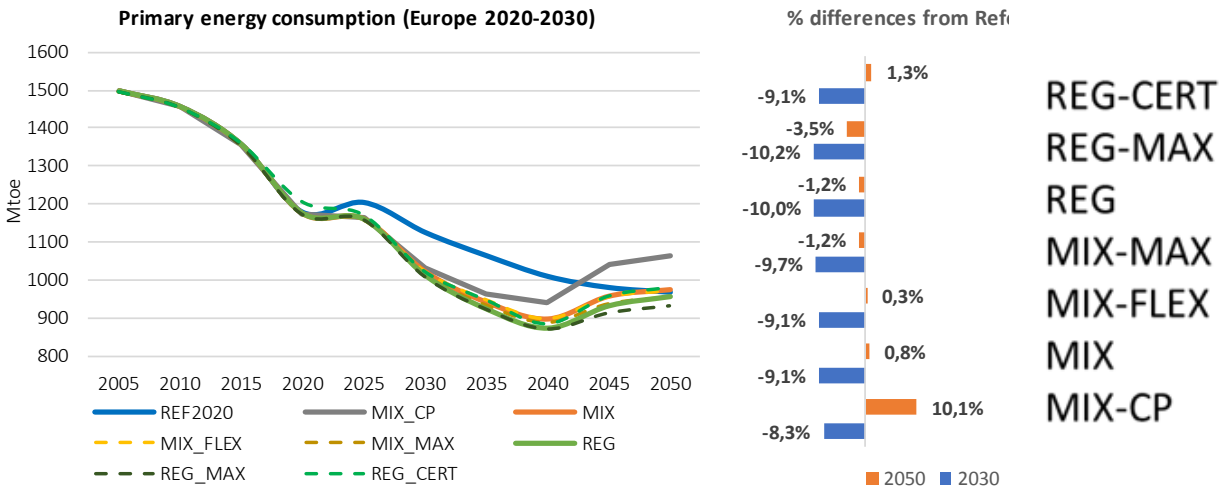
The following graphic shows final energy consumption in the different scenarios. The MIX scenarios achieve -35.7% in 2030 down from PRIMES 2007 projection and the REG scenarios achieve -37%. The MIX-CP stays at -34.6%.

Figure 11: Final energy consumption (wrt PRIMES 2007 baseline)



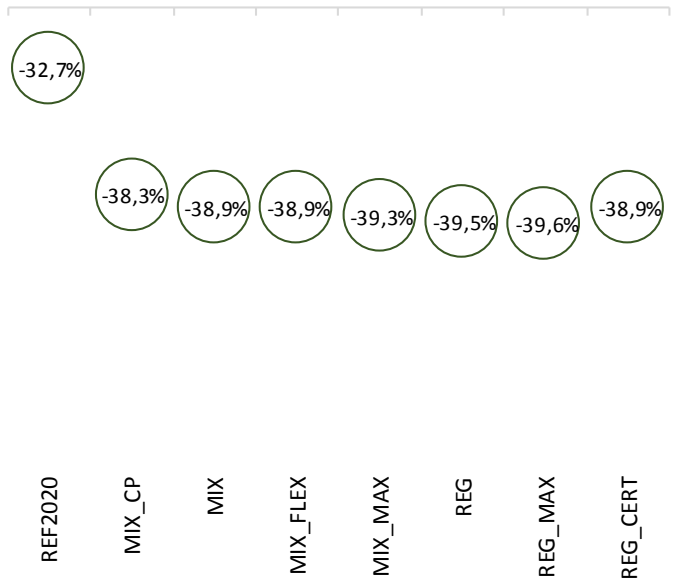
The impacts on primary energy demand combines the effects on final energy consumption with the changes in energy intensity of the energy transformation sectors. The power and heat production sectors are by far the largest energy transformation sectors and the renewables are increasingly dominating the technology mix. At the same time, coal-based production declines and nuclear energy stagnates. As renewables have by definition a primary energy factor of one, while the other technologies have an energy conversion coefficient above one, the deployment of renewables implies a significant decrease in primary energy requirements of the energy transformation system. But, at the same time, the climate neutrality strategy calls upon deployment of hydrogen and synthetic hydrocarbons, which to be compatible with climate neutrality need to rely on electricity produced mainly from renewables (and other carbon free sources) and carbon capture from the air and biogenic sources. Hydrogen and green hydrocarbons produced as e-fuels have a low energy efficiency performance over their production chain. Consequently, primary energy requirements of the entire energy transformation system tend to increase considerably in the longer term. The policy scenarios project primary energy requirements to lay below the Reference projection roughly at 10% below in 2030. In 2050, most of the scenarios based on MIX project higher primary energy consumption compared to Reference due to low energy performance compared to other policy scenarios. This implies higher use of synthetic fuels and hydrogen and hence higher use of electricity.

Figure 12: primary energy demand.



The projections show that the policy scenarios achieve primary energy savings between -38.3% and -39.6% in 2030, below the PRIMES 2007 projection.

Figure 13: Primary energy savings (wrt to PRIMES 2007 baseline)

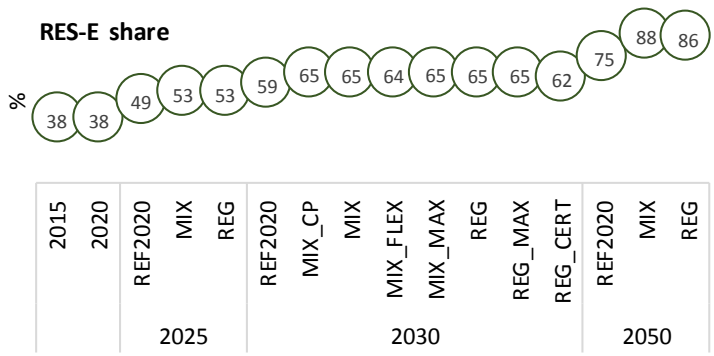


d. Impact on renewables

The deployment of renewables is, with energy efficiency, one of the most important pillars of the energy transition. The policy scenarios involve explicit policies supporting the renewables in all sectors. As renewable technologies costs decrease over time as a result of the learning-by-doing process, the deployment is also a consequence of market forces as they gain in competitiveness over conventional technologies.

In the power sector, the support of renewables focus on technologies that have not yet exploited the learning potential, but also include horizontal measures for all renewables regarding infrastructure development, licensing, support of electricity storage as an essential complement of renewables, and market integration over all stages of the power markets, including balancing and ancillary services. The renewables in the power sector exceed 60% on average in the EU by 2030, which is higher than in the Reference scenario. In the longer term, the renewables exceed 80% in total electricity generation. Development of storage technologies, including the contribution of chemical storage based on hydrogen and e-fuels, is of critical importance to ensure reliability of power system operation, together with the expansion and full operation of the interconnected system over the broadest possible areas.

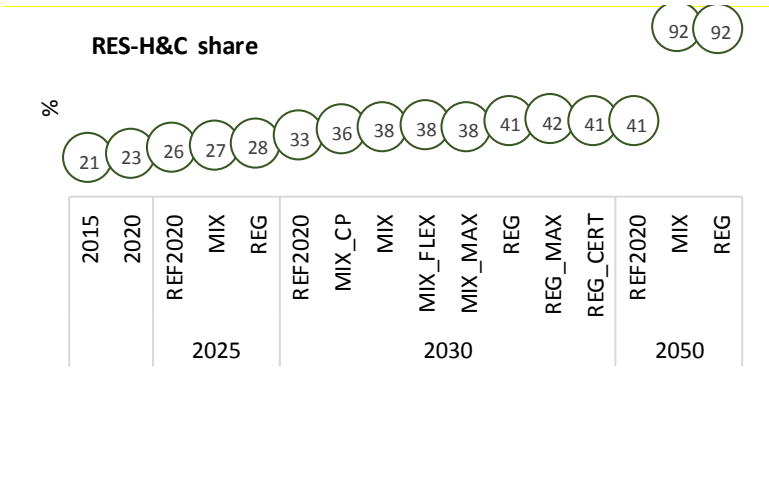
Figure 14: Projection of RES-E shares.



In the buildings sector, there are synergies between strong energy efficiency improvement and higher use of renewables, as heat pumps are likely to be the most cost-efficient choice for deeply renovated buildings. The policy scenarios include, in addition, specific policies promoting heat pumps in all sectors. The increase in the use of biomass for heating purposes is modest, due to environmental concerns and supply limitations. However, the modelling assumes that increasing the use of biomass is still possible in industry and district heating to a certain extent.

Compared to the Reference scenario, the policy scenarios project a significant increase in the RES H&C shares. They range between 36% to 42% in the policy scenarios in 2030, which is 3-9 percentage points higher than in Reference in 2030. The REG scenarios achieve 3-4 percentage points higher RES H&C shares compared to the MIX scenarios, as they include more intense renewable supporting policies.

Figure 15: Projection of RES H&C shares.

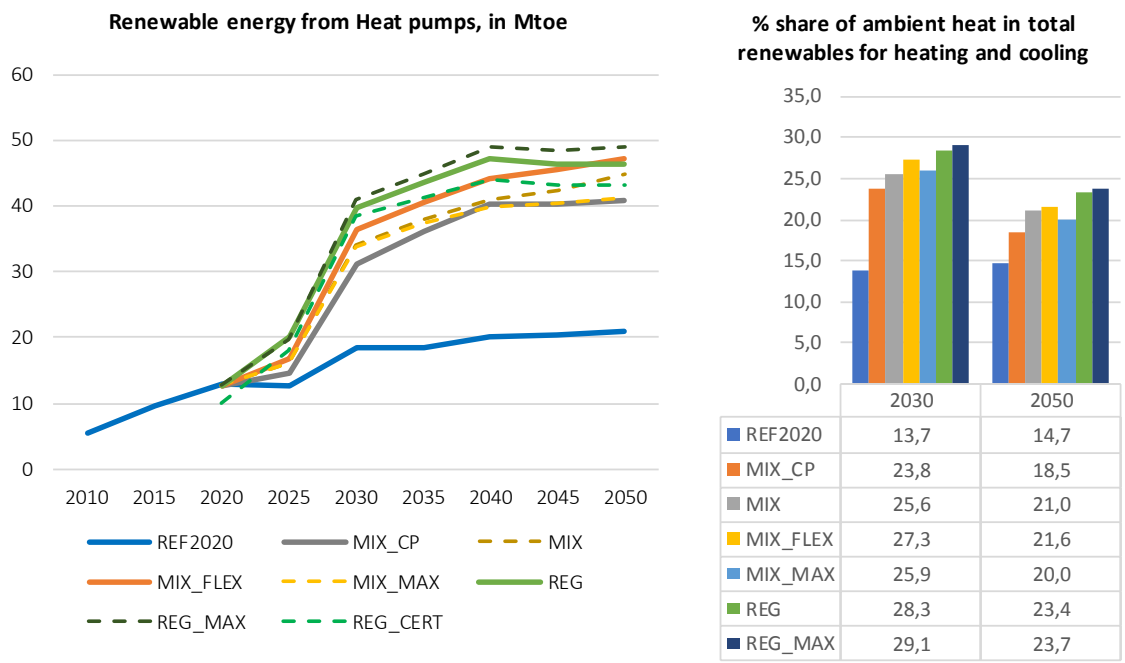


In the transport sector, the development of renewables relies on the blending of biofuels in the transport fuels supported by mandates which also promote advanced biofuels. However, the long term potential of biofuels is limited (due to biomass feedstock limitations and sustainability concerns). Apart from biofuels, source of renewable energy in transport are electricity, hydrogen and synthetic hydrocarbons of renewable energy origin. As a result of multipliers increasing the weight of their contribution, the projections show an impressive increase in the RES-T shares. For 2030, the projection

for the policy scenarios shows RES-T targets reaching a range of 27% to 29%, which is 6-8 percentage points above the Reference scenario projection.

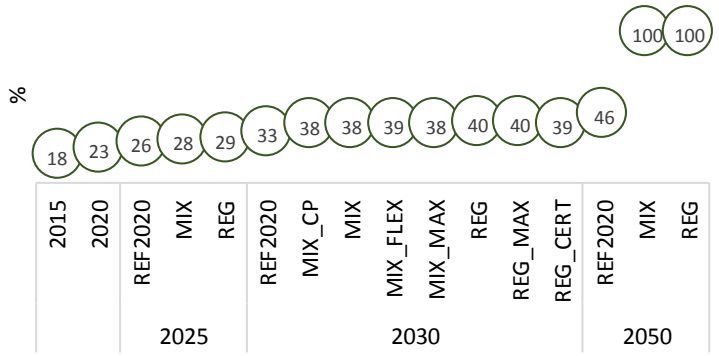
The role of ambient heat used in heat pumps within the RES H&C target is very significant in the medium term. In the longer-term, hydrogen and other RNFBOs, have an increasing contribution in the increase in the RES H&C shares. Compared to the Reference scenario, ambient heat from heat pumps increases considerably until 2030 and constitutes a decisive factor for meeting the RES H&C targets. As mentioned, the market penetration of heat pumps associates with energy efficiency improvement of buildings and in particular links to renovation undertaking. By 2030, the amount of RES from ambient heat is more than double compared to the Reference. The ambient heat amounts follow a much slower pace after 2030 compared to the period before 2030. The costs of the RFNBO are high in the medium term preventing them from getting a significant share in heat markets until 2030, in contrast with the longer-term period. As biomass is also stagnating, the RFNBOs exhibit a fast growth pace within the RES H&C in the longer-term.

Figure 16: Outlook of ambient heat used in heat pumps.



The calculation of the overall RES shares, according to the EUROSTAT calculator, divides the sum of renewables by gross final energy consumption. The overall RES-shares range between 38% to 40% by 2030 in the policy scenarios, which is 5-7 percentage points above the Reference scenario levels.

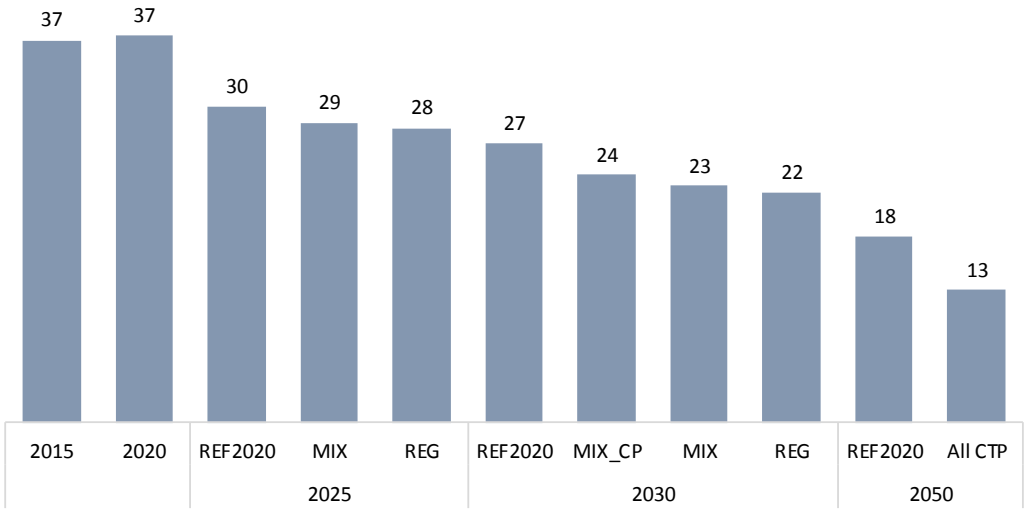
Figure 17: Projection of overall RES-shares.



e. Impact on the residential sector

Income growth drives an increase in useful energy services but thanks to energy efficiency improvement final energy consumption in all energy uses in houses is decreasing steadily over time. Measured by the ratio of final energy consumption per unit of income of households, energy intensity improves continuously and much above the performance under Reference scenario conditions. The decoupling of final energy consumption from income growth, observed already in the Reference scenario projection, is further pronounced in the policy scenarios. The decoupling is higher in the REG scenarios than in the MIX as a result of higher ambition of energy efficiency policies in the former. The ratio of energy over income decreases continuously also in the longer term and reaches a value more than three times lower than its level in the recent past.

Figure 18: Specific energy consumption relative to households'' income (toe/M€ '15).



The improvement of energy performance in houses is a result of three types of energy efficiency improvement, namely in the building envelope, the energy equipment and the electric appliances. Accelerated renovation of the building envelope is the primary driver of energy savings in terms of both share of stock renovated and the depth of energy savings. Renovation of the building envelope counts for roughly more than half of total savings. Energy efficiency improvement takes place also for new buildings as a result of

enforced application of stringent building codes. The choice of energy equipment considerably shifts in favour of advanced efficient technologies, among which advanced heat pumps with high coefficient of performance values emerge as a preferred choice for well-renovated houses. The assumed further stringency of eco-design standards enables choice of highly efficient appliances and lighting. The energy efficiency improvements for all three types are in the policy scenarios significantly higher than in the Reference already until 2030. They are also considerably above Reference scenario trends in the longer-term.

The acceleration in renovation of houses and the increase in the depth of energy savings is the primary energy efficiency measure in the residential sector. The potential to tap on in the policy scenarios is significantly higher than the renovation plans included in the NECPs and mirrored in the Reference scenario projection. The ensuing supporting policies will evidently have to considerably accentuate compared to the NECP. The renovation rates of the building envelope increase in the policy scenarios by more than one percentage point annually until 2030, relative to the Reference scenario. The pace of renovation continuous after 2030 until the end of the projection horizon, while it decelerates under the Reference scenario conditions. The annual rate of building envelope renovation is roughly 0.5 percentage point higher in the REG scenarios than in the MIX.

The following figures show the projections for renovation rates in houses.

Figure 19: Projection of renovation rates in houses.

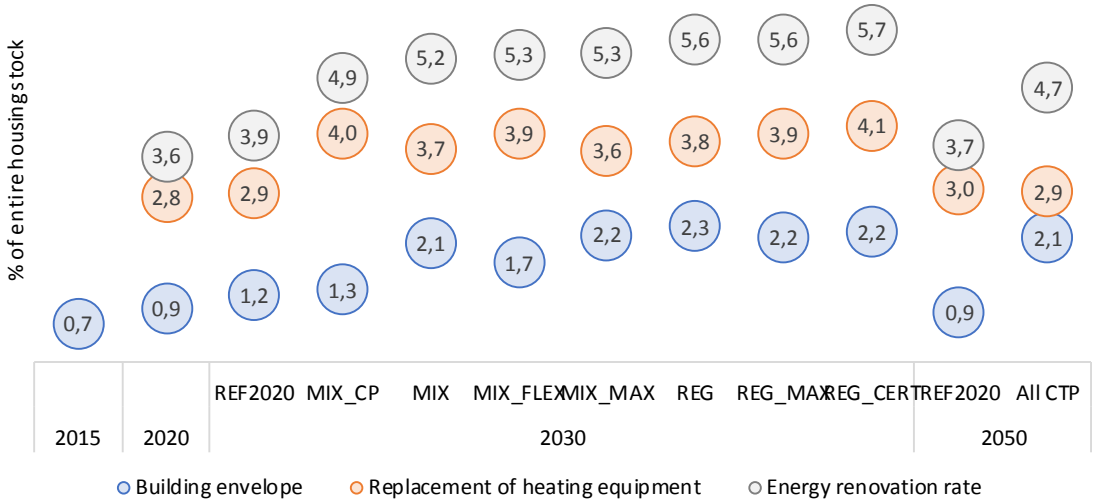


Figure 20: Energy savings from renovation of houses.

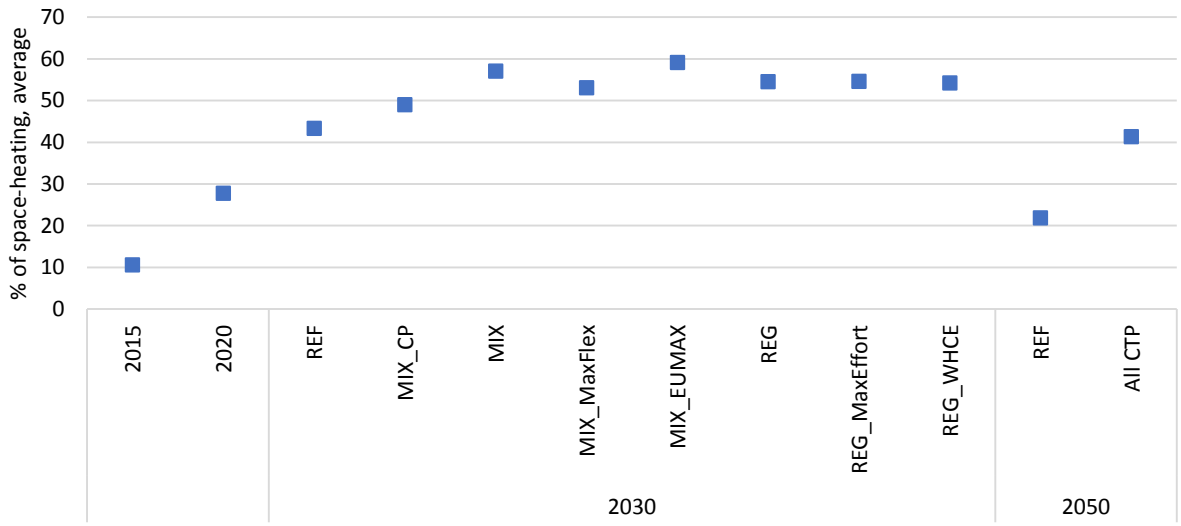


Figure 21: Energy consumption in houses for heating and cooling, on average per household (in toe/household).

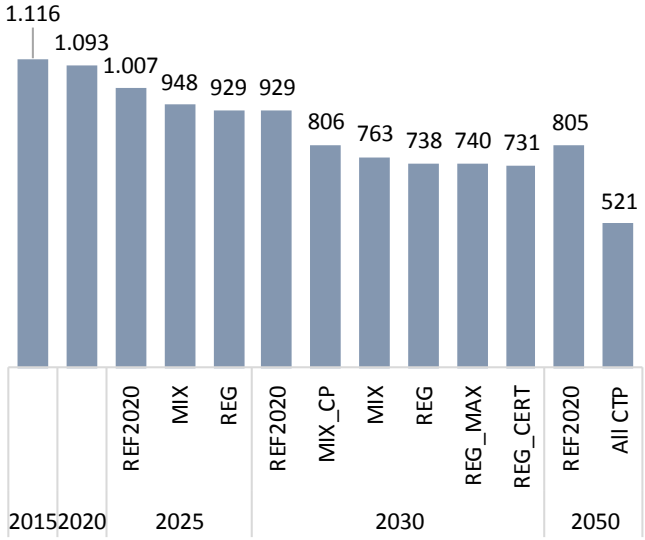
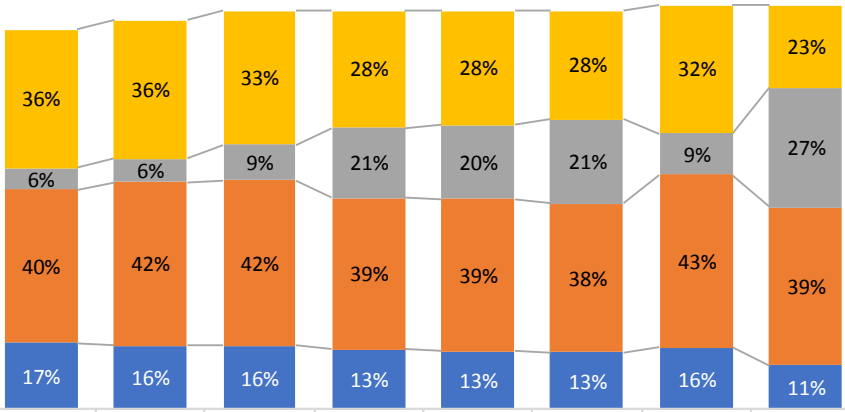
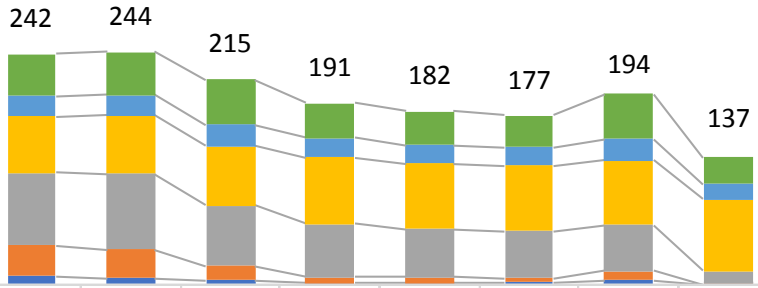


Figure 22: Number of houses by heating equipment (Million).



	2015	2020	REF2020	MIX_CP	MIX	REG	REF2020	All CTP
			2030				2050	
Boilers	68	68	66	57	56	53	63	41
Heat pumps	11	11	18	34	36	41	20	59
Traditional heaters	75	80	81	74	75	73	85	78
Individual heaters	33	31	31	30	28	28	30	22

Figure 23: Final Energy Demand in houses (Mtoe).



	2015	2020	REF2020	MIX_CP	MIX	REG	REF2020	All CTP
			2030				2050	
Renewables	44	44	48	37	35	33	48	28
Heat	21	22	23	20	20	19	22	16
Electricity	60	62	63	70	69	70	68	76
Gas	77	80	63	56	51	49	48	13
Liquids	32	29	15	6	6	5	9	0
Solids	9	7	5	2	1	2	5	0
Total	242	244	215	191	182	177	194	137

f. Impact on the services sector

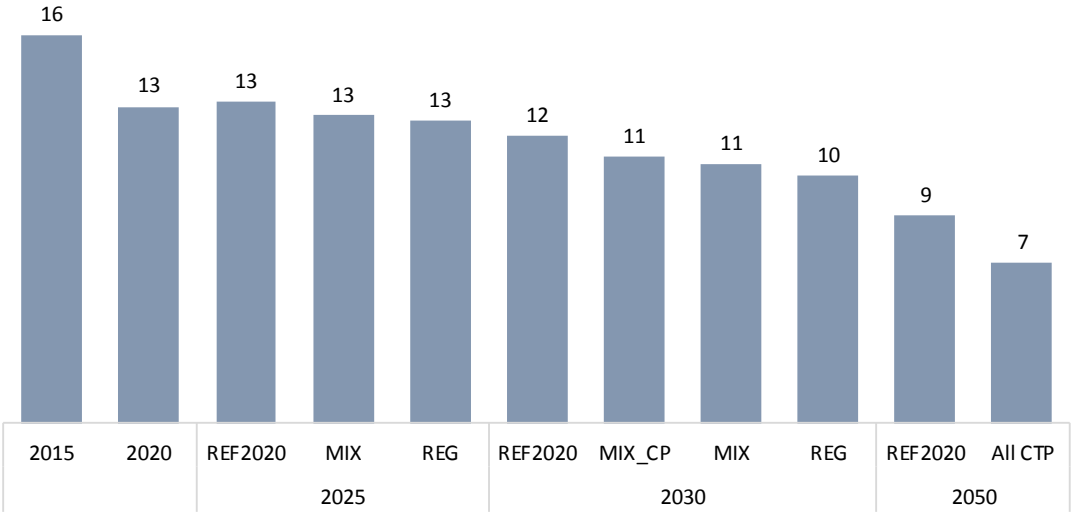
Thanks to energy efficiency improvement, final energy consumption in the services sector steadily decreases over time although value added growth drives an increase in useful energy demand. Decoupling of growth and energy consumption is already in the Reference scenario. The delinking is further pronounced in the policy scenarios; it is

higher in the REG scenarios than in the MIX as a result of higher ambition of energy efficiency policies.

The energy savings stemming from the renovation of the building envelope in the services sector account for roughly more than 20% of total energy savings in the sector. The energy efficiency improvement due to renovation is significantly higher in all scenarios compared to the Reference, and particularly for public services buildings.

Nonetheless, renovation of office buildings plays a relatively smaller role than in the residential sector, given that the office building usually have a faster capital turnover than houses. To this respect, enforcement of stringent building standards is of great importance for energy efficiency.

Figure 24 Specific energy consumption in services sectors relative to value added (toe/M€)

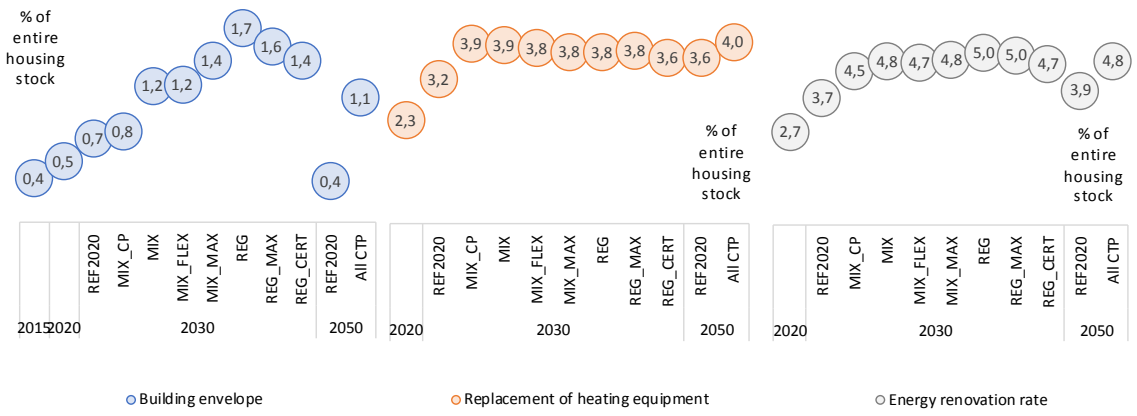


The shift of heating and cooling equipment choice towards advanced and highly efficient technologies (with a strong contribution of heat pumps) allow very significant energy efficiency progress in office buildings. The contribution of equipment to overall efficiency gains is much higher than that of renovation of the building shell.

The specific electricity uses increase in all services sectors much above total energy demand. This increase includes electricity used in data centres, which account for an increasing share of total energy consumption in the services sector. All policy scenario variants include specific electricity efficiency performance standards for data centres.

In the Reference scenario, there is a significant increase in the share of stock undertaking renovation, mirroring the renovation plans included in the NECPs. However, there is significant potential still untapped of building renovation in the services sectors, which is assumed to be exploited in the policy scenarios thanks to the inclusion of high ambition energy efficiency policies. The renovation rates of the building envelope in the services sector roughly double in the policy scenarios until 2030, relative to the Reference scenario. Renovation rates are particularly high in the scenario MIX-MAX, which includes additional measure of higher ambition for Article 5.

Figure 25 Renovation rates in services sector.



As already mentioned, the policy scenarios assume both higher stringency and better enforcement of eco-design standards as well as energy performance standards for data centres. Consequently, the projections show a significant improvement in specific energy consumption of the appliances and lighting, reaching in the policy scenarios 5-10 percentage points above the Reference scenario in 2030.

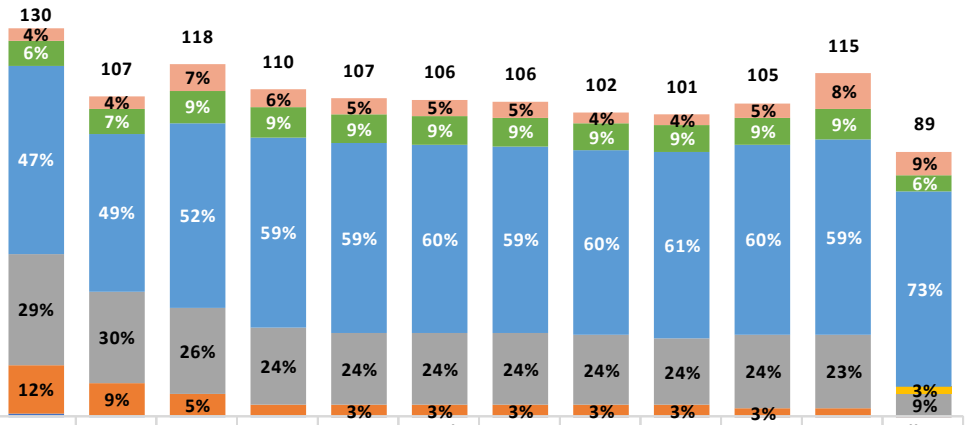
The electrification trend in the services sector is evident in the Reference scenario projection and its pace accelerates in the policy scenarios. Already in the Reference scenario, electricity represents more than half of the total consumption in the services sector in 2030, 5 percentage points above its market share in 2015. The policy scenarios need to increase further electricity's market share between 7 and 9 percentage points in 2030, above the Reference.

As a result of electrification, all fossil fuels see diminishing market shares. Solids and liquids are shown to vanish, whereas the use of gas also declines to a certain extent, due to electrification but also to cost of decarbonising gas distribution. However, the use of more expensive gas fuels, such as biogas, hydrogen and synthetic methane is by assumption modest until 2030.

The volume of renewables slightly increases in the policy scenario compared to past years but remain lower than in the Reference due to higher electrification included in policy scenarios. The substitution away from renewables concern in particular biomass due to air pollution impacts and does not concern solar and geothermal applications.

The district heating expansion plans are part of the Reference scenario, similarly to the assumptions for the residential sector. The network expansion coverage implies an increase in distributed heat volumes in the services sector, compared to past years.

Figure 26 Fuel mix in services sectors - Final Energy Demand in services sectors (Mtoe)



	2015	2020	2030 REF	2030 MIX CP	2030 MIX	2030 MIX Flex	2030 MIX MAX	2030 REG	2030 REG MAX	2030 REG CERT	2050 REF	2050 All CTP
Renewables	4	4	9	6	5	5	5	4	4	5	12	8
Heat	8	8	11	10	10	10	9	9	9	9	10	6
Electricity	63	53	62	64	63	63	63	62	63	63	65	65
Hydrogen	0	0	0	0	0	0	0	0	0	0	0	2
Gas	37	31	29	26	24	24	24	23	22	25	25	8
Liquids	16	11	7	4	4	4	4	4	4	3	3	0
Solids	1	1	0	0	0	0	0	0	0	0	0	0
Total	130	107	118	110	107	106	106	102	101	105	115	89

g. Impacts on the Industrial sector

Several policy drivers influence the restructuring of energy consumption in industry but the most important factor of technology change and investment in competitiveness. The energy efficiency improvement is to a large extent embedded in the turnover of productive capital vintages, which in general is slow (in particular in energy and capital-intensive industries).

A policy instrument of major importance in industry is the EU ETS carbon pricing, which is a sufficient incitation for the industry to internalise carbon costs in the calculation of industrial production costs. The energy-intensive industries are subject to EU ETS obligations and are modelled to adjust their cost-benefit evaluations accordingly. Positive anticipation of future carbon costs is among the relevant policy drivers to promote the choice of advanced and highly energy efficient or low carbon technologies. However, enabling conditions and facilitating legislation are also important, as well as policies favouring recycling and circular economy patterns.

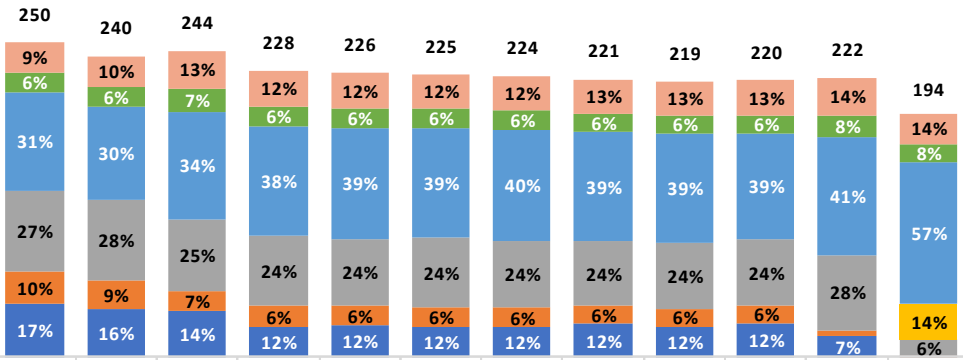
All these multifaceted enabling policies are assumed to be deploying successfully in the policy scenarios and to a significant extent to also part of the Reference scenario projection. The policy scenarios include additional effort regarding material recycling in the economies and the emergence of circular economy features. Regarding recycling, the policy scenarios assume an extensive exploitation of potentials, for the metals, cement, paper and glass.

Direct energy saving investment is a meaningful intervention, to a certain extent independently of the replacement of the productive capital vintage. The potential of improving energy efficiency via direct saving measures is significant and relatively untapped, according to several recent studies which identify untapped energy savings, in particular for heat, as of 10-12% of total energy consumption in the European industry.

Energy savings is also enabled in the policy scenarios via auditing and other obligations acting in addition to Reference scenario conditions. In the maximum effort scenario variants, the included assumption envisages stronger enforcement and scope extension of auditing and control policies.

The overall impacts of the changes in industry indicate that energy efficiency, measured by the ratio of total final energy consumption (including blast furnaces) over total value added in industry, decreases in the Reference by approximately 20% in 2030 compared to 2015 and further decreases in the policy scenarios by roughly 10% in 2030 compared to the Reference. The policy scenario project this energy efficiency indicator to become in 2050 approximately 50% lower than in 2015.

Figure 27 Final energy demand in industry by fuel



	2015	2020	REF	MIX CP	MIX	MIX MaxFlex	MIX EUMAX	REG	REG Max Effort	REG WH_CE	REF	All CTP
			2030								2050	
Renewables	24	25	30	28	28	27	27	28	27	29	30	24
Steam	15	15	18	16	16	15	15	14	14	13	18	14
Electricity	79	74	86	87	88	88	88	87	87	85	93	113
Hydrogen	0	0	0	0	0	0	0	0	0	0	0	29
Gas	65	65	57	56	53	54	54	52	52	53	60	12
Liquids	25	22	16	17	16	16	16	14	14	13	5	1
Solids	43	38	36	24	25	24	24	26	25	27	16	0
Total	250	240	244	228	226	225	224	221	219	220	222	194

The fuel in industry changes smoothly over time in the policy scenarios. The inertia of restructuring is higher compared to the buildings sector. The use of solid fuels until 2030 slightly decreases in the policy scenarios compared to the Reference, but in the long-term abolishment of solids is possible thanks to the use of hydrogen and other sustainable fuels in high enthalpy heat uses. The projections show a persisting electrification tendency, which is slow until 2030 and accelerates only in the long-term. The gaseous fuels see small reduction in market shares in industry until 2030. The gaseous blend becomes climate neutral in the long-term including hydrogen. The direct use of renewables increases only slightly in the future; the use of waste energy feedstocks in industry faces limitations due to absence of support and carbon taxation of non-renewable waste.

h. Impact on the Transport sector

The evolution of transport activity, measured by passenger-km and tons-km has been closely related to GDP growth, since many years. The decoupling of mobility from economic growth is very slow for passenger travelling and almost inexistent for freight transport. The high values of the income elasticity of long-distance travelling of passengers has sustained the increase in aviation and fast rail, which partly substituted

other modes without effecting any decrease in total mobility. The freight transport mobility is remarkably linked with GDP growth.

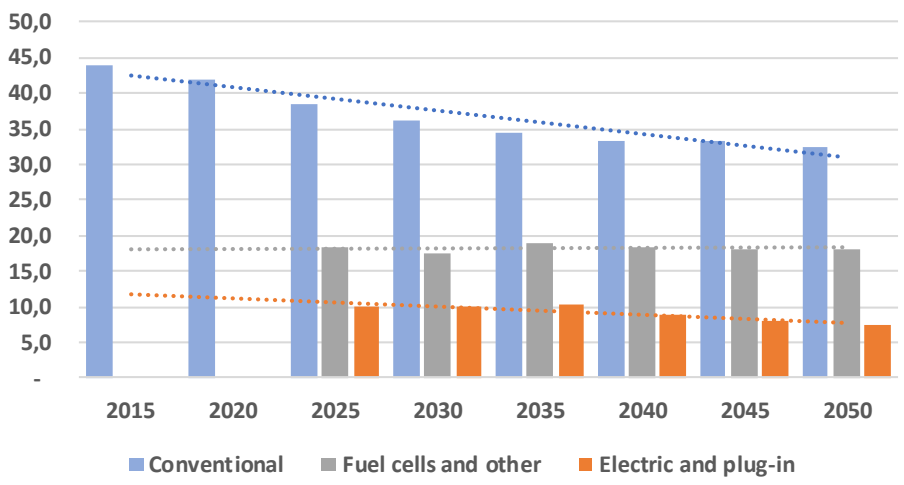
A possible source of energy efficiency improvement are structural changes in modal shifts, such as soft transport modes, public transport, vehicle sharing and freight transport logistics. All such changes imply a reduction in energy consumption per unit of passenger and transport mobility. However, such changes are difficult and slow due to several causes including inflexible habits, infrastructure limitations, economic structures. The policy scenarios include assumptions about structural changes in transport modes that allow for energy efficiency gains. The assumptions about such changes are however prudent and mainly take place in the long-term.

In parallel, the scenarios foresee a considerable change in the technology paradigm of car mobility, based on the electric powertrains, which embed high energy efficiency gains compared to conventional technologies. The carbon emission standards, considered as a major policy tool, induces energy efficiency improvement also for conventional technologies.

The gains are somehow limited in the horizon of 2030 and take place to a large extent in the Reference scenario, which by 2030 decreases specific energy consumption per unit of mobility by roughly 25% relative to 2015 for both passenger and freight transport. The policy scenarios achieve modest additional energy efficiency gains above Reference scenario levels, in 2030. However, in the long-term, the policy scenarios succeed to drop specific energy consumption by 68% for passengers and 55% for freight, down from 2015 levels.

The specific energy consumption performance of car technologies evolves in the future, as expected, also for conventional technologies. However, the impressive improvement of energy efficiency of car mobility achieved in the policy scenarios is due to change in the vehicle mix in favour of the electric cars, which need much less energy than conventional technologies and also significantly below energy consumption of fuel cells. Figure 28 shows the improvement in specific energy efficiency for cars and Light Duty Vehicles (measured in energy consumed per millions of passenger kilometre).

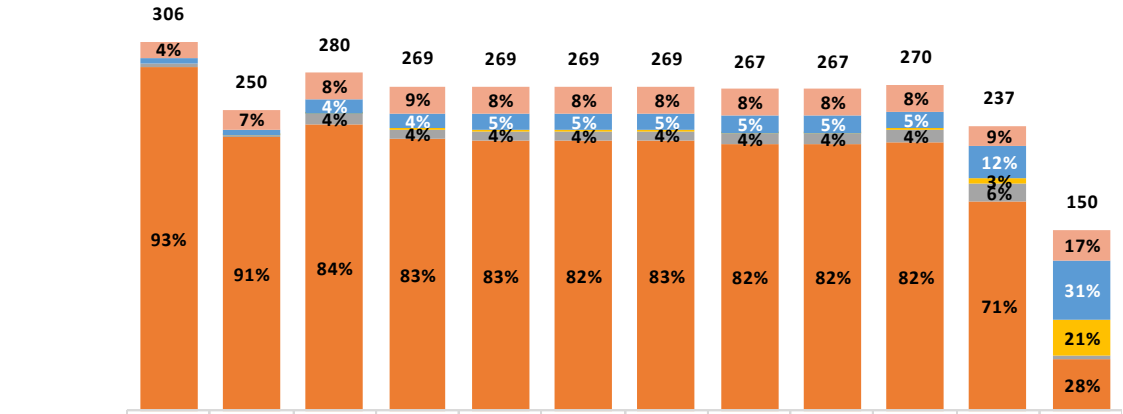
Figure 28 Specific energy consumption of cars and LDV (toe/Mpkm)



The fuel mix in the transport sector changes significantly but only in the long-term. Achieving climate neutrality in transport is an endeavour of particular difficulty. All options are necessary to deploy, including biofuels that cover the most inflexible transport market segments, such as aviation and maritime, hydrogen and synthetic clean

hydrocarbons and electricity-driven vehicles. In the long-term, the shares of fuels are different in the various transport market segments to accommodate technical constraints and resource limitations.

Figure 29 Final energy demand in transport by fuel (Mtoe)



	2015	2020	REF	MIX CP	MIX	MIX MaxFlex	MIX EUMAX	REG	REG Max Effort	REG WH_CE	REF	All CTP
			2030								2050	
Renewables	13	16	21	23	23	23	23	22	22	22	17	25
Electricity	5	4	12	13	13	13	13	14	14	14	27	49
Hydrogen	0	0	0	0	1	1	1	1	1	1	5	31
Gas	3	3	10	8	8	8	8	8	8	12	14	3
Liquids	285	227	237	225	224	224	224	222	222	222	174	42
Total	306	250	280	269	269	269	269	267	267	270	237	150

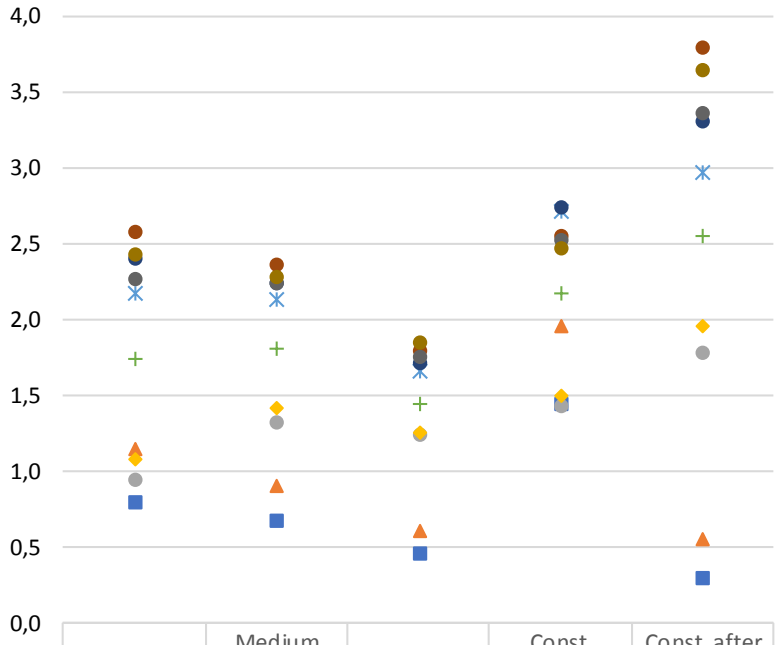
i. Distributional impact for households

The decisions to renovate depend on the income of households. Low-income households have poor access to capital that implies high discount rates influencing renovation decisions negatively. Moreover, uncertainty and lack of information factors are particularly important for low-income households and affect renovation decisions negatively. The age and type of building also affect the decision to undertake renovations. PRIMES model represents mathematically decision making of different types of consumers. Based on this approach, noticeable differences emerge among the categories of consumers and houses regarding both the rate and the energy performance of buildings after renovation.

Renovation rates of the building envelope increase in all building classes in the policy scenarios in the period 2021-2030, compared to the Reference, as a result of the ambitious energy efficiency policies. In the Reference scenario includes the policies and measures of the NECPs and aims at achieving the renovation targets set out in the submissions.

In the policy scenarios, the policy context allows the reduction of risk factors which prevailed in the Reference and the MIX_CP scenario; there are enabling conditions that together with the ambitious energy efficiency policies incite also low-income classes to undertake energy efficiency investments. In the scenarios derived from MIX, carbon price also drives more low-income households to invest in energy efficiency of the building envelope as the effect of this additional cost is lower for high-income households. Figure 30 shows the average annual renovation rate for the 2026-2030 period for different income classes and building types.

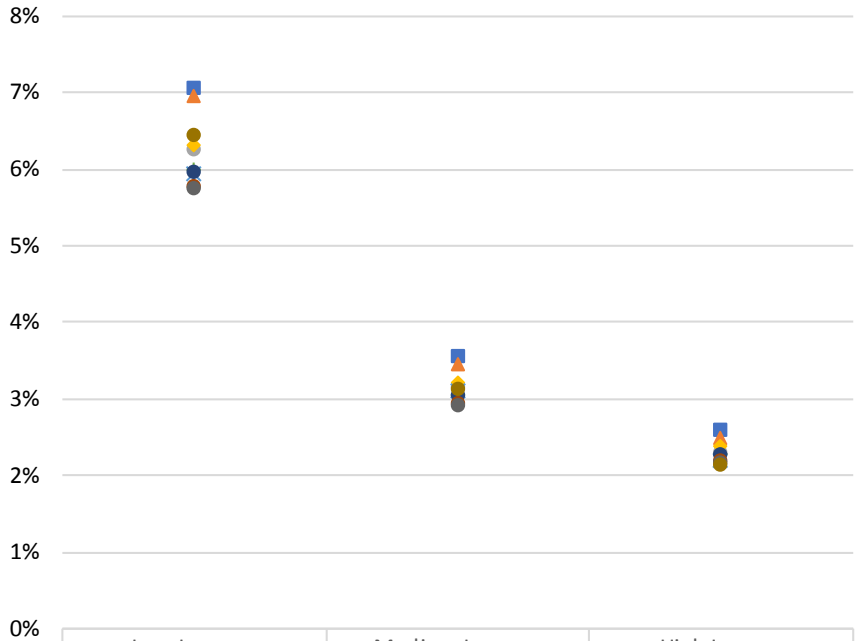
Figure 30 Annual renovation of the building envelope (% of stock)



	Low income	Medium income	High income	Const. before 1975	Const. after 1975
<2015 REF2020	0,8	0,7	0,5	1,5	0,3
2016-2020 REF2020	1,2	0,9	0,6	2,0	0,6
2026-2030 REF2020	1,0	1,3	1,2	1,4	1,8
2026-2030 MIX_CP	1,1	1,4	1,3	1,5	2,0
2026-2030 MIX	2,2	2,1	1,7	2,7	3,0
2026-2030 MIX_FLEX	1,8	1,8	1,4	2,2	2,6
2026-2030 MIX_MAX	2,4	2,3	1,7	2,7	3,3
2026-2030 REG	2,6	2,4	1,8	2,6	3,8
2026-2030 REG_MAX	2,3	2,2	1,8	2,5	3,4
2026-2030 REG_CERT	2,4	2,3	1,9	2,5	3,7

The energy efficiency policies in the policy scenarios enabling an increase in renovation, improve the affordability of energy expenses by reducing the energy consumption significantly and particularly for low and medium-income consumers. However, the differences in energy bills as a percentage of income that existed in the recent past continue to prevail even if in magnitude. Figure 31 shows the energy bill as a share of private income per income class.

Figure 31 Energy bill as a share of private income per income class (%)



	Low Income	Medium Income	High Income
2015 REF2020	7,1%	3,6%	2,6%
2020 REF2020	7,0%	3,5%	2,5%
2030 REF2020	6,3%	3,1%	2,3%
2030 MIX_CP	6,3%	3,2%	2,4%
2030 MIX	5,9%	3,1%	2,2%
2030 MIX_FLEX	6,0%	3,0%	2,3%
2030 MIX_MAX	6,0%	3,0%	2,3%
2030 REG	5,8%	2,9%	2,2%
2030 REG_MAX	5,8%	2,9%	2,2%
2030 REG_CERT	6,5%	3,1%	2,1%

Under the current assumptions about enabling conditions, the policy context of the Reference and the MIX_CP scenario suffices for inciting high-income consumers to undertake fairly deep renovation, but not for low-income consumers who require ambitious energy efficiency policies in addition to institutional measures to shift to deeper renovation. It should be noted that the level of energy savings shown in Figure 31 are generally not enough to repay house renovation, so other policies would are needed to trigger investments, especially for low-income households (energy savings alone, however, do not capture all the benefits of energy efficiency – e.g., reduced air pollution).

j. Impacts on GDP and investments of core policy scenarios

Energy efficiency policies are argued to bring important benefits both at employment and the economy. While reducing energy consumption and emissions, energy efficiency investment also lower energy bills for households and firms. Moreover, energy efficiency investments have the potential to boost employment and the activity of several industrial and services sectors. Energy efficiency investment has a high activity multiplier effect, and affects sectors which have relatively low exposure to foreign competition.

However, the financing of energy efficiency investment has been identified as of critical importance for the positive economic impacts. Poor financing conditions in the economy

may cancel the expected positive impacts as a result of crowding-out effects of energy efficiency investment. In other words, lack of funding resources implies that other productive investment and expenditures reduce to allow for energy efficiency investment to be implemented. It is of particular importance for households to ensure that energy investment funding does not exert crowding-out effects, because in addition to negative net effects there is also risk of welfare losses. Table 22 shows investments in equipment and buildings.

Table 22 Building energy efficiency investments in REG and MIX scenarios

REG (additional to Reference / billion € 2015 per year)	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**
Equipment	25	44	23	5	6	8
Buildings	29	39	66	61	62	71
Total	53	83	89	65	68	78
MIX (additional to Reference / billion € 2015 per year)	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**
Equipment	28	5	1	6	0	0
Buildings	19	34	46	42	39	39
Total	47	39	47	48	39	39

The results show evidence of a positive role of energy efficiency investment for activity and employment, as building and materials sectors have a high Leontief multiplier compared to other investment and maintenance and services for energy efficiency are labour intensive.

To estimate the impact on GDP and employment of energy efficiency investments, the modelling framework based on the macroeconomic General equilibrium model GEM-E3 The version of the GEM-E3 model used for this analysis includes a fully-fledged representation of the banking and financial system. Modelling was carried out for the MIX and REG scenarios. As changes in macroeconomic aggregates are generally close for comparable scenarios, modelling was not carried out for other variants.

A sensitivity analysis has been carried out to analyse the dependence on financing conditions of the impacts of energy efficiency investment on GDP and employment. Two extreme stylised conditions were modelled: a “full-financing” case and a “self-financing” case. The latter implies adverse effects on the economy and employment as the funding of energy efficiency investment requires a reduction of other expenditures; this happens already in the early stages of policy implementation. The full financing case allows deferring the repayment in the longer-term and also assumes reduced costs of capital borrowing. These assumptions minimise crowding-out effects allowing Leontief multiplier effects and inducing positive growth and job creation. However, the model does close the financing accounts inter-temporally and thus debt raised to finance investment in energy and efficiency and renewables is fully repaid by the investors in the long-run. Figure 32 summarises the results of the GEM-E3 model for the MIX and REG core scenarios. Under the assumptions of the full-financing cases, the abundance and long-term horizon of funding implies minimum crowding out effects, whereas as in the self-financing case equity and cash flow of investors is the main source of funding. The self-financing case is not a realistic situation and is simulated in this study to illustrate the importance of easing financial conditions for funding energy efficiency investment. The full-financing case is more plausible in reality provided that appropriate policy supports applies.

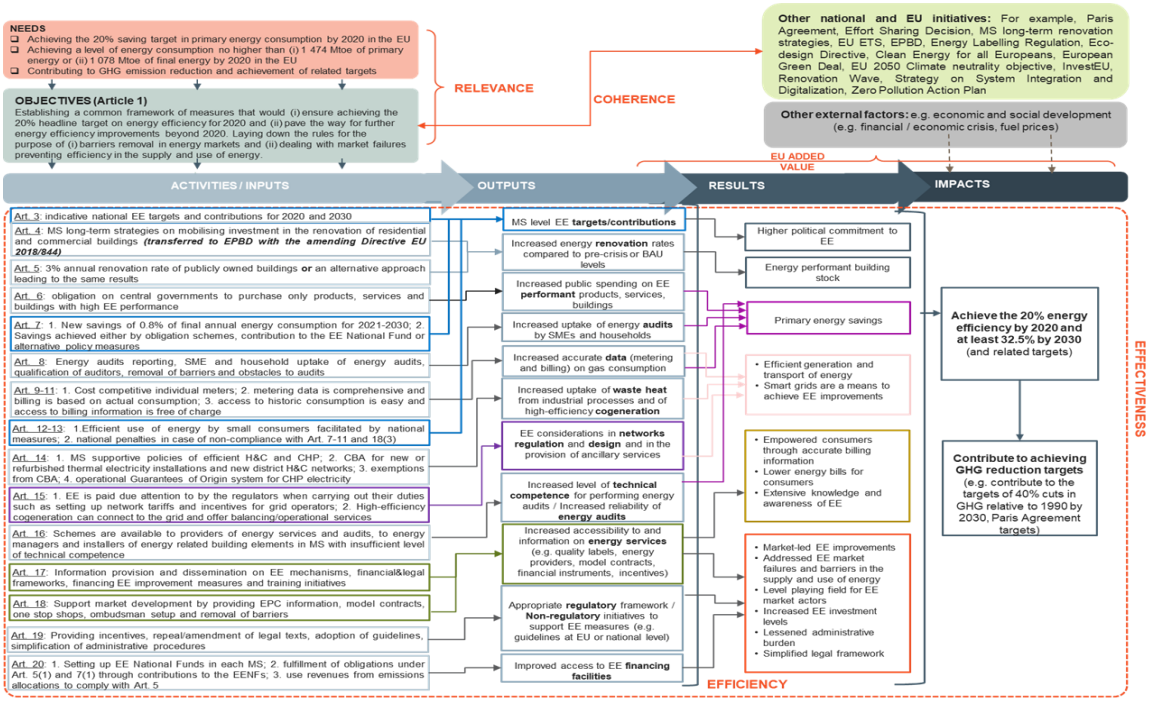
Figure 32 GDP and employment impacts of the REF and MIX scenarios

The full-financing scenario conditions lead to positive, but small impacts on GDP and employment. The changes in GDP, in volume, is close to 0.6% in 2030 and for employment the increase is 0.4% in 2030.

The model-based analysis finds that the REG scenario has higher positive impacts on GDP and employment than the MIX scenario in the short and medium-term and lower negative impacts in the long-term. The REG scenario includes more ambitious energy efficiency and renewable supporting policies than the MIX and at the same time involves lower carbon taxation. The higher energy efficiency and renewables investment included in the REG, compared to the MIX, are beneficial for domestic activity and employment, while at the same time the budget impacts caused are lower in REG compared to the MIX that includes high carbon taxation. The results show that the recycling of auction revenues in the economy, which are higher in MIX than in REG, are not able to fully offset the negative economic effects of the budget impacts of the carbon tax. However, it should be noted that results are small (a fraction of GDP percentage point over many years) and critically depend on the assumptions about the effects of investment crowding out.

Annex F Main elements of the EED

Figure 33 Intervention logic of the existing EED



The overall energy efficiency target

This target sets out the envelope of energy efficiency that the Member States need to achieve. Some of this efficiency will result from normal market behaviour, but this is not sufficient, and this is why EU actions are needed. As there is an underlying rate of upgrading and replacement (e.g. cars have an average life of 14 years), there will be a slow improvement in overall energy efficiency and gradual energy saving (to the degree the efficiency improvements are not offset by increased activity). The level of these background efficiency will depend on how far end users are willing to invest in the most energy efficient processes, actions and devices. Member States will primarily need to intervene in the market to ensure that energy savings above this underlying rate are achieved to meet their overall target.

Energy Savings Obligation

Normal operation of markets will lead to a background level of energy efficiency improvements and a large share of this will be driven by EU level energy performance standards. The energy savings obligation, established in the EED require Member State to put in place energy efficiency obligation schemes and alternative policy measures, that means specific programmes, which will achieve a large proportion of the expected shortfall between the savings needed and the baseline savings due to natural replacement and upgrading.

Exemplary role of public buildings

In view of the essential role that improving the energy performance of buildings has, it is essential for the public sector to play an exemplary role. Public buildings may also be iconic and be visited by large numbers of people meaning that their improved energy

performance may provide inspiration for others to upgrade the energy performance of their own buildings. Public buildings are estimated to consumer around 2% of final energy consumption in the EU.

Supporting markets

Through its requirements to better take account of energy efficiency in public procurement, the EED ensures a demand for more energy efficient products and sends a signal to market operators. The EED also requires Member States to carry out certain activities in specific important areas (e.g. district heating and cogeneration) to help identify the potential for energy savings and the economic attractiveness of it.

Enabling framework

There are many barriers to implementing energy efficient improvements, like, for example, an imperfect access to capital, the lack of proper information, split incentives, the disproportionate perception of hidden costs. Because of these, the rate of action is lower than desirable. To reduce those barriers, the EED requires Member States to carry out actions to create an enabling framework for the promotion of energy efficiency. These include provisions on qualification, accreditation and certification ensuring that there are appropriately qualified personnel available and that for example energy audits are robust and reliable.

Provision of information

Lack of knowledge about the potential for energy efficiency improvements and the economic benefits from it is an important obstacle. While it is addressed in certain areas through – for example – the requirements on energy labelling of products and cars, this is obviously too limited. There are, in fact, more fundamental needs, such as ensuring consumers have good information over their own energy consumption and that they are able to control it. They also need independent advice on actions that they can take to reduce their energy consumption, which may be beyond individual end users knowledge. More information on financial means to increase energy efficiency is also necessary. The EED therefore creates obligations for Member States to ensure that these sorts of information are provided to the end users in need of it.

Finance

A key barrier to undertaking energy efficiency investments is to finance them since there will always be an up-front cost that has to be repaid over time through the energy savings. The EED therefore requires Member States to ensure that appropriate actions are taken to assist in financing these investments.

Annex G Underachievement of targets

1. The energy efficiency 'ambition gap'

EU Member States agreed in 2018 to reach at least 32.5% of energy efficiency by 2030. However, the 2020 assessment of the final NECP[71] shows that the energy efficiency aggregated ambition would amount to a reduction of 29.7% for primary energy consumption and 29.4% for final energy consumption, reaching 1176 Mtoe and 885 Mtoe respectively in 2030.

This means that national policies and measures as planned by Member States create a gap compared to the Union's existing 2030 target of at least 32.5%. This gap still stands at 2.8 percentage points for primary energy consumption and at 3.1 percentage points for final energy consumption.

Of course, this 'ambition gap' in the NECPs does not necessarily mean that a higher energy efficiency target could not be achieved. It needs to be underlined that the 'ambition' gap identified in the NECPs does not reflect a "gap" *de facto*, but simply indicates that current Member States' plans fall short of the required level (currently 32.5% by 2030). This is linked to the following factors:

- The general political situation is very different in 2021 than it was in 2016-2017 in relation to climate change and to the need to ensure a clean energy transition that does not leave anyone behind. As Member States have all endorsed the 55% climate target and as energy efficiency is a precondition of all decarbonisation scenarios, there is no reason to think that Member States would not adopt stronger policy measures with a higher energy efficiency target, also considering their positive effects on social issues, energy poverty and on addressing distributional effects;
- The measures in the existing legislation were adopted to allow reaching the 32.5% energy efficiency target. Member States were working, therefore, on the basis of these measures and of the 32.5% target when preparing the NECPs.

2. Energy consumption trends

When it was clear that the EU was not going to meet its energy efficiency targets for 2020, the Commission set up a dedicated Member States' Task Force to look into what efforts could be made to achieve the targets. The Member States broadly recognised the fact that the EU is currently not on track towards achieving the 2020 target for energy efficiency and that it is important to guarantee that the target is met. The Task Force presented an analysis on the reasons for the growth in energy consumption as well as possible pathways forward.

Although the trend between 2005 and 2020 is of decreasing energy consumption, in the years 2015, 2016 and 2017, final energy consumption rose[72]. This increase follows five years of decrease (2010-2014)[73]. Possible and at least partial explanations are good

[71] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – An EU-wide assessment of national energy and climate plans driving forward the green transition and promoting economic recovery through integrated energy and climate planning (COM/2020/564 final)

[72] JRC 2020

[73] Ibid

economic performance, low oil prices, and cold winter and warm summers during some years[74]. The main increase in energy consumption was observed in buildings followed by transport.

Between 2014 and 2016[75] energy use increased by 7.4% in the residential sector, which was explained mainly by colder winters. The Task Force report highlights that further analysis is needed to understand whether the increase in demand can also be attributed to life-style changes, such as an increased use of ICT. Comfort is stated as one of the explanations for increased energy consumption in public buildings. Following three years' increase in primary energy consumption, in 2018 there was a decrease. This is again partly explained by weather conditions, as the weather was warmer in 2018. By 2018, primary energy consumption decreased in many Member States[76]. The decline was thanks to decrease in the residential sector and in the services sector, whereas transport and industry saw an increase. In 2014, the demand for final energy actually decreased due to an exceptionally warm winter. Final energy consumption increased in 2018 compared to 2014.

Rising energy consumption in transport and industry were the main causes of the slowing progress towards the target in 2015-2017 at the end-use level[77]. Energy use in the transport sector increased by 4.2% between 2014 and 2016. This is partly explained by increased passenger and freight transport due to good economic conditions and the trend towards large vehicles (SUVs). The industry sector saw a very small increase during the same period in spite of an increase in industrial production, which is partly explained by the fact that many energy-intensive companies already having introduced cost- and energy-efficiency measures following the financial crisis.

The 2020 Progress Report indicates that Member States saw economic and activity growth as plausible explanations to the increase in energy consumption in 2017. Other factors identified were increase in the population or the number of households, increase in households' disposable incomes, and weather conditions.

3. Shortfall to meeting 2020 targets

Final energy consumption in the EU28 fell by 5.8%, from 1194 Mtoe in 2005 to 1124 Mtoe in 2018. This is 3.5 percentage points above the 2020 final energy consumption target of 1086 Mtoe. Primary energy consumption in the EU28 decreased from 1721 Mtoe in 2005 to 1552 Mtoe in 2018 – a 9.8% drop. This is 4.65 percentage points above the 2020 target of 1483 Mtoe.

In 2019 primary energy consumption decreased for the second consecutive year. It was 1.7% lower than in 2018 but still 1.9% above the linear trajectory and 2.9% above the 2020 target level. Final energy consumption declined for the first time in six years. The yearly decline of 0.6% in 2019 was in line with the pace of linear trajectory to reach the 2020 target. However, given the accumulated gap the pace was not sufficient to bring the EU28 on track to reach the target: the actual consumption was 2.3% above the linear trajectory and 2.9% above the 2020 target level.

Based on the progress up to 2019 it could be assumed that the 20% energy efficiency target for 2020 would not be reached. However, because of the impact on the COVID-19

---

74 Ibid

75 European Commission, Directorate General for Energy, Brussels, January 2019, Report of the Work of the Task Force on Mobilising Efforts to Reach the EU Energy Efficiency Targets for 2020.

76 COM(2020) 326 final (Progress Report July 2020)

77 JRC 2020

crisis, it is expected that energy consumption fell substantially in 2020 and the targets would be met. At present official data for 2020 are not available.

4. Shortfall of measures in NECPs

EED Article 3 requires Member States to set an indicative energy saving target. The NECPs were developed by Member States to collectively achieve the agreed EU targets for 2030 (at least 32% renewable energy share, 32.5% energy efficiency improvement, and 40% greenhouse gas reductions). The assessment of the draft plans in 2019 indicated a substantial ambition gap in the collective contributions of energy efficiency.

In 2018 and 2019, the Commission launched infringement proceedings against all Member States, for failing to comply with obligations under the EED[78]. Most issues were clarified by the Member States and the infringements closed, but some remain open. Several Member States will most likely not meet their national energy savings obligations by December 2020, as required by Article 7 of the EED, but many introduced new measures and policies during 2019.

Member States have highlighted the need to fully implement existing legislation, to better mobilise EU structural and cohesion funding, and to undertake additional measures that would deliver quick savings[79], during meetings with the Task Force in 2019. In addition, for the 2030 targets, the need to put a stronger focus on ensuring that buildings undergoing major renovations achieve minimum energy performance standards was also emphasised.

The Commission's assessment of the final Member States NECPs has concluded that the sum of the Member State commitments to reduce final energy consumption is not sufficient to achieve the EU target of 32.5% savings for 2030. The sum of commitments reached 29.4% leaving a shortfall of 3.1% to the existing target.

The absence of any overall binding obligation for each Member State in the current legal framework for energy saving reduces certainty over the energy savings that will be achieved. The persistent ambition gap indicates a need for additional EU-wide measures in line with the Governance Regulation, including through a possible revision of the EED.

[78] COM(2020) 326 final (Progress Report July 2020)

[79] https://ec.europa.eu/energy/sites/ener/files/report_of_the_work_of_task_force_mobilising_efforts_to_reach_eu_ee_targets_for_2020.pdf

Annex H Energy savings potentials

There is extensive material published on both technical and economically cost effective energy saving potentials. This annex provides a short overview of some of this material. It provides in the first section an overview of actually implemented energy efficiency investments and the payback times and cost-effective of these.

1. The DEEP platform

The Energy Efficiency Financial Institutions Group (EEFIG) was established in 2013 by the European Commission and the United Nations Environment Programme Finance Initiative (UNEP FI). EEFIG is composed of over 300 representatives from more than 200 organisations - spanning public and private financial institutions, industry representatives and sector experts and aims to accelerate private finance to energy efficiency.

EEFIG aims to develop practical tools to facilitate the energy efficiency market. AS one of these, EEFIG has developed the De-risking Energy Efficiency Platform (DEEP). The DEEP Database is intended to support financial institutions in energy efficiency investment decisions. It is an open-source database for sharing and transparent analysis of energy efficiency investments, performance monitoring and benchmarking. The data comes from actual projects carried out with the costs and energy savings identified.It provides an improved understanding of the real risks and benefits of energy efficiency investments by providing market evidence and investment track records.

It includes more than 15,000 energy efficiency projects (7,767 in buildings and 9,421 in industry) from 30 data providers. Overall these show that the investments in buildings have a median payback time of 5 years and an avoidance cost of 3.1 cents/kWh. For industry the projects have a median payback time of 3.4 years and an avoidance cost of 2.7 cents/kWh.

Table 23 and Table 24 below provides aggregated figures from these projects on the payback times for different types of measures and company sizes.

Table 23 Observed payback time for energy efficiency investments in businesses

Payback time per measure (investment in EUR / energy saving in EUR per year)	
EE measure type	**median**
Motors	1.9
Metering, Monitoring and Energy Management	2.3
Cooling	2.4
Heating	2.4
Power Systems	3.0
ICT	3.1
Pumps	3.3
Compressed Air	3.8
Other	4.0
Refrigeration	4.0
Waste heat (without power generation)	5.2

Street Lighting	5.6
Payback time per enterprise size (investment in EUR / energy saving in EUR per year)	
Enterprise size	**median**
Large enterprises(250+ employees)	2.6
Small enterprises(10-49 employees)	2.8
Micro enterprises(<10 employees)	3.1
Medium enterprises(50-249 employees)	4.1

Table 24 Observed payback time for energy efficiency investments in buildings

Payback time per measure (investment in EUR / energy saving in EUR per year)	
EE measure type	**median**
Lighting	3.0
HVAC Plant	3.3
Building Fabric Measures	11.1
Integrated Renovation	13.5
Payback time per building type (investment in EUR / energy saving in EUR per year)	
Building type	**median**
Wholesale and retail trade	3.0
Other single family dwellings	3.0
Office buildings	3.1
Hotels & restaurants	3.2
Industry	3.2
Not Specified	3.3
Health care	4.5
Educational buildings	5.8
Public buildings	8.3
Multi-family buildings 1-4 storeys	11.9
Multi-family buildings 5+ storeys	14.1
Unit energy saving per measure type (EUR/m^2/year)	
EE measure type	**median**
Lighting	1.98
Building Fabric Measures	4.86
Integrated Renovation	8.79
HVAC Plant	22.20

2. Studies on the energy efficiency potential at national and sectoral level

There are very many assessments of the potential available for energy savings from the further deployment of currently available energy efficient techniques. These differ from

other assessments exploring the further potential to improve the energy performance of appliances and products that are by their nature more speculative.

DG ENER currently has a report under preparation by ICF consulting[80] to estimate the technical and economic energy savings potential by sector and Member State. The tables below are taken from the draft report and compare the technical and economic reduction potential to the projected energy consumption in 2030 from the 2016 EU reference scenario.

Figure 34 Estimated sectoral technical and economic energy savings potential by 2030

Sector	BAU projected consumption by 2030	Technical reduction potential by 2030		Economic reduction potential by 2030	
	[ktoe]	[ktoe]	[%]	[ktoe]	[%]
Residential	236,129	77,113	32.7%	36,673	15.5%
Commercial	127,502	29,956	23.5%	20,375	16.0%
Industry	275,038	66,994	24.4%	64,716	23.5%
Road Transport	248,537	26,086	10.5%	16,107	6.5%
Total	**887,206**	**200,149**	**22.6%**	**137,871**	**15.5%**

Figure 35: Estimated technical and economic energy savings potential by 2030 by Member State

Country	Hungary	Italy	Romania	Ireland	Netherlands	Austria	Belgium	Luxembourg	Germany	Croatia	Czech Republic	Denmark	France	Slovakia	Greece	Bulgaria	Spain	Sweden	Poland	Slovenia	Portugal	Finland	Estonia	Lithuania	Latvia	Malta	Cyprus
Technical energy saving potential	26%	25%	25%	25%	25%	24%	23%	23%	23%	23%	23%	23%	22%	22%	21%	21%	21%	20%	20%	20%	19%	19%	19%	19%	18%	18%	16%
Economic energy saving potential	9%	16%	10%	19%	19%	18%	19%	18%	20%	11%	10%	20%	14%	13%	13%	11%	13%	18%	9%	13%	14%	16%	8%	11%	8%	9%	8%
Energy saving potential is shown as a percentage of the baseline projection for 2030 in the EU 2016 reference scenario																											

It should be noted that these assessments are based on existing technology. They do not assume new technology or future cost reductions.

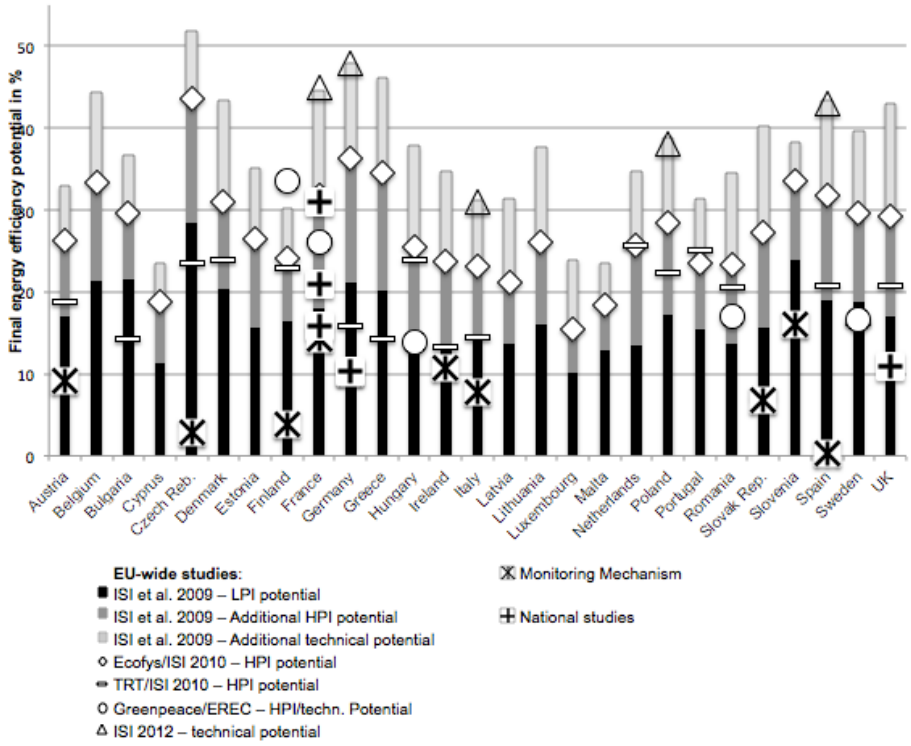
Another recent research paper[81] reviews a significant number of energy efficiency potential studies. While it shows that comprehensive national energy efficiency potentials studies are rare and difficult to compare, it concludes that the existing studies agree that significant energy efficiency potential exists in the EU.

Assuming low policy intensity, energy savings between 10 and 28% could be realised by 2030 compared to a baseline development. However, in order to achieve higher savings of up to 44%, high policy intensity is necessary. Technical energy efficiency potentials in the different EU Member States range from 14 to 52%, as presented in the table below.

[80] Technical assistance services to assess the energy savings potentials at national and European Level (ICF et al) – ongoing study; not yet published

[81] The Potential for Energy Efficiency in the EU Member States – A Comparison of Studies. 2017. Katharina Knoop and Stefan Lechtenböhmer. Research Group Future Energy and Mobility Structures, Wuppertal Institute for Climate, Germany.

Figure 36: Energy efficiency potentials in the EU Member States until 2030 according to different energy and climate scenario studies, in per cent of final energy demand reduction versus the respective baseline



3. Energy saving potential in business

It is often speculated that because business in general and industry in particular are economically driven sectors where energy is often an important cost, that it should be expected that there will not be unexploited cost-effective potential. These sectors have also been subject to emissions trading which provides a further economic incentive to implement available energy efficiency measures. While the energy use trends show the most improvement in the industry sector compared to others, the evidence identified in DEEP and also presented below show that there is still substantial available cost-effective potential.

a. Industrial heat

A large share (around 2/3) of energy use in industry is for heat[82]. Energy saving potential exists for reusing waste heat for other purposes and for avoiding the loss of useful heat. Waste heat may be reused for example through district heating, industrial symbiosis or even the use of heat exchangers within an installation to recycle heat.

With regard to avoiding heat losses, the European Industrial Insulation Foundation supports the performance of industrial insulation audits and estimates a potential 14 Mtoe of cost effective savings from heat insulation[83] (about 6% of all industrial energy use).

b. Electric motors

[82] https://www.iea.org/commentaries/clean-and-efficient-heat-for-industry

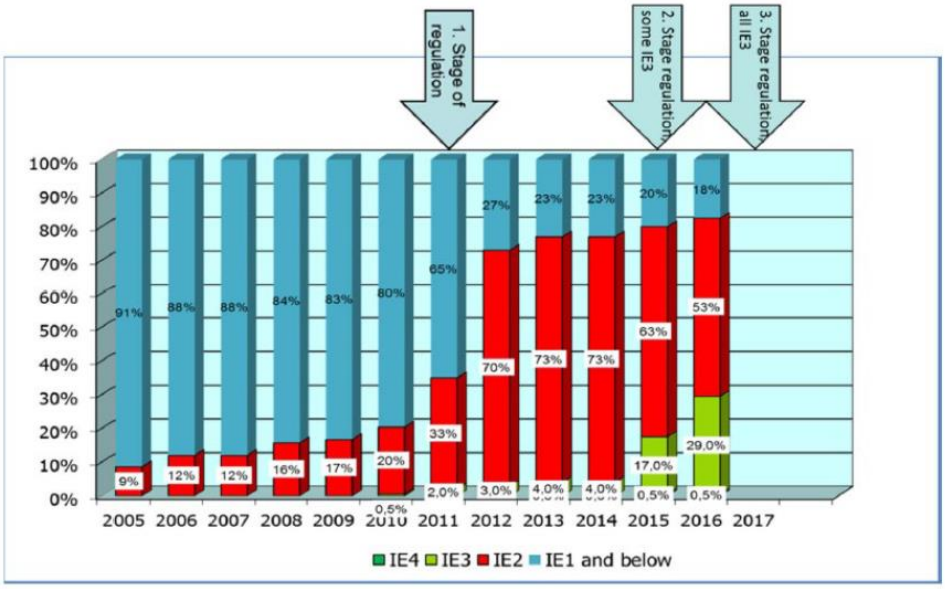
[83] https://www.eiif.org/sites/default/files/2020-12/EiiF_White%20paper_2020_REV.15.pdf

And 'The insulation contribution to decarbonise industry'; EIIF 2021

Electric motors are another important energy using area using around 70% of manufacturing electricity consumption globally. In view of this considerable effort has been made in defining energy performance standards for new motors.

Figure 37 below shows the market share of new motors by efficiency class as a result of eco-design legislation.

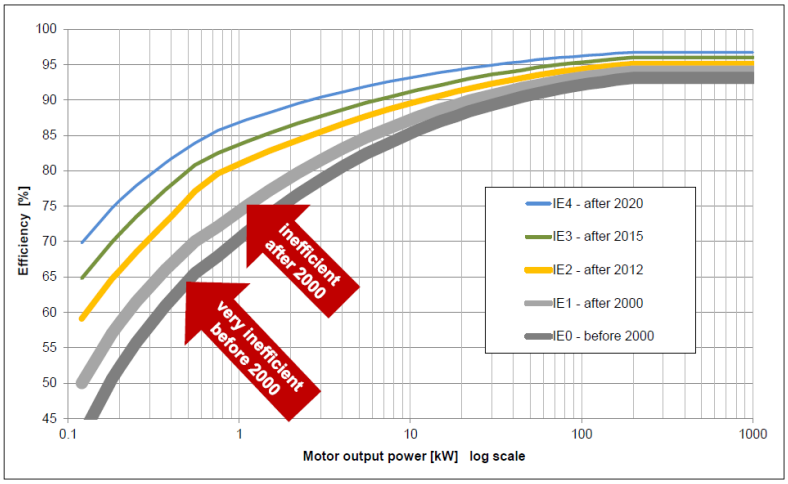
Figure 37 New motor sales share by efficiency class



[84]

Motors meeting higher energy classes are significantly more efficient, especially at part load as illustrated in Figure 38 below[85].

Figure 38 Efficiency of electric motors by efficiency class



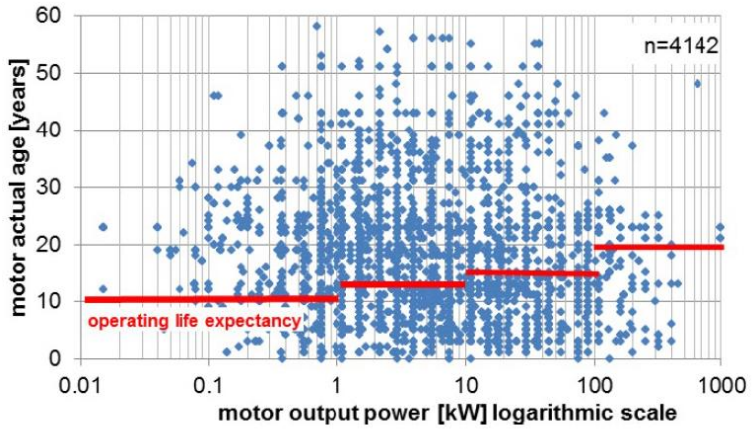
However, because of lengthy motor lifetimes (shown in Figure 39 below[86]) it will take a long time for the full potential energy savings to be realised without incentives to speed

[84] Peter Zwanziger, Efficient Motor and Drives Policy for Europe – Social and Technical Responsibility of CEMEP, EEMODS 2017 Conference, Rome, Italy https://cemep.eu/data/Zwanziger_eemods_2017_CEMEP_plenary_170904.pdf

[85] Efficiency levels in IEC 60034-30-1, 2014 standard. See e.g. https://www.slideshare.net/sustenergy/electric-motor-systems-targeting-and-implementing-efficiency-improvements

up replacement. In Sweden it is estimated that old motor replacement could save 4 TWh/year[87].

Figure 39 Observed age of electric motors in use



Source: Impact Energy, Switzerland, 2014

Another example of the potential for motor replacement is in ventilation and air conditioning systems. These account for a significant share of building energy use and outdated fans are one of the main causes of excessive energy consumption in existing air conditioning and ventilation systems. Replacing old fans with modern, energy-efficient fans can save up to 50% energy. In a German example[88], more than 50% of air conditioning system inspections pointed to the desirability of fan replacement and the cost savings lead to short payback times.

[86] Rolf Tieben, Rita Werle, Conrad U. Brunner, EASY- Lessons learned from four years of the Swiss EASY audit and incentive program, Impact Energy Inc., EEMODS 2015, Helsinki (Finland) on 15-17 September, 2015 https://www.topmotors.ch/sites/default/files/2018-06/E_PB_2015_09_EEMODS15_Paper_Tieben_Werle_Brunner_EASY.pdf

[87] https://www.stenarecycling.com/news/an-abb-and-stena-recycling-collaboration-towards-a-more-sustainable-industry

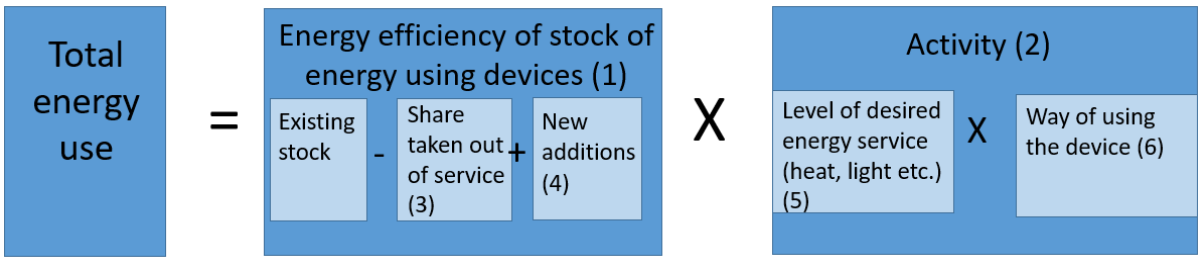
[88] http://ventilatorentausch.de/

Annex I Mechanism to reduce energy consumption

In view of the high importance of reducing energy consumption for the EU as explained in section 1.2, a number of pieces of EU legislation along with the EED and measures also taken at Member State level aim at this general objective. Annex M contains a short description of these main relevant other EU instruments and policies.

In simple terms, the total EU energy use is the result of the energy efficiency (the desired service per unit of energy used) of the energy using devices in the EU multiplied by the amount they are used. This is illustrated in Figure 40 below.

Figure 40 Schematic representation of mechanisms to reduce the consumption of energy-using devices



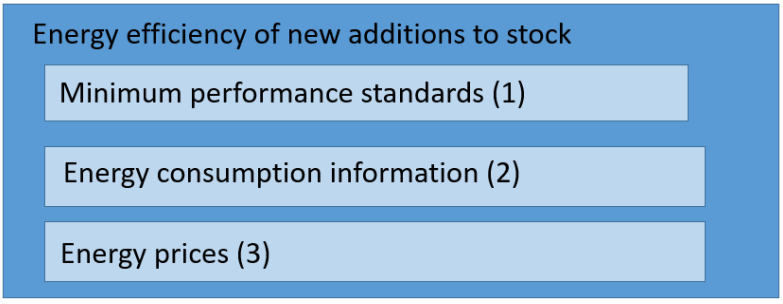
Energy using devices range from the massive (industrial steam boilers or combustion plants) to the tiny (mobile phones or bulbs).

To reduce energy consumption, it is possible to address many different elements of this equation. For example, the energy efficiency of devices in service (1) may be affected by measures that increase the rate at which existing devices are taken out of service (3) for example through scrapping schemes. They can be influenced by the rate of new additions to the stock (4) and their efficiency. The overall energy consumption can also be reduced by decreasing the overall activity (2). This may be a result of changes in the cost of carrying out the activity or by other changes that alter the desired level of service (5). Finally, the way in which devices are used may be influenced (6), for example through the provision of information.

The majority of relevant EU legislation affects the energy efficiency of the new energy using devices. The key mechanisms are illustrated in Figure 41 below. The main mechanism is through the setting of minimum energy performance standards (1). This is done for example through Eco-design for appliances, while road vehicle CO_2 legislation for cars and commercial vehicles addresses the new fleet average efficiency.

A second key mechanism is through the provision of energy consumption information (2). Examples of EU requirements for this are the car labelling Directive, the Energy and Tyre labelling Regulations and energy performance certificates for buildings (EPBD). Finally, energy prices will influence choices over energy efficiency and are partly the result of market forces and partly the result of taxation both at EU level (ETD), national level and the cost of ETS allowances.

Figure 41 Mechanisms to affect the energy efficiency of new energy-using devices



However, it is important to note that none of these instruments creates any obligation to either accelerate the rate at which energy using devices are replaced or to exceed minimum performance standards if they are replaced, nor they are foreseeing an energy efficient development of processes. If the rate of retirement of older higher energy consuming devices is accelerated then their replacement with more efficient ones will lead to lower energy use. But, since there will be a range of performance available for new devices (such as the A to G energy label range), it is also possible to accelerate the rate of reduction of energy use by encouraging the replacement devices to be better energy performing. Both mechanisms can be used simultaneously.

The level of desired or needed energy service (5) is more exogenous. However, it too can be influenced. For example, measures to promote the integration of data centres in urban planning and their contribution to district heating systems reduces the need for heat in buildings. Other measures such as urban planning and mobility measures can reduce the need for motorised mobility.

The way of using energy using devices (6) is also a relevant factor. A lack of knowledge may mean that driving is carried out inefficiently or there is a poor understanding of how to achieve desired temperatures in a building without wasting surplus heat. These are not types of activity carried out at EU level since they require communicating with end users but are typically organised at Member State level or more locally.

Annex J Energy savings obligation

1. Scope of the energy savings obligation

In view of the climate and energy framework for 2030, the EED has extended the energy savings obligation beyond 2020. While the rate of new annual energy savings in the first obligation period (2014-2020) is the same for all Member States (*i.e.* 1.5%), this is not the case in the second period (2021-2030). Member States are required to achieve cumulative end-use energy savings for the entire obligation period 2021 to 2030, equivalent to new annual savings of at least 0,8%[89] of final energy consumption. Malta and Cyprus have a lower yearly energy savings obligation.

That requirement could be met by new policy measures that are adopted during the new obligation period from 1 January 2021 to 31 December 2030 or by new individual actions as a result of policy measures adopted during or before the previous period, provided that the individual actions that trigger energy savings are introduced during the new period.[90] To that end, Member States should be able to make use of an energy efficiency obligation scheme, alternative policy measures, or both. Whether a Member State decides to use an energy efficiency obligation scheme or adopt alternative policy measures, it must ensure that the policy measures are eligible to achieve the required cumulative end-use energy savings by 31 December 2030. Member States have the flexibility to target one or more specific sector(s) in order to meet the energy savings obligation.

For the purpose of the integrated NECPs, Member States must assess the number of households in energy poverty in accordance with Article 3(3)(d) of the Governance Regulation. Under Article 7(11) EED, when designing policy measures to meet their energy savings obligations, Member States are to take account of the need to alleviate energy poverty by requiring, as far as appropriate, that a proportion of policy measures be implemented as a priority among vulnerable households, including those affected by energy poverty and, where appropriate, in social housing.

Article 7(9) EED requires Member States to ensure that energy savings resulting from policy measures referred to in Articles 7a, 7b and 20(6) EED are calculated in accordance with Annex V EED. The additionality requirement needs to be taken into account when determining energy savings for all kinds of policy measures. The basic principles are set out in Annex V(2)(a) and (b) EED.

In addition to the additionality principle, Member States need to satisfy the 'materiality' criterion. Annex V, part 1 EED sets out methods for calculating energy savings other than those arising from taxation measures for the purposes of Articles 7, 7a, 7b and 20(6) EED. For determining the energy savings from tax related policy measures introduced under Article 7b EED , the principles in Annex V(4) EED apply. Annex V(2), point (i) EED provides that Member States need to take into account the lifetime of the measures and the rate at which the savings decline over time in their the calculation of energy savings.

---

[89] Cyprus and Malta are required to achieve cumulative end-use energy savings equivalent to new savings of 0.24 % of final energy consumption for the period 2021 to 2030.

[90] Commission Recommendation on transposing the energy savings obligations under the Energy Efficiency Directive, C(2019) 6621 final

Following the amendment of the EED in December 2018, Member States were obliged to transpose new rules on energy efficiency obligation schemes (*i.e.* the new Articles 7, 7(a) and 7(b) by 25 June 2020.

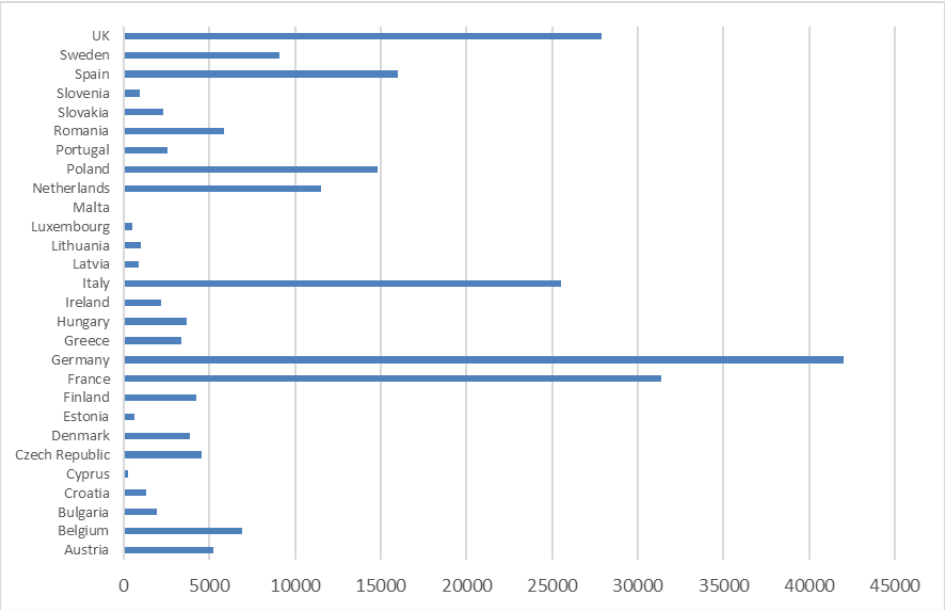
Since the beginning, Article 7 has been a pivotal provision of the EED as was estimated in the impact assessment of the EED[91] that this provision would be responsible for more than a half (85 Mtoe of primary energy consumption in 2020) of the energy savings the Member States should achieve under the EED. The energy savings obligation can be fulfilled by delivering energy savings from all sectors of the economy, with a wide range of policy instruments, across all technologies and non-technological efficiency interventions. The wide-ranging nature of Article 7 EED, the way in which it interacts with other efficiency policies, the requirements for monitoring and verification of energy savings and the additionality requirement make the energy savings obligation the most important component of the EED in terms of its contribution. Article 7 EED encourages Member States to implement policy measures which go beyond the requirements provided in EU law. Article 7 EED provides flexibility to Member States for choosing the type of policy measure which fits best to national characteristics, and is one of the key policies with a great outreach to the end-consumers, e.g. via information campaigns or behavioural measures which are eligible under Article 7 EED.

2. Member States´ progress towards fulfilling the energy savings obligation (period 2014-2020)

a. Cumulative energy savings required by 31 December 2020

For the period 2014 to 2020, Member States notified the following cumulative amounts of energy savings to be achieved under Article 7 EED by 31 December 2020.

Figure 42 Cumulative energy savings to be achieved under Article 7 EED



Source: DG ENER´s assessment; national cumulative savings requirements by 2020 in ktoe

[91] Based on the internal estimates carried out by the Commission services during the negotiations of the EED (in 2012)

Based on the assessment of the energy savings notifies by Member States to the Commission in their annual reports, Member States achieved by the end of 2018 about 55% (126.44 Mtoe) of the sum of the cumulative end-use energy savings obligations for 2014-2020 (230.17 Mtoe) aggregated at EU-level.

Table 25 Progress by Member States towards their cumulative energy savings targets

Country	**Progress towards the cumulative savings requirement**					
	National cumulative savings requirements by 2020 (target)	Progress towards total cumulative savings requirement by 2020 (taking into account actions implement-ted over 2014–2018)	Required cumulative savings for 2018 on the basis of average yearly delivery (benchmark = constant rate of new annual savings; lifetime > 7 years)	Reported savings compared to estimated cumulative savings for 2018 on the basis of average yearly delivery (progress vs. benchmark)	Required cumulative savings for 2018 on the basis of average yearly delivery (benchmark = constant rate of new annual savings; lifetime = 1 year)	Reported savings compared to estimated cumulative savings for 2018 on the basis of average yearly delivery (progress vs. benchmark)
Austria	5 200	80%	2 786	149%	3 714	112%
Belgium	6 911	56%	3 702	105%	4 936	79%
Bulgaria	1 942	26%	1 040	48%	1 387	36%
Croatia	1 296	45%	694	85%	926	64%
Cyprus	242	67%	130	125%	173	94%
Czech Republic	4 565	37%	2 446	69%	3 261	52%
Denmark	3 841	83%	2 058	155%	2 744	116%
Estonia	610	61%	327	113%	436	85%
Finland	4 213	112%	2 257	208%	3 009	156%
France	31 384	56%	16 813	104%	22 417	78%
Germany	41 989	51%	22 494	96%	29 992	72%
Greece	3 333	41%	1 786	76%	2 381	57%
Hungary	3 680	47%	1 971	88%	2 629	66%
Ireland	2 164	65%	1 159	121%	1 546	91%
Italy	25 502	50%	13 662	93%	18 216	70%
Latvia	851	65%	456	121%	608	91%
Lithuania	1 004	54%	538	100%	717	75%
Luxembourg	515	22%	276	41%	368	31%
Malta	67	71%	36	132%	48	99%
Netherlands	11 512	68%	6 167	126%	8 223	95%
Poland	14 818	60%	7 938	112%	10 584	84%
Portugal	2 532	20%	1 356	37%	1 809	28%
Romania	5 817	23%	3 116	43%	4 155	32%
Slovakia	2 284	62%	1 224	116%	1 631	87%
Slovenia	945	47%	506	88%	675	66%
Spain	15 979	44%	8 560	81%	11 414	61%
Sweden	9 114	51%	4 883	95%	6 510	71%

Country	Progress towards the cumulative savings requirement					
	National cumulative savings requirements by 2020 (target)	Progress towards total cumulative savings requirement by 2020 (taking into account actions implement-ted over 2014–2018)	Required cumulative savings for 2018 on the basis of average yearly delivery (benchmark = constant rate of new annual savings; lifetime > 7 years)	Reported savings compared to estimated cumulative savings for 2018 on the basis of average yearly delivery (progress vs. benchmark)	Required cumulative savings for 2018 on the basis of average yearly delivery (benchmark = constant rate of new annual savings; lifetime = 1 year)	Reported savings compared to estimated cumulative savings for 2018 on the basis of average yearly delivery (progress vs. benchmark)
Total (EU)	**202 310**	**54%**	**108 380**	**100%**	**144 507**	**75%**
United Kingdom	27 859	66%	14 924	124%	19 899	93%
Total (EU and United Kingdom)	**230 169**	**55%**	**123 305**	**103%**	**164 406**	**77%**

Source: DG ENER´s assessment (November 2020), progress towards the cumulative savings requirement in the Member States

Based on the assessment of the last annual reports Member States submitted in 2020, it appears that five Member States are very unlikely to meet their energy savings target in 2020 if no additional actions are taken. Another nine are unlikely to fulfil the energy savings obligation by the end of 2020. On the other side, four Member States and UK are likely and nine Member States are very likely to meet their energy savings target. In total, 14 countries will likely or very likely meet their energy savings target. According to Article 27 of the Governance Regulation, each Member State shall report to the Commission on the achievement of its required amount of energy saving (obligation period 2014-2020) by 30 April 2022.

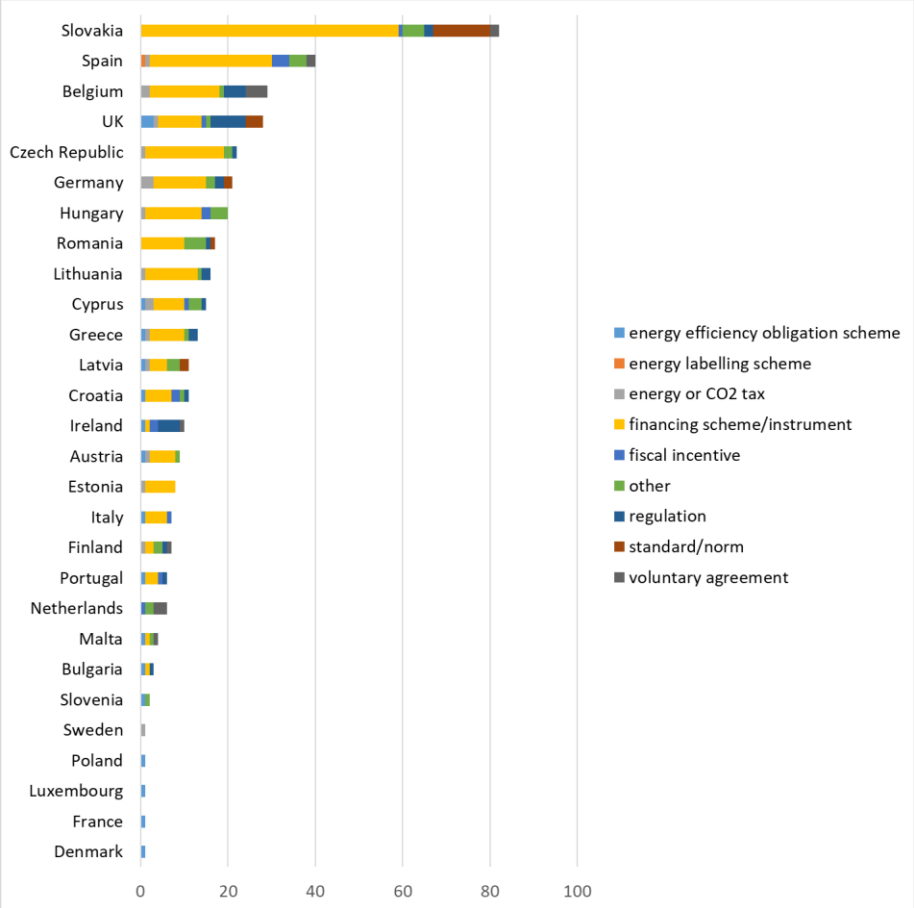
b. Policy measures implemented by Member States in the period 2014 to 2020

Five Member States (Denmark, France, Luxembourg, Poland, and Sweden) notified only one policy measure, all of them but one (Sweden implemented energy and carbon taxes) implemented energy efficiency obligation schemes (EEOS). Six countries reported more than 25 policy measures. All countries with more than 10 policy measures reported a mix of at least five different instrument types.

Member States implemented 463 (total number) policy measures by 2018. The majority of the reported policy measures (50%) are financing schemes/instruments. The other half of notified policy measures refers to other instrument types. EEOS count for 4% of the number of policy measures implemented. Energy labelling schemes have been rarely chosen as an instrument.

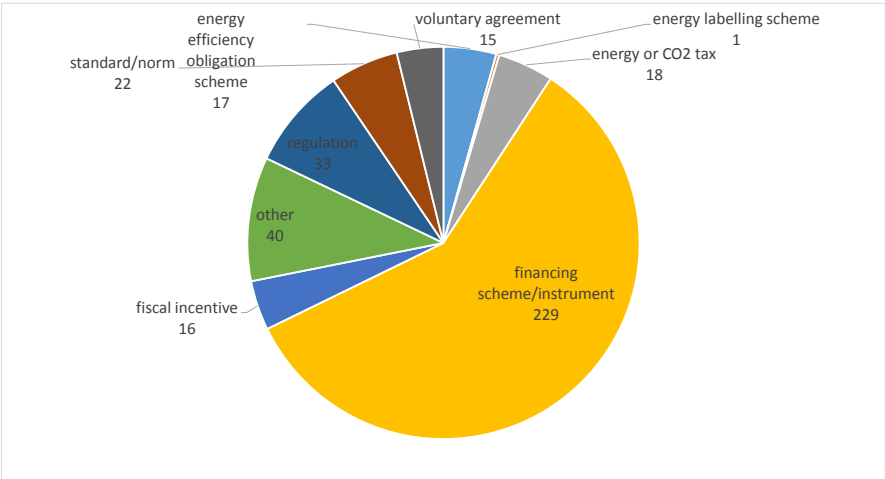
While EEOS represent only 4% of the number of policy measures implemented, the assessment of energy savings achieved by the different types of policy measure show that EEOS contribute to around 35% of energy savings. The share of energy savings achieved by financing schemes is around 12%, and energy and CO_2 taxes result in 16%.

Figure 43 Breakdown of the number of reported measures by type



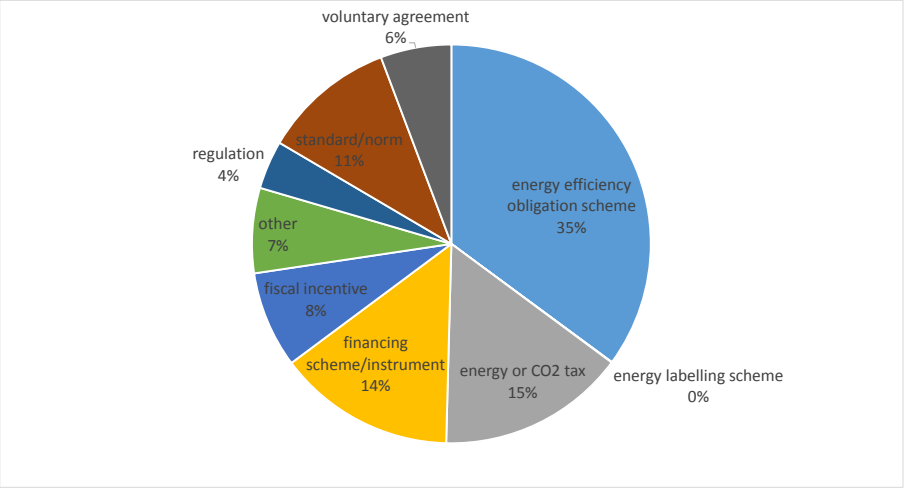
Source: DG ENER assessment (November 2020), number of reported policy measures by Member State

Figure 44 Breakdown of all reported measures by instrument type



Source: DG ENER assessment (November 2020), number of reported policy measures by instrument type aggregated at EU level

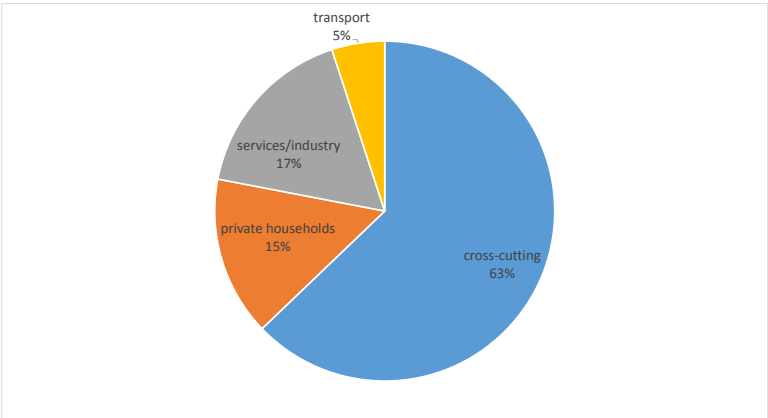
Figure 45 Share of reported energy saving by type of measure



Source: DG ENER assessment (November 2020); share of reported energy savings by type of policy measure aggregated at EU level

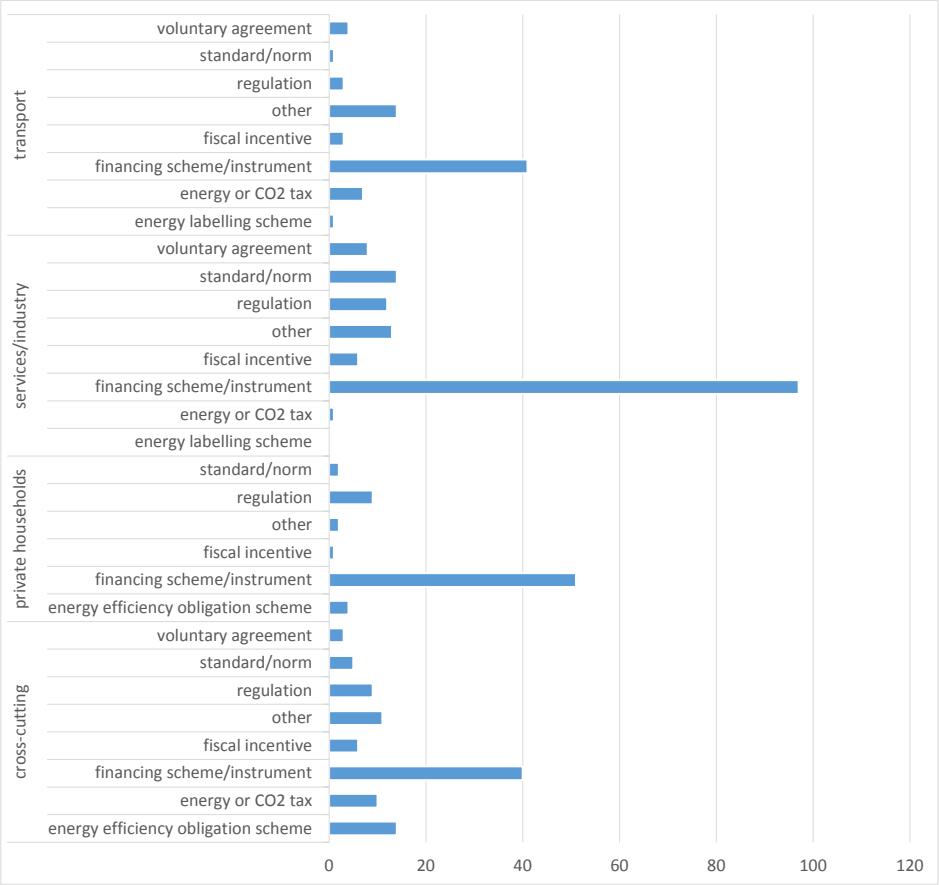
On the sectors targeted by the implemented policy measures, the largest share of energy savings reported by Member States by 2018 results from cross-cutting measures, which cannot be attributed to a single sector. Most measures (by count of reported measures) target services and industry, which cover most companies (except for transport companies) and the public sector (except for housing owned by public bodies, which is included in the private households sector). The two main instrument types in terms of energy savings, EEOS and taxation measures, are exclusively cross-cutting. The majority of measures (by count) is targeting services/industry, reflecting the heterogeneity of this sector.

Figure 46 Share of EU level reported energy savings by sector



Source: DG ENER assessment (November 2020); share of reported energy savings by sector aggregated at EU level

Figure 47 Number of policy measures by instrument type for targeted sectors at EU level



Source: DG ENER assessment (November 2020); number of policy measures by instrument type for targeted sector at EU level

Taxation measures are implemented in 15 Member States and the United Kingdom in the first period 2014–2020. These taxation measures target various fuels and energy carriers and have delivered a substantial amount of energy savings. More specifically, Cyprus, Estonia and Sweden report a high proportion of cumulative savings (over 75%) from taxation measures. Four more countries have a share of cumulative savings from taxation measures higher than 25%: Finland (28%), Latvia (39%) and Germany and Lithuania (both around 43%). For the majority of countries, this share remains between 5 and 19%. It is also important to note that 13 Member States and the United Kingdom have reported their taxation measures as a separate policy measure (see table below), while two Member States (Malta and the Netherlands) include them in a broader policy package. For the obligation period of 2021 to 2030, only in eight Member States notified taxation measures for the purpose of Article 7 EED. The majority of these Member States will continue to apply the existing ones.

Figure 48 Overview of reporting of taxation measures in the first obligation period 2014–2020

Country	**Year of notification**	**Sectoral coverage**	**Cumulative Savings over 2014–2018 (ktoe)**	**% in the total cumulative savings (2014–2018)***	**% in the new annual savings of 2018***
Austria	2014	Cross cutting	595	14.8%	48.7%
Belgium	2017	Cross cutting	230	5.9%	39.3%
Cyprus	2017	Cross cutting	146	90.1%	95.3%

Country	Year of notification	Sectoral coverage	Cumulative Savings over 2014–2018 (ktoe)	% in the total cumulative savings (2014–2018)*	% in the new annual savings of 2018*
Czech Republic	2019	Cross cutting	183	10.9%	18.7%
Germany	2014	Cross cutting	9 267	43.0%	62.5%
Estonia	2014	Cross cutting	341	92.1%	98.2%
Greece	2019	Transport sector and buildings	252	18.6%	61.3%
Spain	2013	Cross cutting	470	6.8%	9.1%
Finland	2013	Transport	1 321	28.1%	47.7%
Hungary	2018	Cross-cutting	269	15.5%	13.1%
Lithuania	2017	Transport	230	42.6%	66.3%
Latvia	2018	Cross cutting	213	38.5%	50.3%
Malta	2019	Transport	Reported as part of a policy package		
Netherlands	2013	Cross cutting	Reported as part of a policy package		
Sweden	2014	Cross cutting	4 654	100%	100%
United Kingdom	2013	Cross cutting	860	4.7%	15.8%

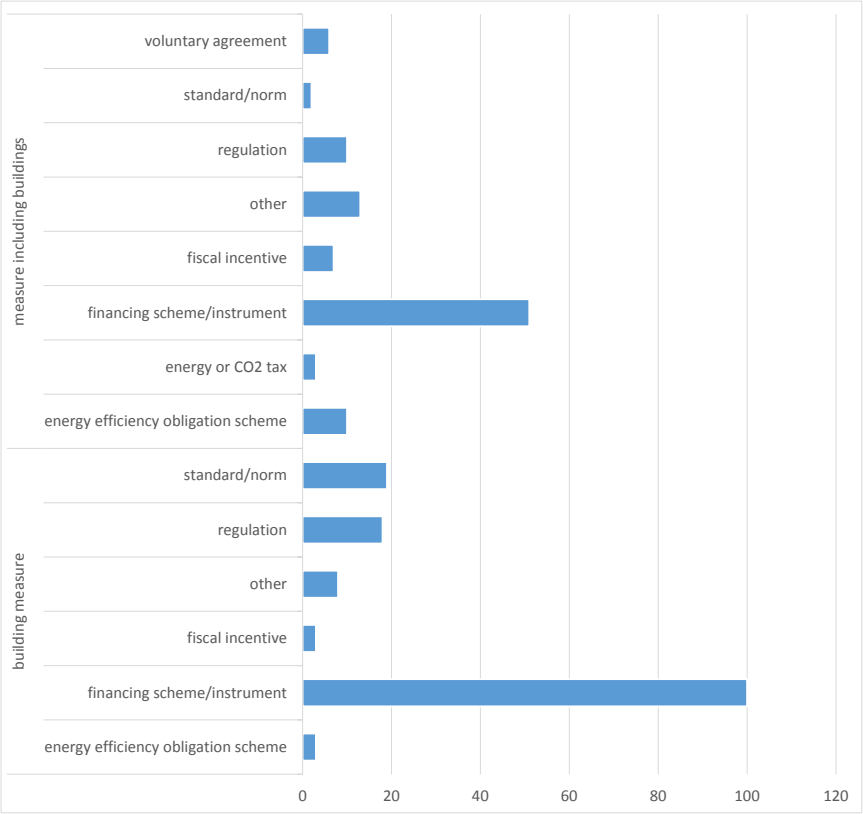
** The percentages in the table above represent the share of savings from taxation measures in the sum of savings from all the measures for each country, respectively for cumulative savings and new annual savings*

Source: DG ENER assessment (November 2020); overview of the reporting of taxation measures in the first obligation period 2014–2020

As buildings represent a major share of the EU's energy consumption, a broad variety of policy measures targets them exclusively or at least partially. Among the measures targeting buildings exclusively, financing schemes are the dominant policy measures implemented as shown in Figure 49.

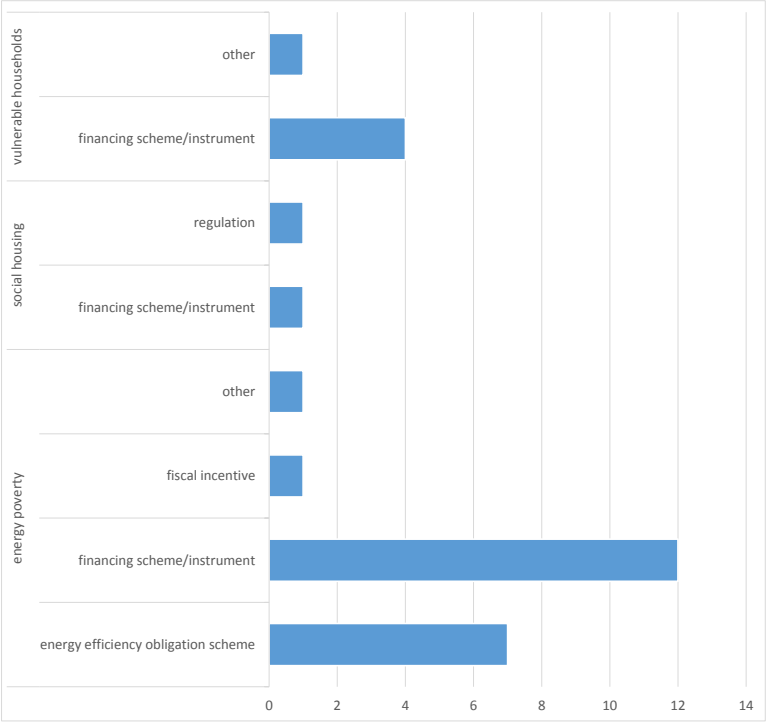
The current EED encourages Member States to implement, to the extent appropriate, policy measures alleviating energy poverty, increasing energy efficiency in social housing or protecting vulnerable households. The type of policy measures targeting energy poverty, social housing or vulnerable households differs between these three groups as shown in Figure 50. Whereas six countries have an EEOS including a special focus on energy poverty (Austria, Croatia, France, Greece, Ireland, UK), EEOS are not specifically used to target social housing or vulnerable households. For these groups, financing schemes are the preferred instrument type.

Figure 49 Number of policy measures targeting buildings and including buildings by instrument type at EU level



Source: DG ENER assessment (November 2020); number of policy measures only targeting buildings and measures including buildings by instrument type at EU level

Figure 50 Number of policy measures targeting energy poverty, social housing or vulnerable households by instrument type at EU level

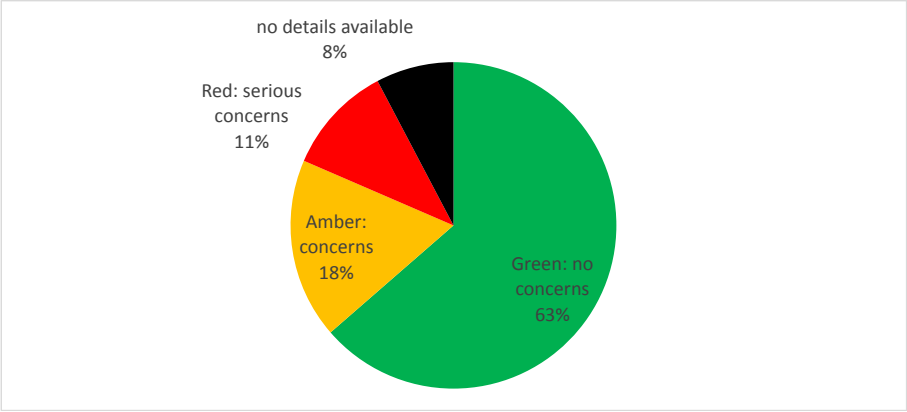


Source: DG ENER assessment (November 2020); number of policy measures targeting energy poverty/social housing/vulnerable households by instrument type at EU level

Member States must address the additionality requirement when calculating energy savings from policy measures as set out in Annex V(2)(a) and (b) EED. Energy savings need to be additional to those that would have occurred in any event without the activity of the obligated, participating or entrusted parties, or implementing public authorities. To determine the savings that can be claimed as additional, Member States have to show how energy use and demand would evolve in the absence of the policy measure in question by taking into account energy consumption trends, changes in consumer behaviour, technological progress and changes caused by other measures implemented at Union and national level. Energy savings resulting from the implementation of mandatory Union law are considered to be savings that would have occurred in any event.

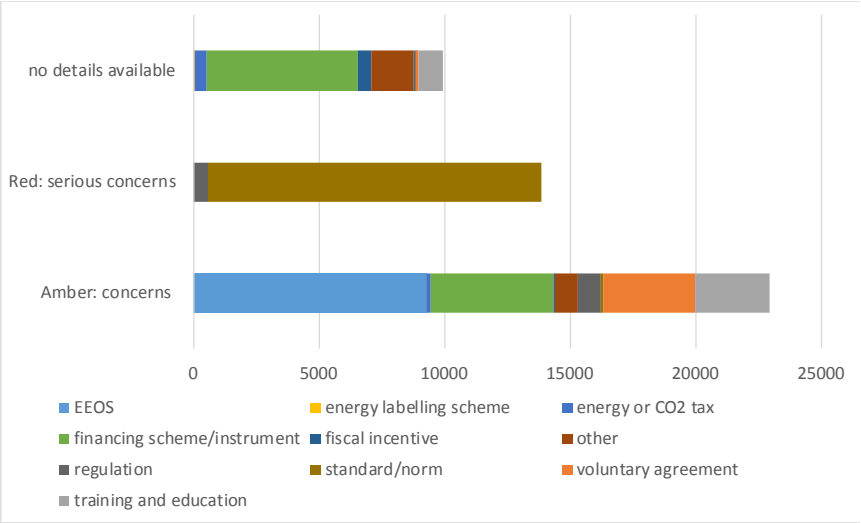
Figure 51 shows that in the obligation period 2014 to 2020, 63% of cumulative energy savings (2014–2018) derive from policy measures with no concerns regarding the additionality requirement, 18% of cumulative energy savings from policy measures raised concerns, 11% of cumulative energy savings raised serious concerns, and 8% of cumulative energy savings were claimed without providing details on additionality.

Figure 51 Share of concern over additionality requirement by energy savings



Source: DG ENER assessment (November 2020); Cumulative energy savings (period 2014–2018) by type of concern regarding compliance with additionality requirement

Figure 52 Cumulative energy savings (in ktoe in period 2014–2018) by type of concern regarding compliance with additionality requirement and type of policy measure



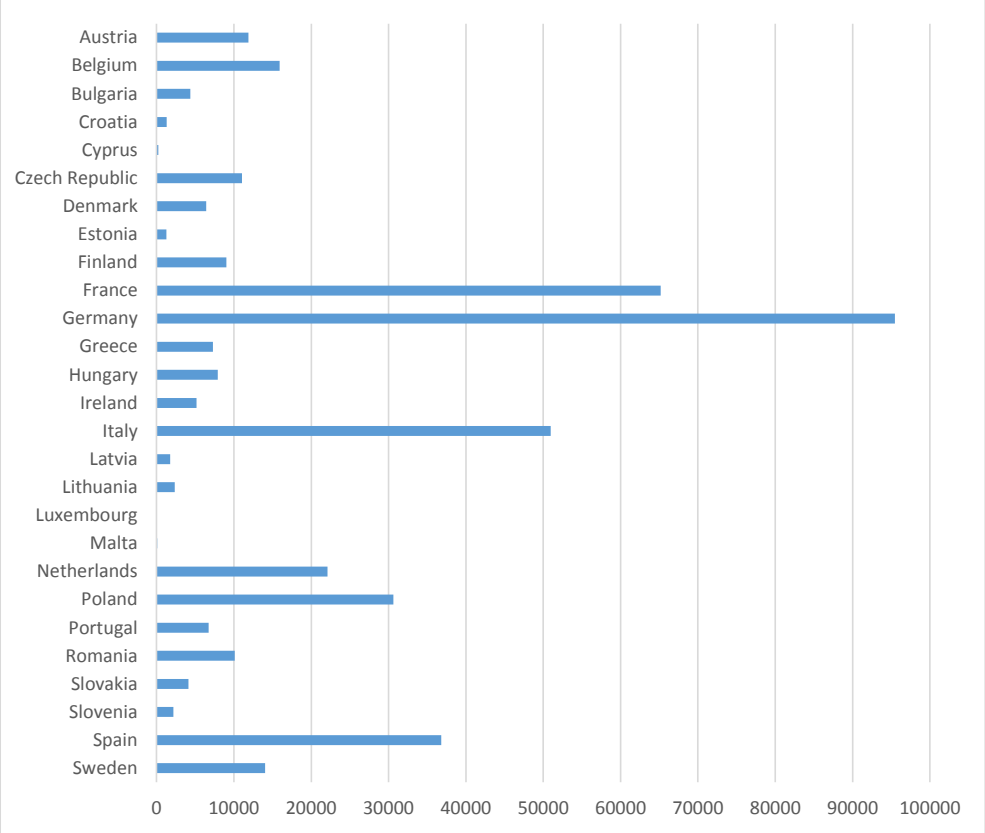
Source: DG ENER assessment (November 2020); Cumulative energy savings (in ktoe in period 2014–2018) by type of concern regarding compliance with additionality requirement and type of policy measure

3. Member States´ notifications to fulfil the energy savings obligation covering the obligation period 2021 to 2030

a. Cumulative energy savings required by 31 December 2030

In their first final National Energy and Climate Plans, Member States notified the following cumulative amounts of energy savings to be achieved by 31 December 2030.

Figure 53 Cumulative savings target for the period 2021–2030 by Member State



Source: DG ENER assessment; cumulative savings target for the period 2021–2030 by Member State

The comparison of the amounts of cumulative energy savings notified by the Member States in their final NECPs with the minimum energy savings obligations calculated in line with Article 7(1)(b) EED and using Eurostat data (FEC2020–2030 indicator) resulted in a difference of less than 1%.

Figure 54 Comparison of cumulative energy savings required by 2030 notified by Member States in their final NECPs with the minimum energy savings obligation according to Article 7 EED(1)(b)

Country	Required amount of cumulative energy savings over 2021–2030 (in ktoe)		difference (notified vs. minimum)
	As notified by the Member States	Minimum energy savings obligation according to Article 7 EED(1)	
Austria	11 878	12 414	-4.3%
Belgium	15 907	15 967	-0.4%
Bulgaria	4 358	4 320	0.9%
Croatia	1 290	2 994	-56.9%
Cyprus	243	242	0.6%
Czech Republic	11 035	11 094	-0.5%
Denmark	6 414	6 483	-1.1%
Estonia	1 261	1 270	-0.7%
Finland	9 028	11 187	-19.3%
France	65 179	65 180	0.0%
Germany	95 460	95 442	0.0%
Greece	7 299	7 203	1.3%
Hungary	7 911	8 055	-1.8%
Ireland	5 180	5 221	-0.8%
Italy	50 977	50 977	0.0%
Latvia	1 760	1 762	-0.1%
Lithuania	2 346	2 345	0.0%
Luxembourg	*Target not notified in the NECP*	1 843	n.a.
Malta	82	82	0.1%
Netherlands	22 093	22 052	0.2%
Poland	30 635	30 727	-0.3%
Portugal	6 740	7 287	-7.5%
Romania	10 120	10 143	-0.2%
Slovakia	4 117	4 788	-14.0%
Slovenia	2 169	2 171	-0.1%
Spain	36 809	37 289	-1.3%
Sweden	14 016	14 145	-0.9%
TOTAL for EU27	**424 305**	**432 682**	**-1.9%**

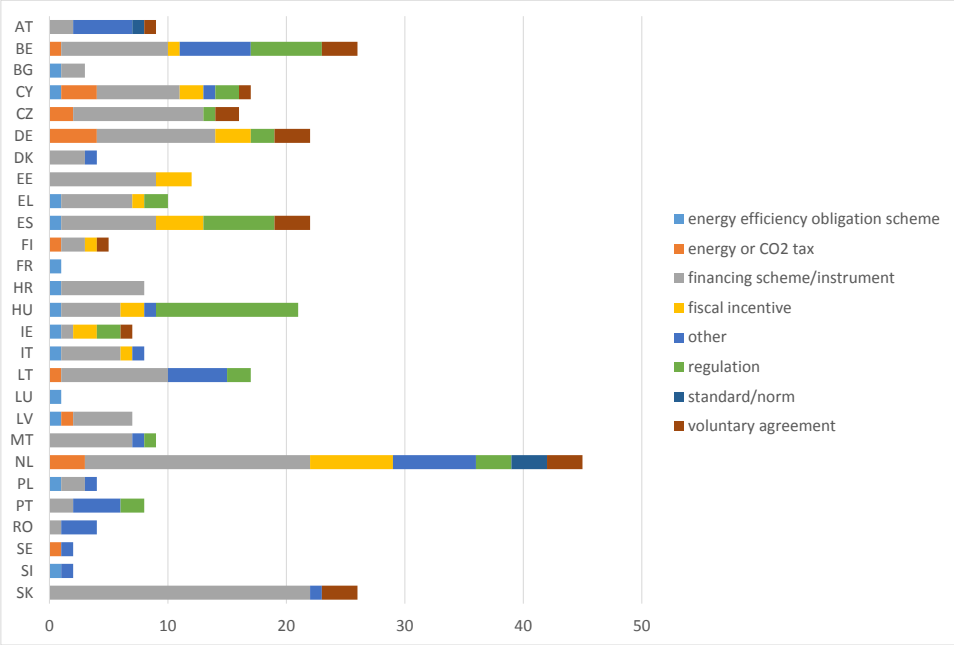
Source: DG ENER assessment; comparison of the cumulative amounts of energy savings required by 2030 notified by the Member States in their final NECPs with the minimum energy savings obligation according to Article 7 EED(1)(b) by using Eurostat dataset

b. Policy measures implemented by Member States in the period 2021 to 2030

Around 50% of the policy measures notified by the Member States in the first final National Energy and Climate Plans are financial programmes. But again, when looking at

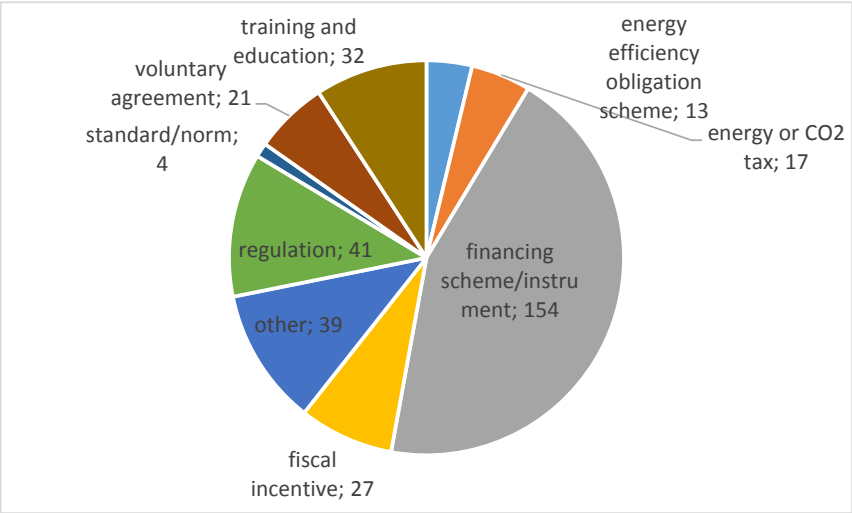
the energy savings achieved by the different policy measure types, around 70% of the savings are expected to be achieved by the EEOS, and 25% by the financial schemes. Most of the expected energy savings will be achieved in the cross-cutting sector.

Figure 55 Number of reported policy measures by Member State



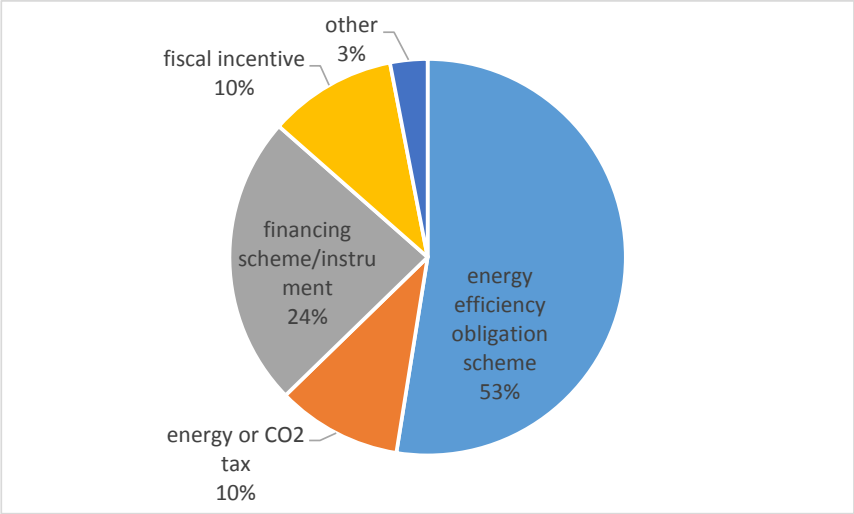
Source: DG ENER assessment (November 2020); Number of reported policy measures by Member State

Figure 56 Number of policy measures by instrument type



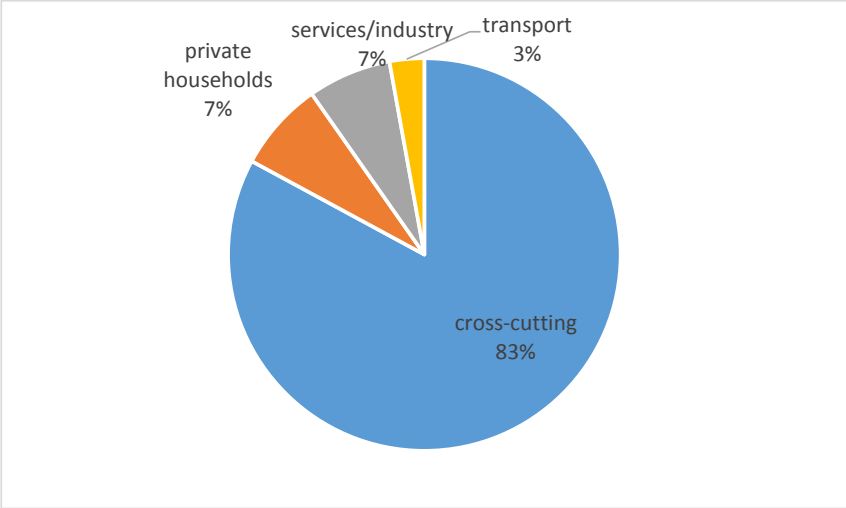
Source: DG ENER assessment (November 2020); Number of policy measures by instrument type

Figure 57 Share of cumulative energy savings 2021–2030 by instrument type



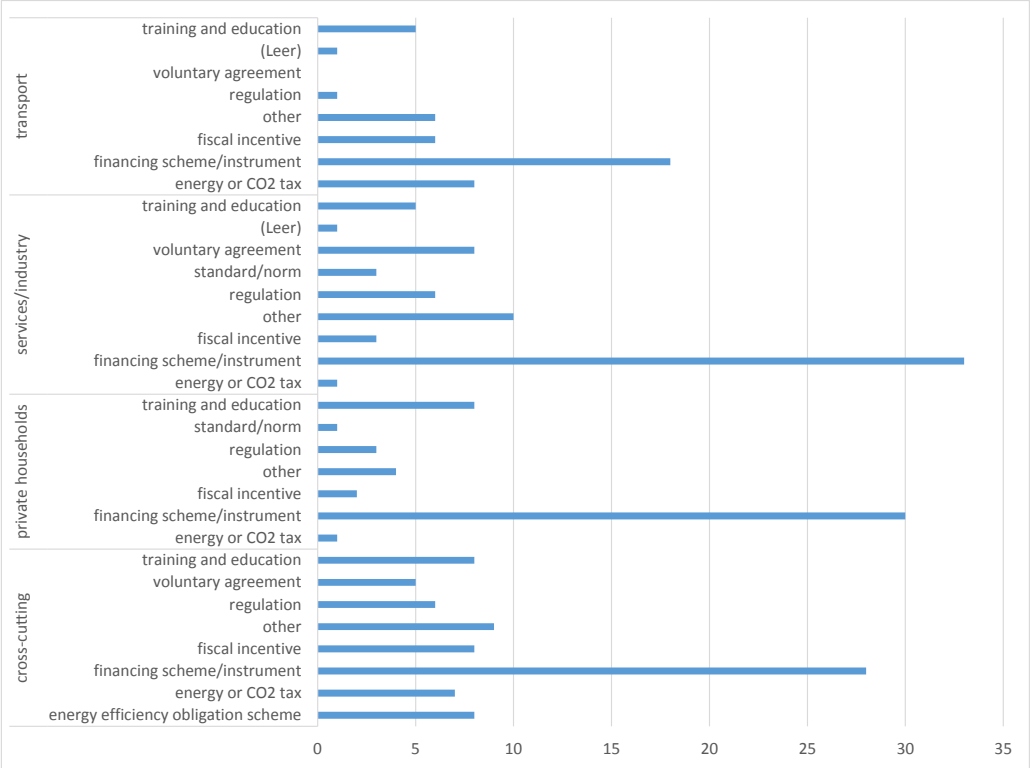
Source: DG ENER assessment (November 2020); Share of cumulative energy savings 2021–2030 by instrument type

Figure 58 Share of cumulative energy savings 2021–2030 by targeted sector



Source: DG ENER assessment (November 2020); Share of cumulative energy savings 2021–2030 by targeted sector

Figure 59 Number of policy measures by type reported per sector



Source: DG ENER assessment (November 2020); Number of policy measures (type) reported per sector

Annex K White Certificate Schemes under Article 7 EED

Article 7a EED provides the flexibility to trade of energy savings. Member States are required to report information on trading in line with part 3.1 and 3.2 of Annex III to the Governance Regulation.

Trading can take place either between obligated parties (horizontal trading) or between obligated parties and energy efficiency service providers (vertical trading). In some energy efficiency obligation schemes (EEOS), Member States implemented a vertical trading mechanism via White Certification in which credits can be traded in a regulated market.

Horizontal trading between obligated parties is relatively common within an EEOS. Only Austria and the United Kingdom allow vertical trading. Three EEOS currently implemented by France, Italy and Poland allow trading in the form of White Certificates.

White Certificates in an EEOS can lead to cost optimisation to achieve energy savings, open the energy savings markets to third parties, provide price signals to market actors, give a formal value to energy savings

The expansion of the geographical scope of an EEOS, with or without White Certificate trading, could lead to benefits, as it would allow obligated parties in high-cost Member States to find alternative lower-cost energy savings in other locations that would otherwise not have been taken up. This would reduce the overall programme costs of delivering a given amount of energy savings and would create an Internal Market for energy savings. An EU-wide scheme would potentially reduce the total costs of policy design and administration, if it replaced individual national programmes and if Member States would agree on common rules. At the energy company level, an EU-wide energy efficiency obligation would be aligned with business models increasingly operating on a cross-border basis, potentially reducing their administration costs.

Standardising methods for the measurement, monitoring, verification and reporting of energy savings across the EU could have some benefits for the development of the energy efficiency services industry, reducing costs and enabling more cross-border competition. The increase in the amount of required energy savings and the number of obligated and eligible parties within an EEOS with White Certificates would increase market liquidity and reduce the risk that market power would be concentrated in a small number of players.

Although, according to the modelling undertaken, this results in a lower overall cost of achieving the energy saving goal, it has to be borne in mind that the modelling assumes effective implementation. However, implementing such a scheme on this scale would raise significant complexities and may require a complex administrative scheme to be put in place.

In addition, its implementation would be incompatible with the existing Article 7. This would therefore require Member States to change the approach they have put in place half way through the compliance period until 2030. In fact, significant efforts might be needed in some other Member States to catch up with the requirements of the harmonised methods (e.g. when the data needed are not readily available in the country). Taking account of the natural variability in the market penetration of technologies, and the existing energy performance of buildings and industrial processes in an EU-wide scheme would be challenging. The overall system would likely need to take into account national specificities in the savings calculations (when defining the baseline situations, taking into account climate zones, etc.). This would represent a very large amount of data to handle,

regularly update, etc. Moreover, the calculation methods and related data are usually discussed with the stakeholders as part of the consultation processes of the EEOS. Organising such consultations at EU level would require coordinating many consultations in the different countries or groups of similar countries. Harmonising energy savings calculations for an EU-wide EEOS or trading scheme would likely imply many more parties, increasing the difficulty to get an agreement.

Moreover, a white certificate scheme would most likely create undesirable results if applied together with the EU ETS and an ETS extension on buildings and transport. Both schemes are based on the principle of passing on the costs to the consumer. On the one hand, this could financially overextend consumers in some Member States and increase the risk of energy poverty, unless additional, well-balanced actions would be taken to counterbalance these effects. On the other hand, the co-existence of both schemes could potentially lead to a significant imbalance in some countries between the costs being borne (and passed through to energy consumers) and the benefits received. Such cross-subsidising effects have already been observed at national level between sectors and have raised criticism. In a single, EU-wide energy market, in which the total energy system benefits of energy efficiency outweigh the costs, and are felt across the entire EU, this would not necessarily be problematic in theory. However, in practice national governments might be loath to run the political risk of their citizens funding energy efficiency actions in other countries. This undermines the rationale for an EU-wide White Certificate programme funded through energy bills.

Annex L Impacts on energy poverty

A rapid assessment has been made of the likely impacts of the measures envisaged on energy poverty by Member State. This is based on data related to three questions from the EU Survey on Income and Living Conditions (EU-SILC):

- Ability to keep home adequately warm (HH050)
- Arrears on utility bills (HS021)
- Presence of leaks, damp, rot (HH040)

The approach uses consensual energy poverty indicators based on an approach used by Wuppertal Institute for the 2016 EPBD revision IA[92], which was further developed for this assessment.

1. Methodology

The broad methodology used is shown in the figure below:

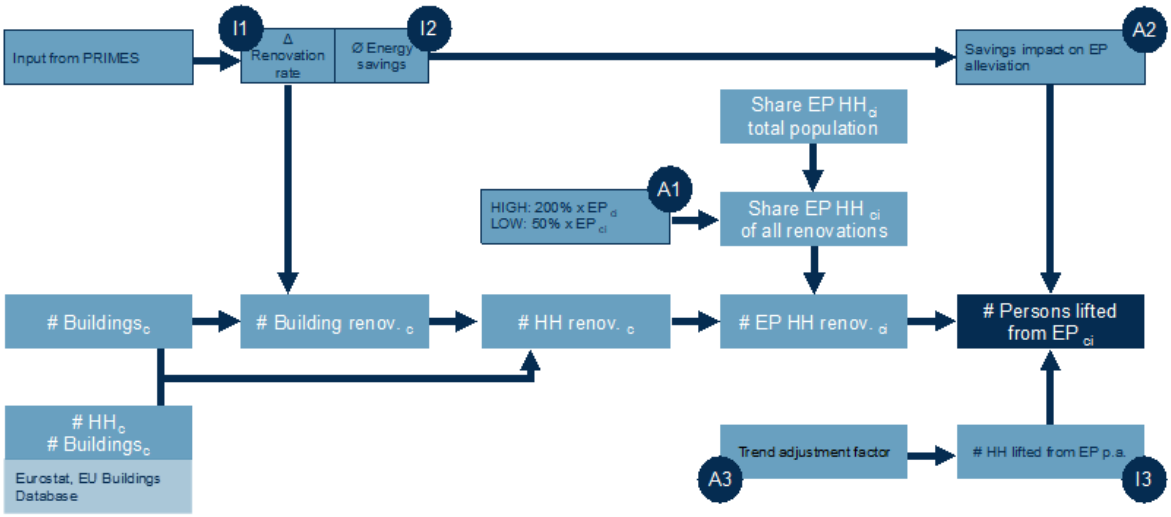


Figure 1: Methodological approach for assessing the energy poverty alleviation impact based on consensual energy poverty indicators

Note(s): A # denotes central assumptions. I # denotes inputs from PRIMES or own micro data based calculations.

Indices:

c = by country (EU)

i = by energy poverty indicator

2. Assumptions and inputs

To enable this assessment a set of assumptions have been made concerning:

- *Share of energy poor households affected by renovations*
- *Impact of additional energy savings in existing buildings on energy poverty alleviation*
- *Adjustment factor to account for effects attributable to existing policies*
- *EED impact on renovation rate (in % points) (by scenario)*

[92] https://ec.europa.eu/energy/sites/ener/files/documents/final_report_v4_final.pdf

- *EED impact on energy savings due to renovations (in %): Additional annual energy savings in existing buildings as a result of policy implementation (by scenario)*
- *Extrapolated energy poverty trends based on historical development*

3. Conclusions

Compared to the reference scenario, until 2030, depending on the indicator between 650,000 and 5.2 million people in the EU would additionally be lifted from energy poverty. The proportion of the population currently meeting each definition[93] that would be lifted above the threshold for each indicator is shown in the table below. For each column, figures above the EU average are shaded red. The reference year for the indicator is the last year when a complete data set is available of the indicator.

Table 26 Percentage of the population lifted above energy poverty criterion by Member State

Percentage of the population meeting energy poverty criteria that would be lifted above them by the EED action						
	Proportion in arrears (2018)		Presence of leak, damp, rot (2016)		Ability to keep home adequately warm (2018)	
	Low impact	High impact	Low impact	High impact	Low impact	High impact
AT	3.0%	11.6%	2.8%	10.8%	2.9%	11.1%
BE	0.8%	3.2%	0.8%	3.0%	0.3%	1.0%
BG	0.8%	3.1%	0.8%	3.3%	0.8%	3.1%
CY	2.2%	6.5%	2.2%	8.1%	2.3%	6.3%
CZ	3.0%	7.7%	3.2%	7.0%	5.4%	5.5%
DE	1.3%	5.1%	1.8%	7.2%	1.5%	5.7%
DK	2.0%	7.7%	3.5%	13.5%	2.5%	9.6%
EE	1.7%	6.9%	1.1%	4.5%	1.5%	5.9%
EL	3.1%	11.9%	2.4%	9.3%	2.3%	9.0%
ES	3.6%	13.7%	3.2%	12.3%	2.3%	8.6%
FI	2.0%	7.8%	1.9%	7.6%	1.5%	5.9%
FR	2.7%	10.3%	2.6%	10.2%	2.9%	11.3%
HR	1.2%	4.6%	0.8%	3.1%	0.7%	2.9%
HU	2.8%	11.0%	2.4%	9.1%	2.0%	7.6%
IE	1.1%	4.2%	0.8%	3.1%	1.0%	3.9%
IT	2.2%	8.7%	1.3%	5.0%	1.7%	6.5%
LT	2.4%	9.2%	2.0%	7.9%	2.4%	9.2%
LU	1.8%	6.9%	2.7%	10.7%	2.3%	8.9%
LV	1.6%	6.1%	1.6%	6.2%	2.0%	7.9%
MT	1.6%	6.2%	0.8%	3.2%	1.5%	5.9%
NL	1.8%	7.2%	2.0%	7.9%	0.9%	3.7%
PL	7.5%	28.8%	3.1%	11.7%	2.2%	8.2%
PT	3.4%	13.2%	2.6%	10.1%	2.8%	10.9%
RO	1.0%	4.0%	0.7%	2.8%	1.0%	4.0%
SE	3.1%	12.0%	3.5%	13.6%	2.7%	10.3%
SI	0.8%	3.3%	0.6%	2.5%	0.6%	2.6%
SK	3.8%	14.5%	2.8%	10.8%	3.7%	14.1%
EU	2.4%	9.2%	2.0%	7.5%	2.0%	7.6%

[93] Indicators & Data | EU Energy Poverty Observatory

Annex M Other relevant legislation and policy areas

The EED is not the only policy instrument addressing energy efficiency but is part of a broader set of policies addressing energy efficiency potential. The EED can be considered as a 'framework' Directive that sets the overall target and complements the other instruments by ensuring that Member States create appropriate frameworks and implement policies to ensure investment in more energy efficiency.

1. Legislation setting standards

Buildings

The Energy Performance of Buildings Directive[94] (EPBD) is the main legislative instrument for promoting energy performance improvements in buildings within the EU. The Directive works through two complementary mechanisms: (1) minimum performance requirements for new and existing buildings (raising the depth of any upgrades and the standards for new-built); and (2) information for citizens and companies through certificates for buildings to enable them to choose the efficiency level that is right for them.

The cost-optimal methodology helps Member States set their ambition levels right and keep them under review. Taken together, these mechanisms contribute to set the right energy performance standard for different buildings, and facilitate information on more energy-efficient housing. To complement this, the EED promotes actual renovations and Member States' action through the energy efficiency obligations (Article 7), the renovation of public buildings target (Article 5) and the provision of efficient heating and cooling services to buildings (Article 14). As such, the EED acts as an accelerator of the renovation rate of buildings.

The EU building stock requires energy renovation at a large scale: almost 75% of the EU's building stock is inefficient according to current building standards, and 85-95% of the buildings that exist today will still be standing in 2050. The weighted annual energy renovation rate is persistently low at around 1%, and deep renovations that reduce energy consumption by at least 60% are carried out only in 0.2% of the building stock per year. Two thirds of the energy used for heating and cooling of buildings comes from fossil fuels. To further boost the energy performance of buildings, the Commission launched the Renovation Wave.

The EPBD requires Member States to establish a long-term renovation strategy to support the renovation of their national building stock into a highly energy efficient and decarbonised building stock by 2050. The long-term renovation strategies must include an overview of the national building stock policies and actions to stimulate cost-effective deep renovation of buildings policies and actions to target the worst performing buildings, split-incentive dilemmas, market failures, energy poverty and public buildings an overview of national initiatives to promote smart technologies and skills and education in the construction and energy efficiency sectors. The strategies must also include a roadmap with measures and measurable progress indicators indicative milestones for 2030, 2040 and 2050 an estimate of the expected energy savings and wider benefits and the contribution of the renovation of buildings to the Union's energy efficiency target.

[94] Directive 2010/31

Work has started to review the EPBD[95] with a focus on setting more ambitious minimum requirements for buildings, and strengthen other provisions of the EPBD to intensify the efforts towards meeting the energy efficiency targets in the building sector[96]. It will look at introducing new elements to enhance the performance of buildings, based on the specific areas and issues identified in the Renovation Wave:

- The phased introduction of mandatory minimum energy performance standards for different types of buildings,
- An update of the Energy Performance Certificates framework with a view to increasing their quality and availability e.g. through greater harmonisation, inclusion of additional information and more stringent provisions on availability and accessibility of databases.

Other measures that will be considered include the introduction of Building Renovation Passports and the introduction of a 'deep renovation' standard in the context of financing and building decarbonisation objectives. The requirements for new buildings and measures fostering sustainable mobility might also need to be updated in line with the enhanced climate ambition of the European Green Deal and the Climate Target Plan 2030, developing a new long term vision for buildings.

Products

In the products area, the Ecodesign Directive[97] provides a framework for setting mandatory product-specific energy efficiency and other environmental performance requirements before products can be placed on the Union market. It is implemented through product-specific regulations, directly applicable in all EU countries. Currently, such requirements are in place for 30 product groups.

Ecodesign measures often go hand in hand with energy labelling requirements for the same product group. Energy and tyre labelling allow end-consumers to identify better-performing products, via the well-known A-G/green-to-red scale. The Energy Labelling Regulation[98] provides a framework for establishing mandatory product-specific labelling requirements, allowing end-consumers to identify the better-performing products, via the well-known A-G/green-to-red scale. Currently, such requirements are in place for 14 product groups.

Of particular relevance are the reviews of the Ecodesign and Energy labelling requirements (including rescaling) for central/hydronic space and water heaters which are ongoing. Reviews for other types of (local or solid fuel) space heaters are also ongoing or to be launched in 2021, with the aim of having rescaling measures adopted by August 2023, which could trigger further energy savings and assist decarbonisation in heating.

Ecodesign contributes to the achievement of the overall energy efficiency goal set in the EED by taking away inefficient products from the market. Energy Labelling contributes to the achievement of the overall energy efficiency goal set in the EED by steering consumers towards more energy-efficient products and heating and cooling appliances,

---

95 https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12910-Revision-of-the-Energy-Performance-of-Buildings-Directive-2010-31-EU

96 Moreover, implementation of the product reviews under the Ecodesign Working Plan 2020-2024 and the "Renovation Wave" Action plan, together with the review of the EPBD, will make an important contribution to reaching the 2030 energy saving target.

97 2009/125/EC

98 Regulation (EU) 2017/1369

while Article 7(2) of the Energy Labelling Regulation steers financing towards the most efficient appliances.

The EED supports this framework, in particular by promoting the purchasing of more efficient products through its public procurement provisions which requires central governments to purchase only products that belong to the highest energy efficiency class on the energy label and, for those products not covered by an energy label, only procure products that comply with energy efficiency benchmarks specified in the relevant Ecodesign implementing measure.

EU road vehicle CO_2 legislation

The EU road vehicle CO_2 legislation requires manufacturers to reduce the new vehicle fleet average tail pipe CO_2 emissions from the vehicle mix they sell. Regulations have been put in place for Heavy Duty Vehicles and for passenger cars and light commercial vehicles[99]. These regulations mean that manufacturers must either deploy technology to improve the energy efficiency of the vehicles (for example by reducing their aerodynamic or rolling resistance or powertrain efficiency) or by using an energy source with reduced CO_2 emissions in use. Switching to fully electric powertrains avoids the energy losses from internal combustion engines and leads to a fraction of the final energy use per km. Reduction of energy use in the transport sector as a result of the vehicle CO_2 legislation is reflected in the quantification of the overall EU energy efficiency target.

2. Pricing measures

Emission Trading System (ETS)

As regards carbon pricing, the price of ETS allowances can lead to responses in the covered sectors, including reducing financial barriers for the energy transition. This may include increased energy efficiency, because companies would make operational changes or energy efficiency investments to lower the cost to them. However, in itself this does not remove non-financial barriers, which limits its effect[100]. Moreover, carbon pricing may have distributional effects, since for example, low and medium income households are more affected by carbon pricing on buildings and transport unless mitigating measures are taken, for example through well-designed energy efficiency programmes. Although ETS revenues could be spent on energy efficiency measures for low and medium income households, this is currently not systematically happening. While energy savings from ETS pricing contribute to the overall EED target, this in itself is insufficient to meet the target as analysis shows[101].

Energy Tax Directive

The Energy Taxation Directive[102] (ETD) lays down the EU rules for the taxation of energy products used as motor fuel or heating fuel and of electricity. An evaluation of the ETD published in September 2019[103] concluded that the EU rules on energy taxation no longer deliver the same positive contribution as when they first came into force in 2003.

---

99 Regulation (EU) 2019/631 of 17 April 2019 of the European Parliament and of the Council setting CO_2 emission performance standards for new passenger cars and for new light commercial vehicles

100 SWD(2020)176

101 Rosenow, J., Graichen, J., and Scheuer, S. (2018). Destination Paris: Why the EU's climate policy will derail without energy efficiency. Retrieved from: http://www.raponline.org/knowledge-center/destination-paris-why-eus-climate-policy-will-derail-without-energyefficiency/.

102 Directive 2003/96

103 SWD(2019) 329

The evaluation showed that the current requirements do not contribute to the new EU regulatory framework and policy objectives in the area of climate and energy, where technology, national tax rates and energy markets have all evolved considerably. For example, no link exists between the minimum tax rates of fuels and their energy content and CO_2 emissions and the ETD does not reflect the current mix of energy products on the market in the EU.

The evaluation also pointed out that the high divergence in national energy tax rates is not in line with other policy instruments and can lead to fragmentation of the internal market, a problem exacerbated by the widespread use of optional tax exemptions. It concludes that overlaps, gaps and inconsistencies significantly hamper EU objectives in the field of energy, environment, climate change and transport.

Work is ongoing to revise the ETD[104] to better tax energy use, provide different tax rates for renewable fuels, and eliminate the current exemptions.

3. Other legislation

Beyond specific energy efficiency legislation, other policy instruments also contribute to increased energy efficiency and savings. This is particularly true for the Renewable Energy Directive[105] (RED) and the Effort Sharing Regulation (ESR)

Renewables

There is a strong interaction between the EED and the REDII because a higher overall share of renewable energy reduces the need for energy efficiency to achieve the same level of GHG savings, which ultimately contributes to meet ESR national targets. At the same time, a high level of energy efficiency reduces the need for energy and, therefore, allows for a higher share of renewable and clean energy in the energy mix. The strong coherence between the EED and the REDII is particular evident in the heating and cooling policy area, where the two directives are interlinked and complementary. Article 14 of the EED sets the planning framework in terms of identifying the energy efficiency and renewable energy potential in heating and cooling, and requires the Members States to implement policies and measures to exploit this potential. These policies and measures directly support the achievement of the renewable energy target in heating cooling laid out in Article 23 of REDII. Vice versa, this target contributes to the achievement of the energy efficiency objectives laid out in Article 14 of the EED and the entire directive. In addition, the REDII refers to specific provisions of the EED, most notably by linking several requirements to the definition of efficient district heating and cooling (Article 2(41) of the EED) and at the same time this definition directly promotes the deployment of renewable energy in district heating and cooling.

Effort Sharing Regulation

The EED contributes directly to the required emission reductions in ESR sectors. In particular, energy savings from Article 7 of EED contribute to the achievement of the ESR national targets. The additionality requirement under Article 7 of the EED provides incentives to Member States to implement national policies and measures that exceed the minimum energy performance requirements levels set at EU level (e.g. stricter national building codes and programmes promoting higher classes of appliances).

---

[104] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12227-Revision-of-the-Energy-Tax-Directive

[105] Directive (EU) 2018/2001 of 11 December 2018 of the European Parliament and of the Council on the promotion of the use of energy from renewable sources

4. Other relevant policy areas

Circular Economy

The European Green Deal states that it "…*is a new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use. It also aims to protect, conserve and enhance the EU's natural capital, and protect the health and well-being of citizens from environment-related risks and impacts*". This sets out clearly the important of resource efficiency in achieving the EU's goals.

Energy efficiency can make an important contribution to resource efficiency and a more circular economy. Fuels represent 20% of all material consumption and so saving energy contributes directly to reducing resource consumption. Reducing material use for products also means that less energy is used and therefore resource efficiency and reducing waste is a key route to industrial energy savings from audits. Recycling waste as secondary raw material can often also save energy[106]. Increasing the lifetime of products and buildings may also reduce energy consumption and related emissions, although it is important to recognise that there may be trade-offs.

Energy can be consumed at all stages of a product's lifecycle and therefore there are important synergies with a more lifecycle-based approach to products and circular economy. The importance of energy use in each part of the lifecycle varies enormously from product to product. Sub-optimal energy use choices can arise if the embedded energy in materials is not taken into account or decisions in one part of the lifecycle affect conditions in another. It is important that these aspects are fully considered during design, for example of buildings. However, the EED energy saving target encompasses energy savings from all aspects of the lifecycle occurring in the EU and therefore should not itself create an incentive to shift energy use between stages of the lifecycle.

If Member State measures aim to accelerate replacement or upgrading, their impact in terms of material use will depend on the materials replaced and the fate of those that become superfluous. Where materials are largely recycled such as metals there need be no additional material extraction (provided that the same quantity or less are used afterwards as before). However, in this case the energy impacts depend on the energy used for recycling which is highly variable depending on the material. Where materials have low rates of recycling it will be necessary to consider the trade-off between those increased material requirements and the energy savings.

In the case of building renovations, the majority of the materials remain in situ and there are changes that enhance the structures energy performance. In general in these cases it can be assumed that renovation requires less materials than a new building, regardless of the degree to which any materials removed may be recycled.

The life cycle energy savings themselves will depend on the degree of improvement in energy performance of the product in use and in manufacture and end of life. Whether energy use would be reduced from shortening or lengthening the average product life will depend on the share of energy use in its manufacture or end of life phases compared to the use phase. If the manufacturing or end of life phases are responsible for most of the energy use then extending the life may be a good energy saving strategy and this will align with reducing material consumption. Where energy consumption in the use phase is

[106] 'Circular Economy: Theoretical Benchmark or Perpetual Motion Machine?'; Jonathan M. Cullen; May 2017

a large share of total energy use, then the benefit from increasing or decreasing the lifetime will depend on the rate of improvement in energy usage. In view of these complexities care needs to be taken in making simple claims. However, overall, provided attention is taken, the circular economy and energy saving objectives should be synergistic.

Industrial Emissions Directive

The Industrial Emissions Directive[107] (IED) regulates the largest installations in the most polluting agro-industrial sectors. It requires installations to operate in conformity with a permit. The permit must be updated periodically and in line with the use of Best Available Techniques (BAT) as identified in EU level BAT conclusions that form part of sectoral BAT Reference documents (BREFs). BAT conclusions identify environmental performance levels for installations within the relevant sector. The Directive contributes to better energy performance of industry through the identification of BAT to reduce energy consumption and the definition of energy performance levels. These are not binding on permitting authorities.

A report looking at how the IED contributes to the circular economy[108] assessed the BAT conclusions adopted for 17 industrial sectors. In these it identified 117 energy related BAT. However, of these only 25 are quantitative and the rest are qualitative. The recent evaluation of the IED[109] found little evidence of the effect of these energy performance levels. A more recent assessment of cement kiln permits[110] identified that of 31 permits reviewed, 11 included energy performance levels of which 7 specified limits within the BAT range. It is to be noted that this BAT energy performance level is only applicable to new plants and major upgrades and subject to raw material moisture content.

In addition, the IED can also contribute to energy savings through material efficiency and the reduction of waste. These are regulated in a similarly non-binding manner as energy performance. These elements show that while energy is clearly a key factor in the operation of large industrial installations, the IED's requirements in this regard are limited and not strictly binding. Work is ongoing to revise the IED[111] to ensure industry uses techniques that create a more sustainable EU economy and a cleaner environment that improves public health.

Energy savings and Life Cycle Assessment

Energy can be consumed at all periods of a product's lifecycle, the stages of which are illustrated schematically by the circles in Figure 60Figure 60 Schematic representation of regulation affecting a product lifecycle below. There is much EU and national legislation that regulates the different phases of the lifecycle, shown by the rectangles in the figure, and some of this may implicitly or explicitly impact the energy use either in that or other phases.

---

107 Directive 2010/75

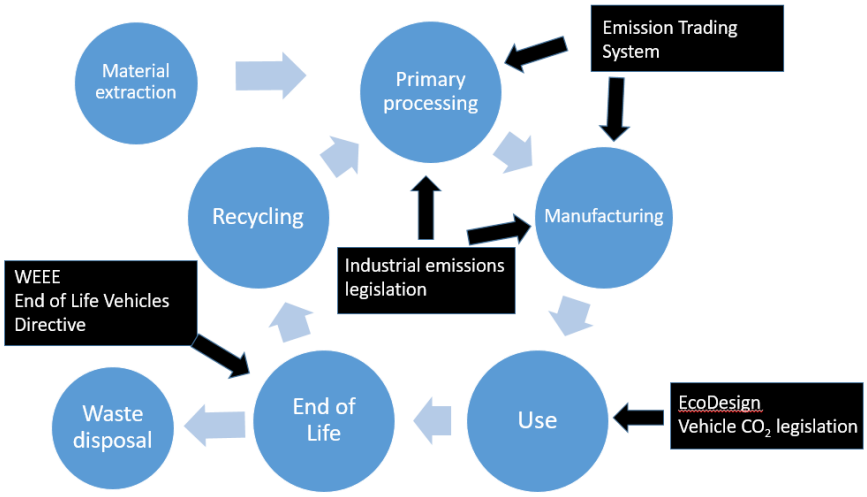
108 IED Contribution to the circular economy; Ricardo energy and environment; May 2019

109 SWD(2020) 181

110 IED Additional Permit Assessment; Eunomia; August 2020

111 https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12306-EU-rules-on-industrial-emissions-revision

Figure 60 Schematic representation of regulation affecting a product lifecycle



The importance of energy use in each part of the lifecycle varies from product to product. For example, a car might use 80% of the lifecycle energy in its use phase while for ceramics the majority of the energy use will be in manufacturing.

There is a risk that sub-optimal energy use choices can be made if the embedded energy in materials is not taken into account or decisions in one part of the lifecycle affect conditions in another. This can be as a result of market or regulatory forces. It is important that these aspects are fully considered during design, for example of buildings. The EED's overall energy saving target encompasses energy savings from all aspects of the lifecycle that occur in the EU and therefore it does not create any incentive to shift energy use between stages of the lifecycle.

European Pillar of Social Rights & European Skills Agenda

The European Pillar of Social Rights sets out 20 key principles[112] and rights to support fair and well-functioning labour markets. These principles are the beacon towards a strong social Europe that is fair, inclusive and full of opportunity. The evaluation of the EED referred to the importance of benefits from energy efficiency that go beyond the European energy and climate targets and contribute to the creation of social and economic impact.

More specifically, EED can contribute primarily to the delivery of Principle 20 "Access to essential services" (e.g. provision of affordable energy services) but also to the delivery of Principles 1 "Education, training and life-long learning" (e.g. accreditation and promotion of new skills), 10 "Healthy, safe and well-adapted work environment and data protection" (e.g. promotion of healthier work environments) and 19 "Housing and assistance for the homeless" (e.g. provision of better housing to vulnerable citizens). Pertinent to the delivery of Principle 1 is the European Skills Agenda[113] and how EED as part of the European Green Deal shares the objectives of strengthening sustainable competitiveness, ensuring social fairness and building resilience to react to crises.

[112] https://ec.europa.eu/info/european-pillar-social-rights/european-pillar-social-rights-20-principles_en
[113] https://ec.europa.eu/social/main.jsp?catId=1223&langId=en

Annex N Estimated administrative costs

The estimation of the administrative costs imposed by the measures included in the preferred option is conducted using the 'Standard Cost Model', in the sense that administrative burdens are calculated on the basis of the average cost of the required administrative activity (Price) multiplied by the total number of activities performed per year (Quantity). Administrative costs are the costs incurred by the public or private sector in meeting legal obligations to provide information.

These are presented for the proposed measures of the preferred policy option in Table 27.

The results of the exercise using the standard cost model show that, overall, there is a net increase of the burden of €5.5 million per year. The burden on the private sector is increased by €0.3 million per year, and there is an increase in the burden for the public sector of €5.2 million per year.

A detailed explanation of the assumptions used, which are a simplification of the complex reality, are set out for each of the measures. To the extent possible, the assumptions are in line with the step-by-step application of the model set out in the in Better Regulation guidance. It is assumed that 2,080 working hours per year represents a Full Time Equivalent (FTE) employee.

Simplification measures

Change the basis for requiring energy audits to one based on energy use

This **(IND.2)** is a simplification measure, which would mean that the obligation to carry out a four yearly energy audit would only apply to enterprises with an energy consumption above a threshold. This is estimated to result in a significant reduction in the number of enterprises that would be subject to the obligation. It is estimated that some 600,000 enterprises that should have been audited under the original definition would no longer be subject to the audit obligation. In addition the verification of whether or not an enterprise should be subject to the obligation would be much more straightforward.

<u>Administrative cost-savings for the public sector:</u>

The requirement to verify that audits have taken place will be removed for the companies concerned. It is assumed that this represents 0.5 person-hours per enterprise. This amounts to a total of around 187 FTE saved every four years or equivalent to around 47 FTE per year.

<u>Administrative cost-savings for the private sector:</u>

It is assumed that providing information to the public authorities to show compliance with the audit requirement requires on average 0.5 person-hours per enterprise. Since this is only required once every four years, the avoided effort amounts to around 47 FTE per year.

Measures of the preferred policy option

Measure 1: EU energy efficiency target

The target is increased and made binding at EU level. This is not in itself expected to lead to different or additional monitoring requirements for Member States and therefore no administrative costs for the public sector or private sector.

Measure 2: Benchmarks for Member State contributions

Benchmarks will be calculated at EU level **(TARGET.2)**. There is no additional work required at Member State level and therefore no administrative costs for the public sector.

Measure 3: Energy savings obligations

*Measure 3a: Increase annual energy savings rate (**ESO**).*

This measure changes the rate of energy savings required. It does not require a new system to be set up, but it will require an intensification of efforts to be made to achieve the needed savings.

Administrative costs for the public sector:

The doubling of savings effort is estimated to require an average additional effort of 1 FTE per Member State at central government level. No estimate is provided for other levels of government since it is likely to vary very much depending on the structures and mechanisms used to achieve the savings. The total estimate is therefore 27 FTE.

Administrative costs for the private sector:

Private sector companies will be involved in delivering some of the increased levels of energy savings. Administrative costs for them are likely to be low, and related to demonstrating the achievement of the necessary savings. This is likely to increase with the saving level. In view of this, it is assumed that the impact in the private sector is of the same magnitude as in the public sector at 27 FTE.

Measure 3b: Minimum sectoral savings and exclusion of measures promoting fossil fuel use ***(ESO.1, ESO.2, ESO.3)****.*

Administrative costs for the public sector:

The obligations to achieve savings in certain sectors and to not include measures promoting fossil fuel use will require some additional effort. However this is estimated to be small in contrast to the impact of doubling the overall savings and is estimated at 9 FTE.

Administrative costs for the private sector:

The sectoral requirements should not substantially change the administrative burden on private sector companies since in principle the obligations don't change. Similarly, the fossil fuel exclusion relates to measures put in place, and so should not create an administrative burden for private companies.

Measure 4: Energy Efficiency First

*Measure 4a: Guidance on the application of the EE1st principle (****EE1st.1****).*

This is intended to assist in applying the principle and therefore is not considered to create any administrative burden.

*Measure 4b: Obligation for Member States to apply EE1st principle (****EE1st.2****).*

Administrative costs for the public sector:

It will be necessary for Member States to ensure that they effectively apply the principle. This will relate to ensuring that energy saving options are adequately considered in appropriate activities. The assessment itself is not considered an additional administrative effort since in principle it ought already to be carried out as part of good project assessment. The additional administrative burden would arise from checking that this has been adequately carried out. It is assumed that this will result in one hour of work on average per relevant infrastructure project. If it is assumed that 2% of public procurement is for relevant infrastructure projects this would be around 5,000 per year leading to 3 FTE needed per year.

Administrative costs for the private sector:

The private sector should not be affected in any significant manner.

Measure 5) Exemplary role of the public sector

Measure 5a: Extend to all public buildings to NZEB standard and remove alternative measures ***(BUILD.3)***.

The actual standard to which renovation is required should not have an effect on administrative burden. The increase in the number of buildings and the removal of alternative measures can.

Administrative costs for the public sector:

Member States' public authorities will need to report on their compliance with the renovation of their public bodies' buildings stock. Since the renovation requirement would increase by a significant multiple it can be assumed that the efforts to gather the data will also take more effort, although probably less than a proportional increase. It is assumed that this additional monitoring effort will amount to 27 FTE per year.

Administrative costs for the private sector:

There are no specific information requirements related to this measure that would not fall within the normal contractual arrangements relating to the works.

Measure 5b: Guidance to authorities, on circularity and Green Public Procurement ***(PROCURE.1)***.

This is intended to assist in applying circular economy and green public procurement principles and therefore is not considered to create any administrative burden.

Measure 5c: Extend public procurement provisions to all public administration levels ***(PROCURE.2)***.

Administrative costs for the public sector:

This would extend the requirement that currently only applies to central government to require all contracting authorities to aim to procure the most energy efficient products and services. There are estimated to be around 250,000 contracting entities[114]. Of these only a small proportion will be central government. It appears that there are around 230,000 tenders published each year on Tenders Electronic Daily[115]. The majority of these are above the €144,000 threshold so the total number of tenders will be higher. The majority of these tenders are not covered by the existing requirement and incorporating energy efficiency criterion into each tender would require additional work. However, these processes do not result in any information requirements and therefore do not create an additional administrative burden.

Administrative costs for the private sector:

There are no specific administrative costs related to this obligation since all costs pertaining to tendering and performance of the normal contractual relationship.

Measure 6) Industry

Measure 6a: Change audit requirement to apply only to large energy users ***(IND.2a)***.

Administrative costs for the public sector:

[114] https://ec.europa.eu/growth/single-market/public-procurement_en
[115] https://simap.ted.europa.eu/en_GB/web/simap/statistical-production-files

Member States' public authorities currently must verify whether enterprises are subject to the audit requirement as a non-SME. The obligation to verify whether their energy use exceeds a certain value will be less onerous. There is therefore no additional administrative burden.

Administrative costs for the private sector:

Enterprises will need to verify whether or not they are affected by checking their energy use. However, this will only be pertinent for those that have borderline energy use. Those that are substantially below or above the threshold will not need to check. It is estimated that a maximum of 50,000 enterprises would need to verify their consumption.

As an operating cost, all enterprises would be expected to have this information easily available. It is necessary to convert all energy consumption (which may be in different forms such as electricity, road fuel, gas, oil or solid fuel) into the format required. This can be carried out using a spreadsheet and the effort required to collect the necessary data and carry out the calculation is estimated to be a maximum of 1 hour.

The total estimated administrative burden therefore amounts to around 30 FTE. This will arise once every four years. The burden therefore averages to 8 FTE per year.

Measure 6b: Require energy management systems for largest energy users ***(IND.2b)***.

Administrative costs for the public sector:

Member States' public authorities currently must verify whether enterprises are subject to the audit requirement as a non-SME. The obligation to implement an energy management system applies above a certain energy use threshold and therefore verifying this will be less onerous. In addition, since energy management systems are subject to external third party verification, public authorities need only ensure that the enterprise is correctly certified. It is considered that in view of this there is no additional administrative burden compared to the current situation.

Administrative costs for the private sector:

Enterprises will need to verify whether or not they are affected by checking their energy use and this will only be pertinent for those that have borderline energy use. For those above the threshold once they have an energy management system in place there is no burden since their energy use will be continuously monitored.

Enterprises under, but close to, the threshold will need to verify whether they fall under the requirement. This is expected to apply to a maximum of 10,000 enterprises. They will know their energy consumption from previous audits and can readily verify if this has increased or decreased. It is assumed that this will require no more than 30 minutes work. The resulting administrative burden would amount to about 3 FTE per year.

Measure 7) Heating and cooling:

Improve definitions and strengthen obligations for cost-benefit analysis and local cooling and heating planning ***(HEAT.2)***.

Administrative costs for the public sector:

Member States' public authorities must approximately every five years review their comprehensive assessments. It is assumed that on average each Member State will need to dedicate 40 person-days to this task. This results in a total effort of 5 FTE every five years or 1 FTE per year.

Administrative costs for the private sector:

Additional burden could arise from information requests to enable the analysis to be updated. There are currently approximately 2,500 Large Combustion Plants[116] and 5,400 Medium Combustion Plants[117] above 20 MW thermal and it can be assumed that these would likely represent the majority of plants that would need to supply information. If they have to supply information it is assumed this would take a maximum of 2 person-hours work so the total effort would amount to around 10 FTE. This would occur once every five years so amounting to roughly 2 FTE per year.

Measure 8) Energy networks:

*Enhance definition of losses and reporting **(NET.2)**.*

Administrative costs for the public sector:

There are no specific administrative impacts for Member States' public authorities. While they might wish to be involved in discussion in developing uniform definitions this would not appear to be necessary.

Administrative costs for the private sector:

The purpose of **NET.2** is to engage system operators in adopting uniform definitions. The reporting obligation for trade associations will take place periodically. Developing uniform definitions would largely be a one-off exercise and good be expected to require a few hundred person days of effort. The reporting obligation for trade associations, which would primarily require collating input from their members could be expected to require a total of 200 person-days each time a report is produced. The overall burden could be assessed at around 1 FTE per year.

Measure 9) Transport:

*Include energy efficiency elements in line with the EE1st principle and the Sustainable and Smart Mobility Strategy, including, for example, in urban mobility policy planning **(TRANS.1)**.*

Administrative costs for the public sector:

The administrative impact of **TRANS.1** would depend on the degree to which large urban areas already implement SUMPs. The obligation would only apply to the largest urban areas. The scope is narrower than to produce a SUMP and the information requirements would only relate to reporting the energy use and expected savings. It is envisaged that this would require no more than 2 hours per affected urban area. Overall the requirement would amount to less than 1 FTE.

Administrative costs for the private sector:

There are not expected to be administrative costs except to provide any input they choose to the elaboration of a transport energy plan.

[116] Assessment and summary of Member States' reports under Commission Implementing Decision 2018/1135/EU

[117] Impact Assessment for the Medium Combustion Plants Directive; SWD(2013)531

Measure 10) Support measures:

*Strengthen provisions on skills, energy services and financing mechanisms, consumer empowerment, addressing split incentives and the alleviation of energy poverty (**SUPPORT.1**; **SUPPORT.2**).*

Administrative costs for the public sector:

The measures under **SUPPORT.1** continue with the existing structure of the Concerted Action. They are voluntary and not envisaged to create any additional administrative burden.

The **SUPPORT.2** measures will create some additional administrative burden. There will be one-off efforts needed to establish minimum quality assurance criteria for energy services providers. There will be recurring requirements to assess qualification and certification schemes and to strengthen oversight of energy services market intermediaries. It is assumed that these will amount to around third of the burden on the ESCOs at 1 FTE.

Administrative costs for the private sector:

While **SUPPORT.1** does not create any burden, **SUPPORT.2** would require efforts to demonstrate compliance with criteria set for energy service providers and qualification and certification schemes. There are around 3,000 ESCOs[118] across the EU. If it is assumed that these are each subject to 2 hours additional administrative burden the total would amount to 4 FTE.

Measure 11) Monitoring and reporting:

*Reinforcement of requirements (**MONITOR.1**; **MONITOR.2**), building on the integrated approach under the Governance Regulation.*

Administrative costs for the public sector:

The measures under **MONITOR.1** would involve the use of surveys and other data gathering to improve knowledge. Some of these will involve requests for information to be supplied by public authorities. This would not amount to more than a 2 FTE administrative burden per year across all Member States.

The **MONITOR.2** and **3** measures will create some additional reporting requirements that will increase administrative burden. There will be one-off efforts needed to establish reporting arrangements. Regular gathering of the necessary information will add recurring requirements however, the effort required can be minimised through well designed electronic data gathering. This is assumed to amount to 54 FTE effort across all Member States.

Administrative costs for the private sector:

MONITOR.1 would only create a burden if the focus of the data gathering requires input from private sector organisations. It is assumed that there will be value in their input for some types of assessment, but that demands will be less than for public administrations. In view of this half the effort is assumed i.e. 1 FTE.

MONITOR.2 and **3** can be expected to result in data requests. It is assumed that the administrative burden would be somewhat less than that for public administrations at 5 FTE.

[118] Energy Service Market in the EU; JRC; 2019

The results of these assessments for all elements of the preferred option are summarised and summed in Table 27.

Table 27 Estimated additional public and private sector administrative costs

Standard cost model
Calculation of additional administrative costs

	Private sector			Public administrations			Total
	Cost €/hour	Quantity FTE/year	Total €/year	Cost €/hour	Quantity FTE/year	Total €/year	€/year
Simplification measures							
Require audits based on energy use	€32.1	47	€3.1m	€32.1	47	€3.1m	€6.3m
Preferred option							
Measure 1: *EU energy efficiency target*							
Energy targets	€32.1	0	0	€32.1	0	0	0
Measure 2: *Benchmarks for Member State contributions*							
TARGET.2	€32.1	0	0	€32.1	0	0	0
Measure 3: *Energy savings obligations*							
ESO	€32.1	27	€1.8m	€32.1	27	€1.8m	€3.6m
ESO.1, ESO.2, ESO.3	€32.1	0	0	€32.1	9	€0.6m	€0.6m
Measure 4: *Energy Efficiency First*							
EE1st	€32.1	0	0	€32.1	3	€0.2m	€0.2m
Measure 5: *Exemplary role of the public sector*							
BUILD.3	€32.1	0	0	€32.1	27	€1.8m	€1.8m
PROCURE.1 & 2	€32.1	0	0	€32.1	0	0	0
Measure 6: *Industry*							
IND.2 (a)	€32.1	8	€0.5m	€32.1	0	0	€0.5m
IND.2 (b)	€32.1	3	€0.2m	€32.1	0	0	€0.2m
Measure 7: *Heating and Cooling*							
HEAT.2	€32.1	2	€0.1m	€32.1	1	€0.1m	€0.2m
Measure 8: *Energy networks*							
NET.2	€32.1	1	€0.1m	€32.1	0	0	€0.1m
Measure 9: *Transport*							
TRANS.1	€32.1	0	0	€32.1	1	€0.1m	€0.1m
Measure 10: *Supporting measures*							
SUPPORT.2	€32.1	4	€0.3m	€32.1	1	€0.1m	€0.3m
Measure 11: *Monitoring*							
MONITOR.1	€32.1	1	€0.1m	€32.1	2	€0.1m	€0.2m
MONITOR.2	€32.1	5	€0.3m	€32.1	54	€3.6m	€3.9m
TOTAL			€0.3m			€5.2m	€5.5m

Annex O The SME Test – Summary of results

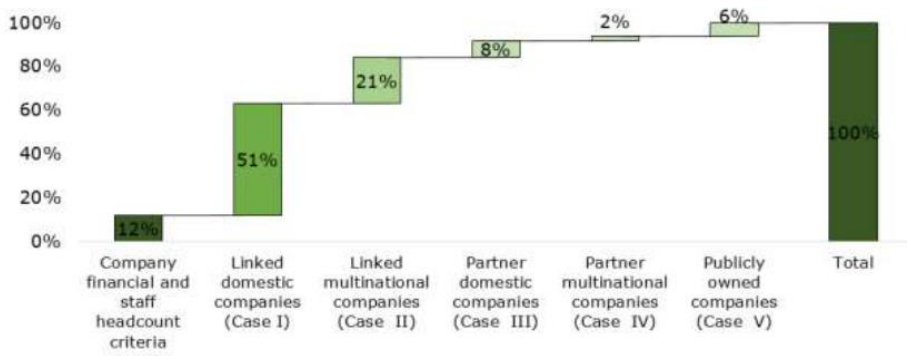
(1) Preliminary assessment of businesses likely to be affected

The EED primarily functions by requiring action by Member States to achieve energy savings. The focus of the majority of the measures that will be undertaken under the EED are not determined by the provisions of the Directive, but by Member States as they choose what schemes to implement to achieve those requirements.

Some of the requirements of the EED are addressed to specific sectors, for example business (energy audits), heating and cooling, energy transmission and energy services. For some of these sectors, it is unlikely that the businesses involved will be SMEs. One example is energy transmission. Another example is, in the heating and cooling sector, the businesses that generate large amounts of waste heat or use cogeneration.

The case of energy audits is a bit different, since the existing EED already encourages Member States to facilitate SMEs receiving energy audits, while the obligation to carry out energy audits only applies to non-SMEs. The supporting study explores the difficulties that Member State authorities have had to implement this provision. It illustrates that the majority of the companies that fall under the non-SME definition only do so because of their links to other companies. Only around 12% are estimated to fall under the definition as a result of the entity itself, as shown in Figure 61 below – if it were not for these links they would be excluded.

Figure 61 Composition of enterprises meeting the non-SME definition



The Impact Assessment considers the desirability of changing from the non-SME definition to one based on energy use. The supporting study illustrates that, for a conceivable level of energy use threshold, this would have the effect of dramatically reducing the number of businesses that would be impacted by this requirement. Those businesses removed from the requirement will be the ones that do not use much energy but which, because of ownership or control relationships, are not classified as SMEs. This would result in a significant reduction in the burden of the obligation that applies to businesses for which it may make less sense including those that would be SMEs but for their links.

However, a shift to an energy-based threshold could conceivably also encompass highly energy intense SMEs. The assessment carried out in the support study concludes that this would be the case, but it needs to be borne in mind that the approach to allocate energy use to businesses in the study is rather crude, since it is based purely on number of employees, and that itself had to be estimated for a proportion of the businesses. In the case of the transport sector, the area where there is most likely to be an impact is in long distance road haulage. Long distance road haulage can be estimated to use around 1TJ per HDV employed full time[119], implying that a company would need to use more than 10 HDVs full time on long distance haulage to exceed a 10TJ energy use threshold. However, road haulage is a sector where the EU

[119] https://ec.europa.eu/clima/sites/default/files/transport/vehicles/docs/ec_hdv_ghg_strategy_en.pdf

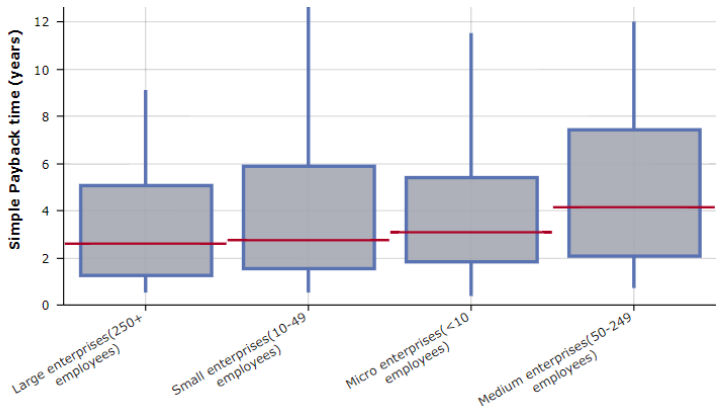
wide average business size is 5.2 persons employed and the vast majority (>80%) of companies in the road haulage sector are below this average[120]. These factors suggest that a very limited share of road haulage companies would actually be affected.

Other sources of information are instructive in understanding the potential for energy savings in SMEs and the cost effectiveness of those actions. For example, a range of projects addressing energy efficiency measures in SMEs have been supported under the LIFE and HORIZON programmes. An ex-post assessment of 41 of these projects has recently been completed[121]. The detailed assessment, based on project reporting, concluded that the potential energy savings rate was about 18% and the implementation rate averaged about 25%. The total energy savings are therefore estimated (from potential savings rate x implementation rate) to amount to 4.5%. These figures are reflective of real-world activities. These figures are lower than values from literature, which suggest that potential savings of 10% are possible from no and low cost measures, and up to 20% savings with all measures.

The payback times by type of measure identified in the projects are slightly longer than those identified in the DEEP[122] database (except for compressed air, which is shorter). Nonetheless, they are the same order of magnitude and given the small number of projects and uncertainty over the key performance indicators, this suggests that the results are credible. Across all the projects, every Euro of funding achieved €1.9 per year cost savings for SMEs and average savings were 9.2 kWh/year per Euro of investment.

The DEEP database shows the results for over 9,400 energy saving projects financed in businesses. The website provides information on payback times for those projects, which can be compared by type of area of the investment and by company size. Figure 62 below shows the calculated payback times.

Figure 62 Simple energy efficiency payback time by company size



The red lines show the median payback time while the boxes cover the range between the 25th and 75th percentiles and the line extend to the 10th and 90th percentiles. It is evident that while there are minor differences between the payback times, with these being slightly longer in particular for medium sized enterprises, there is little fundamental difference in the attractiveness of energy saving investments based on company size.

(2) Consultation with SMEs representatives

SMEs have been consulted as part of the outreach to stakeholders.

[120] An Overview of the EU Road Transport Market in 2015

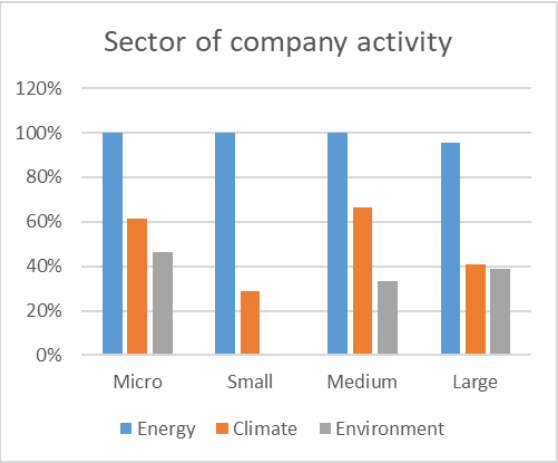
[121] Assessment and Communication of Relevant EU-funded Projects Supporting the Market Uptake of Energy Efficiency Measures in Industry and Services; Study contract number EASME/2019/OP/0011

[122] De-risking Energy Efficiency Platform (DEEP), An open-source initiative to up-scale energy efficiency investments in Europe through the improved sharing and transparent analysis of existing projects in Buildings and Industry, https://deep.eefig.eu/

Views of SMEs represent a reasonable (34%) share of the business views collected in the PC. Of the 92 respondents that identified themselves as companies, 61 are large (>250 employees), 6 medium (50-249 employees), 9 small (10-49 employees) and 16 micro enterprises (1-9 staff). In view of the relatively small SME sample size, in particular for medium sized companies, caution needs to be exercised about the robustness of the fully disaggregated results.

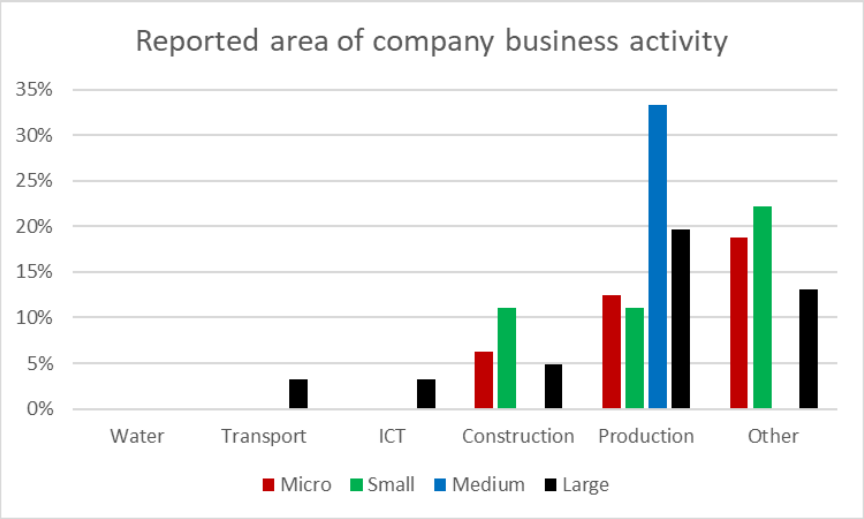
These companies classified themselves as whether they operate in the energy, climate or environment fields. Positive answers to this were given by 81% of micro, 78% of small, 50% of medium and 72% of large sized businesses. In terms of which of these areas the ones that answered yes operate in, the split is shown below, and it is clear that there is major distinction between company sizes and energy activities are dominant for all company sizes, with climate as the second most significant and environment as the third.

Figure 63 Self-classification of domain of business activity



Although only a small proportion of companies indicated the sector in which they operate, Figure 64 shows that the most significant ones identified for all company sizes are production, followed by construction. Medium sized companies are dominated by production. A significant share stated 'other' and this covers a range of specific activities.

Figure 64 Reported area of activity by company size



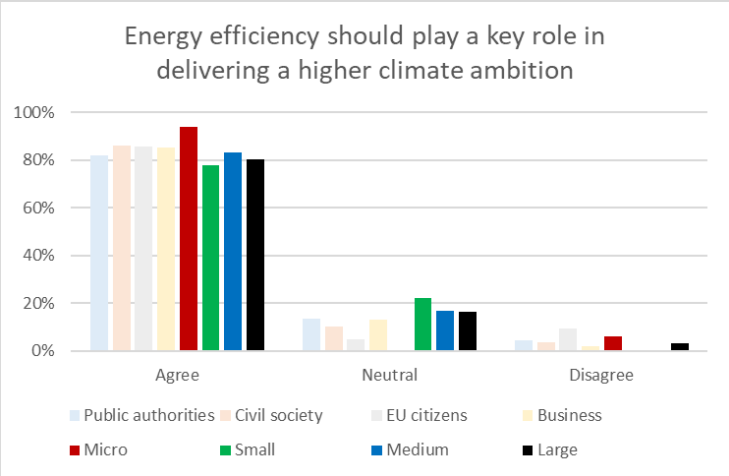
With regard to other specific interaction with SME representatives, a presentation was made to a meeting organised by the Commission with SMEs regarding the findings of the study on energy audits on 5 May 2021.

While there is some differentiation of views among businesses depending on company size, this variation is small. It is shown below for various of the PC questions that are referred to in the Impact Assessment.

For reference, the four groupings of stakeholder responses used in the body of the Impact Assessment are shown in faded colour. The four coloured bars show the views of micro, small, medium and large businesses (red, green, blue and black).

Figure 65 shows the views of SMEs by size on the role that energy efficiency should play in attaining our climate goals. For all company sizes, there is little divergence from the overall business view although micro enterprises have a higher level of agreement with the statement than other sized enterprises.

Figure 65 Business views on the role of energy efficiency in achieving climate goals



SME views about which factors had contributed to the EED achieving its objectives shown in Figure 66 were comparable to the overall responses from all stakeholder groups received that are shown in Figure 7 in Section 5.2.1. In terms of size-related variations, it appears that the smaller the business, the less they believe flexibility left to Member States and national planning policies have contributed to the EED achieving its objectives. There is also a modest tendency for smaller businesses to believe national targets and strong monitoring and reporting to have been more important.

Overall, there is little divergence in view between different company sizes or from the overall responses. Outlying views are the micro company opinion on the importance of the EU level targets and medium companies on national targets.

Figure 66 Business view by company size on the factors that helped achieve EED objectives

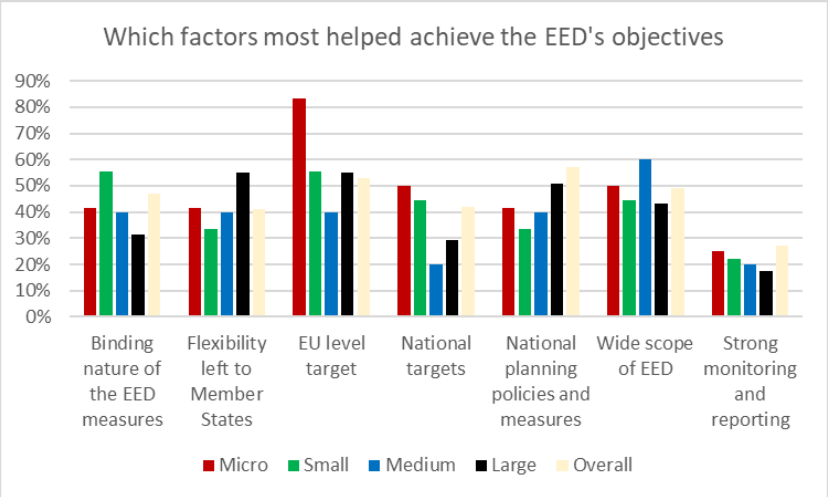
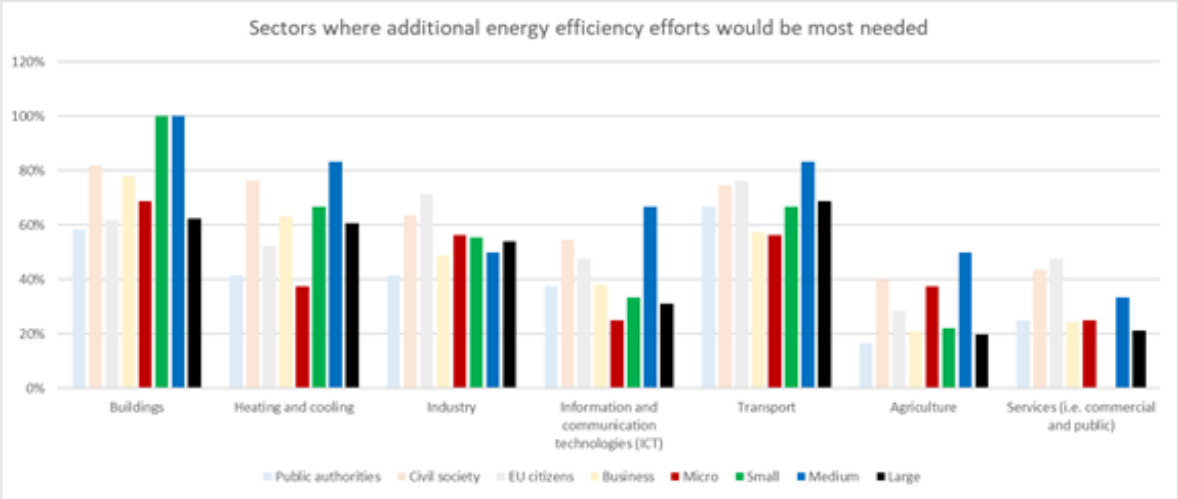


Figure 67 shows stakeholder responses by company size about which areas additional effort is desirable to achieve higher energy savings. There is no consistent impact of company size on the ranking of the responses. There is little divergence in SME responses from the overall view of business although small and medium sized companies are very positive about addressing buildings while medium-sized companies also believe heating and cooling, ICT and transport have a higher opinion of the importance of

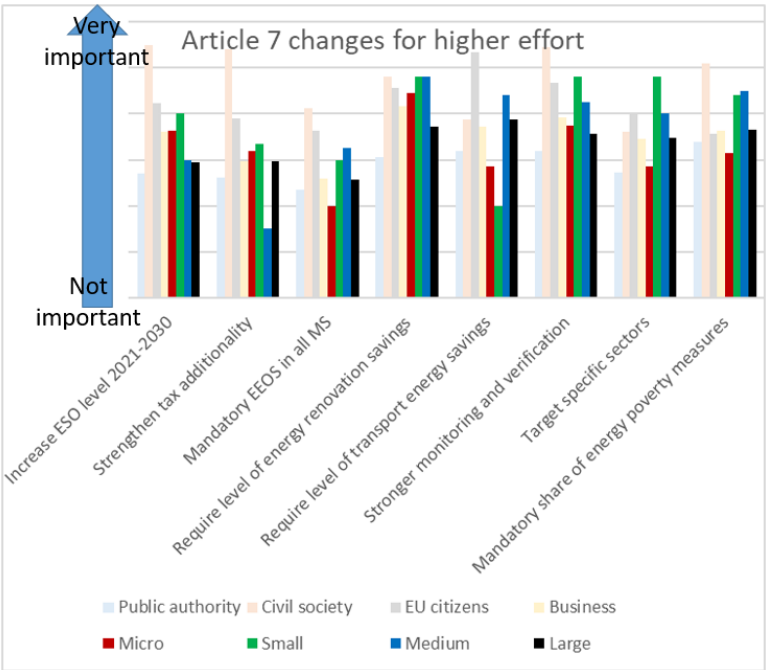
addressing these sectors than business in general.

Figure 67 Business view by company size on sectors where more energy savings are needed



Stakeholders were asked in the PC about how Article 7 might be changed to achieve higher energy savings. The results of this by category are shown in section **Error! Reference source not found.**. The business results are further disaggregated by company size in Figure 68 below. It can be seen that in general the micro enterprises are most positive about all the possible measures with generally the support decreasing as company size increases. Overall, there is little divergence from the general business opinion.

Figure 68 Business opinion by company size on how Article 7 should be strengthened

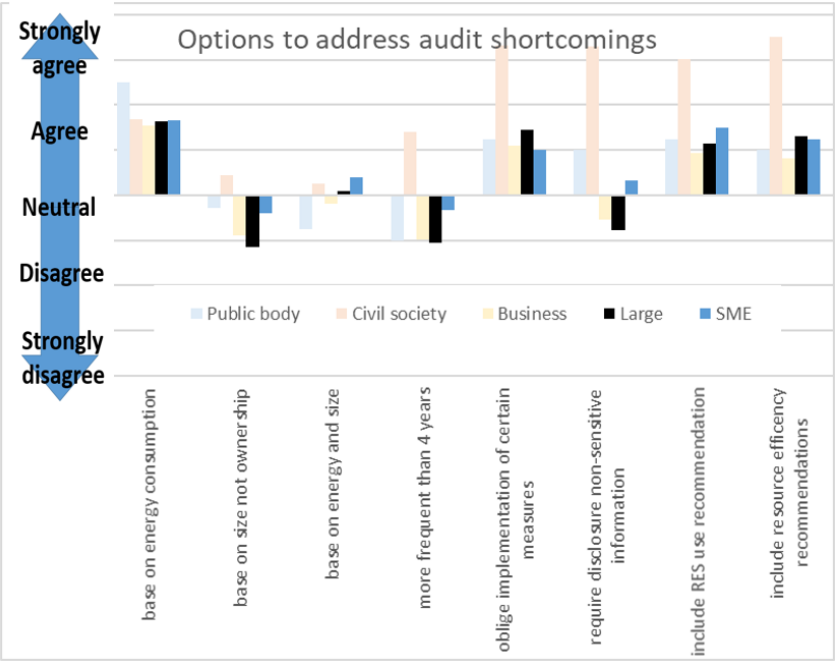


Stakeholders were asked for their opinion about how to address the shortcomings with the energy audit requirements. There was a limited response to this with less than a third of respondents in all business categories giving their view. In view of this, in Figure 69 below, the SME answers have been aggregated and shown alongside the answers for large businesses and the three categories shown in the Impact Assessment.

The results for SMEs are largely in line with those for business in general with the most noticeable difference being that they are significantly less negative about the options with which business overall

disagreed.

Figure 69 Business views by company size on how to address energy audit weaknesses



Stakeholders were asked in the PC about the benefits of certification and/or accreditation schemes in their country. The overall responses are shown in section 2.2.2 of the Impact Assessment. It is to be noted that only a small share of respondents answered this question so in Table 28 the results have been aggregated for all SME company sizes and should be treated as somewhat uncertain. The results are colour coded to indicate if they are above (green) or below (red) the overall response. It can be seen that there is no consistent trend.

Table 28 Business view by company size on certification and accreditation

Benefits of certification and accreditation schemes			
	Overall	**Large**	**SME**
Ensures availability of skills (providers of energy services, energy auditors, energy managers and installers)	26%	29%	33%
Ensures quality of energy services offered by energy service providers	17%	33%	0%
Increases confidence in the energy services sector	12%	5%	17%
Facilitates the development of the energy services markets	11%	0%	8%
Other	34%	33%	42%

Stakeholders were asked in the PC about whether they thought certain measures should be considered in the heating and cooling area. The answers were scored on a scale from 1 to 6 and an average is calculated for all respondents answering. Table 29 shows in the first (white) column the overall stakeholder view as shown in section 2.2.2 of the impact assessment. The four right hand columns show the answers given by companies split by company size. Where the answer is more in agreement with the statement than the general stakeholder view it is shown in green, where it is a stronger disagreement it is shown in red. It can be seen that SMEs other than micro enterprises are more positive about all of the statements. In contrast, large companies are less positive.

Statement [scoring is from 6 (strongly agree) to 1 (strongly disagree]	**Overall stakeholder view**	**Micro**	**Small**	**Medium**	**Large**
The recovery of waste heat from heating and cooling (air-conditioning) systems in individual buildings should be promoted	4.8	5.1	5.1	4.3	4.7
Member States should facilitate local and district approaches to policy and infrastructure planning and development in heating and cooling	4.8	4.4	5.4	4.8	4.3
Fossil fuels in heating systems (in buildings and district heating) should be gradually phased out with a faster phasing out of the most polluting ones	4.4	4.1	5.7	5.0	4.1
Requiring district heating and cooling operators to prepare long-term plans to improve their energy efficiency in terms of primary energy intensity energy	4.4	3.6	4.8	4.5	4.0
Fossil fuel heating system should be banned for new buildings whenever technical feasible	4.2	3.9	5.7	4.6	3.6
Allow public support for heating systems only to non-fossil fuel technologies	4.1	3.8	5.5	3.0	3.3
Member States should introduce specific energy efficiency targets for the heating and cooling sector to ensure that energy consumption in this sector is sufficiently taken into account	4	3.6	4.4	4.4	3.8
Specific requirements for utilization of waste heat and waste cold should be set for industry and services	4	4.3	4.4	3.3	3.6
Member States should unbundle the management of the generation and distribution heat network	3	3.3	4.0	3.3	2.0

Table 29 Business view by company size on how to strengthen heating and cooling aspects

Overall, the disaggregation of the stakeholder responses by company size does not show any strong trend in relation to SMEs. In response to certain questions, there are some modest differences. Generally, the SME views fall within the overall spread of views expressed by stakeholders.

(3) Measurement of the impact on SMEs

Any SMEs that do fall under the energy threshold and need to carry out an energy audit will need to bear the cost of the audit. As a result, they will benefit from the identification of energy saving opportunities.

Some smaller transport companies would possibly be implicated under the audit obligation. In that case, consideration needs to be given to whether the cost impact of that would be justified by the benefits. The non-SME definition study report estimated the potential energy savings that could be identified by audits in the transport sector at 15.2% and that around 4.9% savings would be likely to be realised.

Based upon the threshold 10 TJ diesel consumption, using a conservative cost of 1 Euro per litre implies that this level of energy use amounts to a fuel expenditure of around 270,000 Euro per year. A potential 4.9% saving on that expenditure would realise savings of 13,000 Euro per year, which would vastly exceed the cost of an audit for a company with a small number of employees. In view of this, it can be considered that the energy saving payback for the transport company would be rapid if it chose to implement the measures identified.

Enhancement of the enabling and supporting measures, including information and awareness raising activities would be likely to be beneficial for SMEs. While these are important in terms of fairness and increase the likelihood of SMEs benefitting from energy saving opportunities the impacts are too uncertain to attempt any quantification of them. Nevertheless, it can be reasonably assumed that these will not increase costs for SMEs and will offer cost saving opportunities.

4) Assess alternative options and mitigating measures
The majority of the measures explored in the Impact Assessment do not directly address SMEs. The main measures place obligations on the Member States that might lead to changes in the situation for businesses. This will depend on the measures that Member States implement and could not be assessed in the Impact Assessment. To the degree that the measures envisaged in the Impact Assessment will have any impact on SMEs, they are likely to be beneficial for them. Such an impact may arise through the creation of business opportunities such as building renovations to increase energy efficiency. The most likely of any of the measures assessed to have a direct impact on SMES is the change to the definition for obligatory energy audits. The main effect of this will be to benefit small, low energy using businesses that were only subject to the obligation because of business links. The change would be likely to avoid some unjustified expenditure by companies in that situation. In contrast, there is a possibility that some energy intense SMEs may become subject to the audit requirement. In those cases, the businesses will have a very high energy expenditure and are likely to be able to benefit considerably from the expertise in an audit. It has been demonstrated there are substantial energy saving opportunities available to SMEs, as in larger businesses, and therefore taking advantage of those will lower SME operating costs and increase their competitiveness. The crucial factor for energy audits to be cost-effective is for the energy expenditure to be high enough that the implementable energy savings identified can justify the cost of the audit. In the case of smaller companies exceeding the energy threshold, this is bound to be the case and will be vastly more attractive for them than many of the companies that were previously covered by the audit obligation due to their links with other businesses. In view of the fact that the impacts are likely to be beneficial for SMEs no alternative options have been considered and no mitigating measures are desirable.