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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}

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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.

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[23] Regulation (EU) 2018/1999

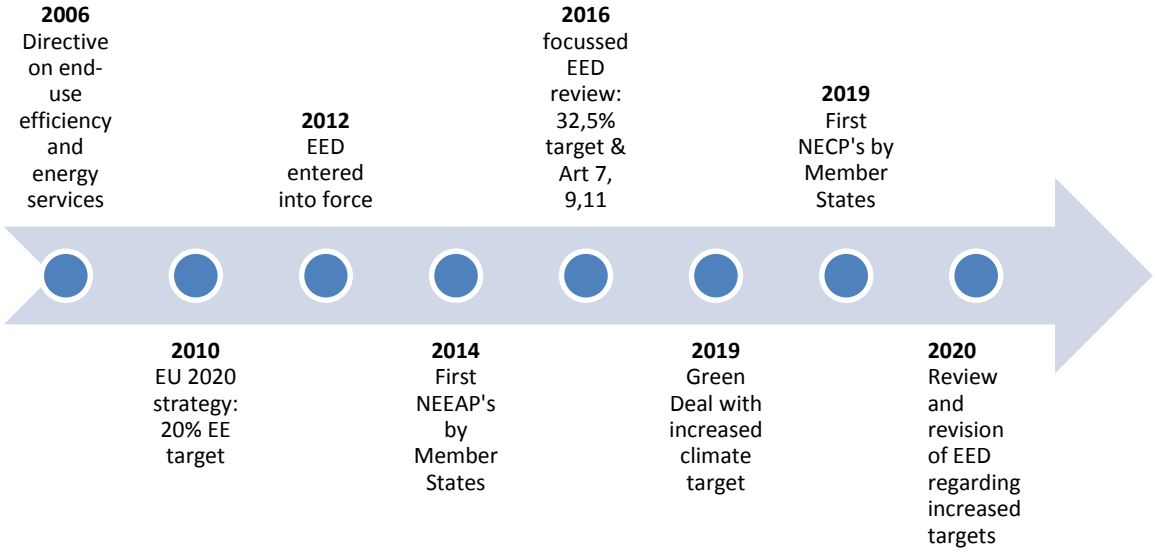
24 Entered into force together with the recast Renewable Energy Directive and a new Governance Regulation on 24 December 2018

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;

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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].

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[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.

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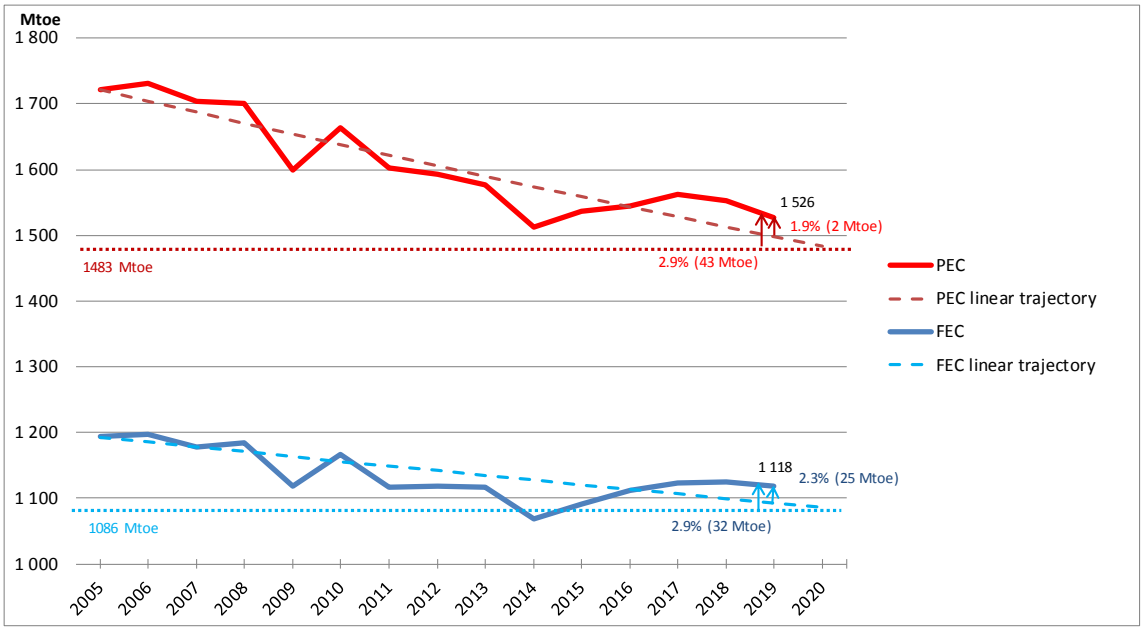
[51] `Cf COM(2020) 326 final and COM(2020) 954 final

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

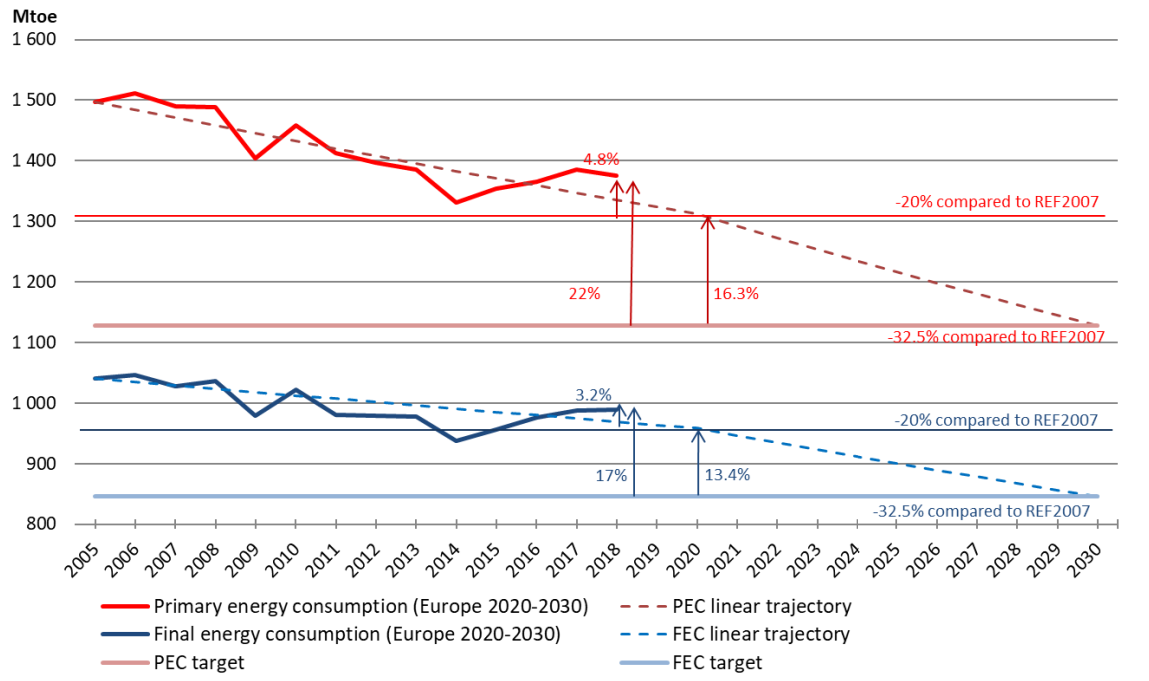
[53] The Commission reporting obligations for 2030 energy efficiency targets are part of the Governance Regulation EU/2018/1999.

[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

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[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

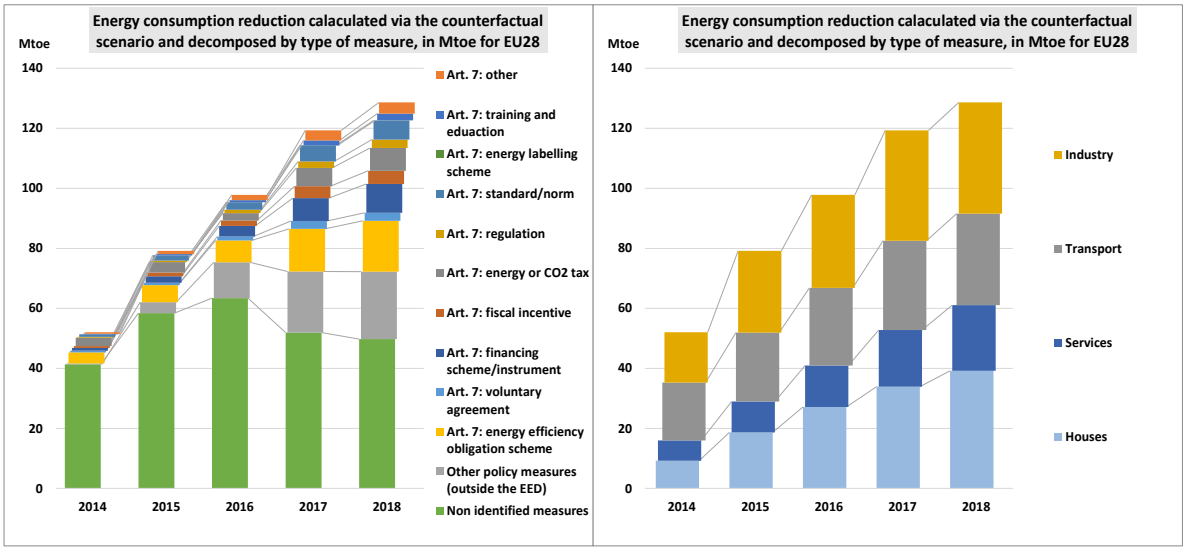
[60] Estimations are based on a bottom-up methodology and rely on calculations provided by the Member States in their annual reports. Data is mostly available for Article 7 measures.

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.

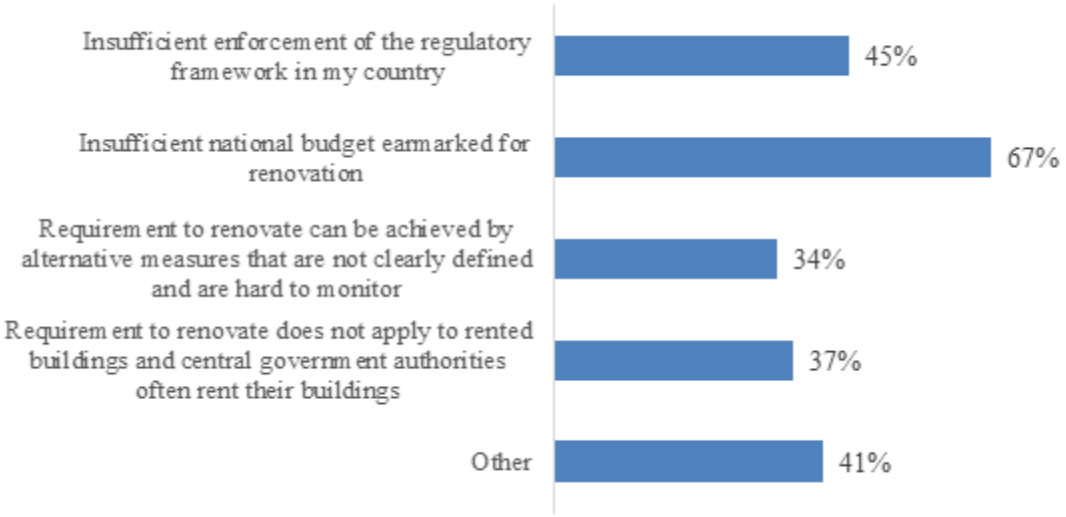
Even though a substantial part of the energy savings under alternative approach was achieved through renovations, overall most of the savings were reached through other measures such as energy management, information campaigns and behavioural change. There are two limitations related to the current reporting 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.

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[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.

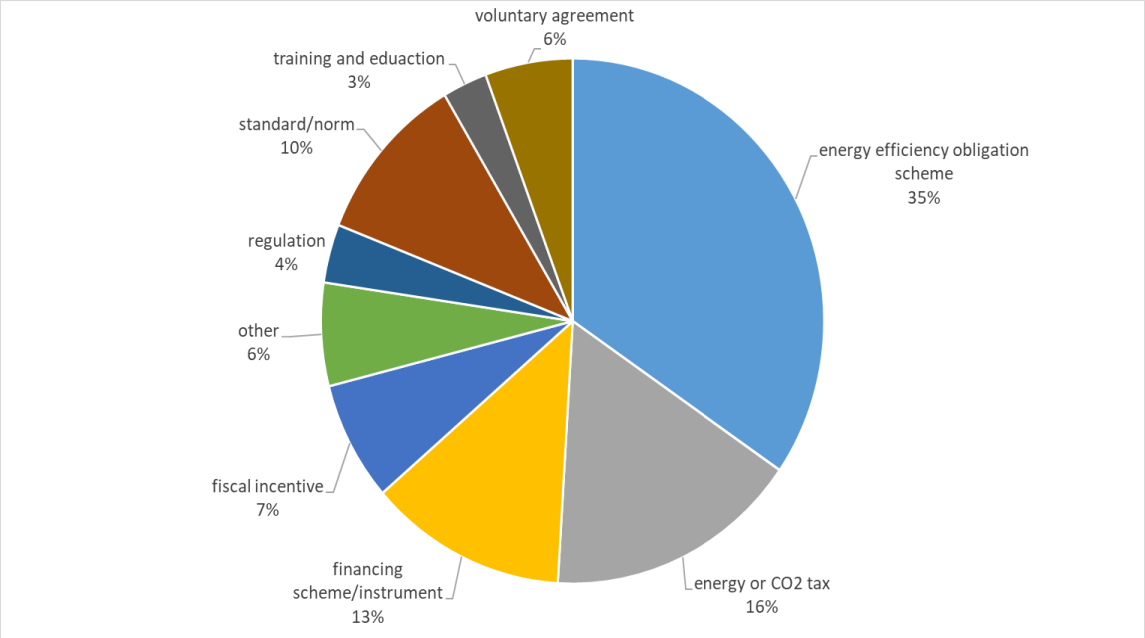
75 COM(2020) 954

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

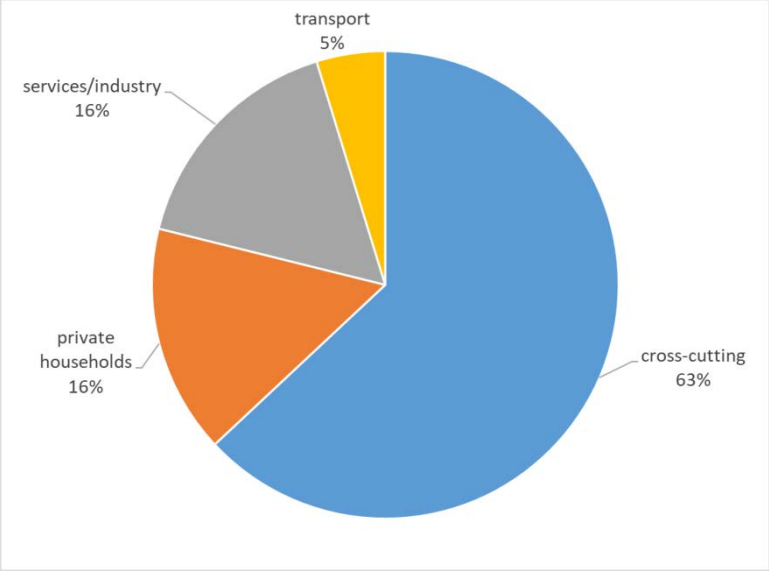


Source: DG ENER's own calculations based on the 2020 national annual reports.

[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].

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[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.

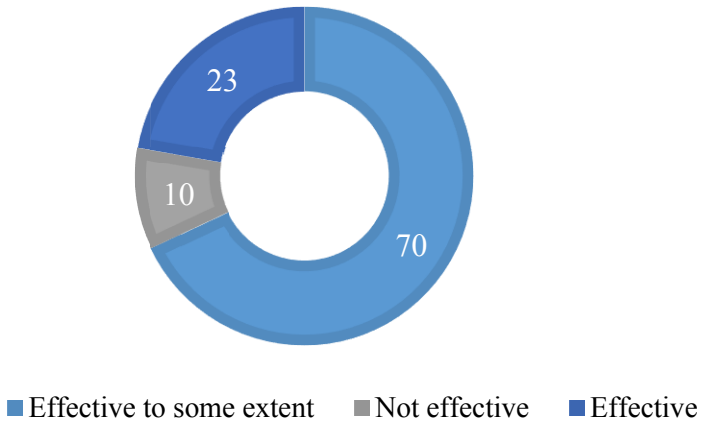
There is limited information available, though, on whether the qualification and certification schemes are effective in ensuring the right level of technical competence in Member States for all energy efficiency specialists (required by Article 16).

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



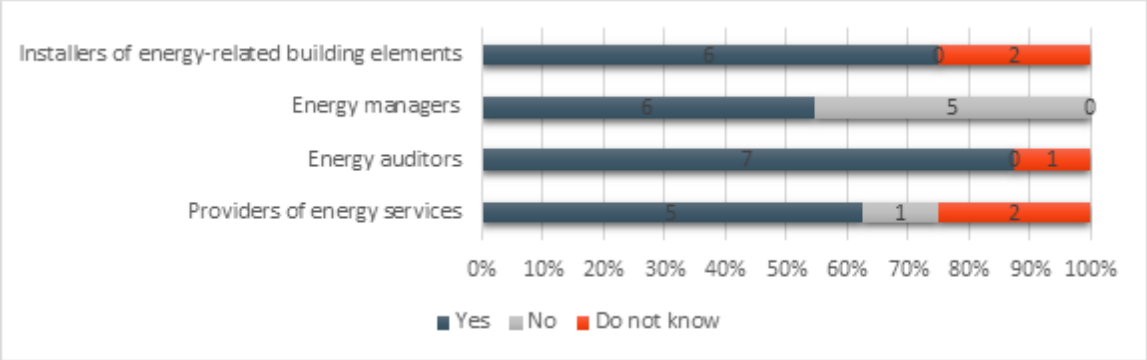
Source: feedback from the open public consultation

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***

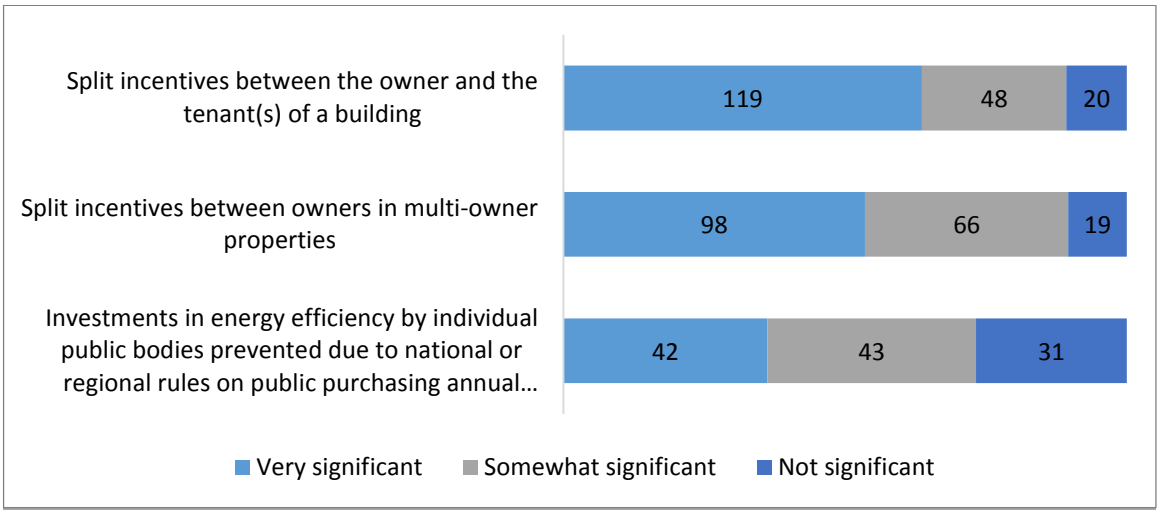
Feedback from stakeholders, during the targeted consultation, indicated that the EED has a small extent contributed to addressing the **split of incentives** and to removing of market and other types of barriers for public purchasing, annual budgeting or accounting (see

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

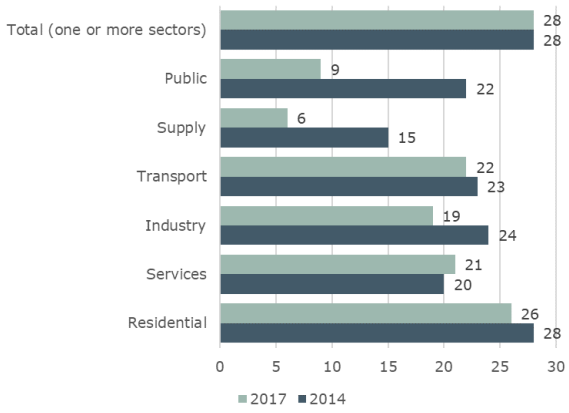
[116] Final report of technical assistance study on evaluating the EED, COWI, 2021

have established and made use of different financial instruments for the purpose of energy efficiency improvements.

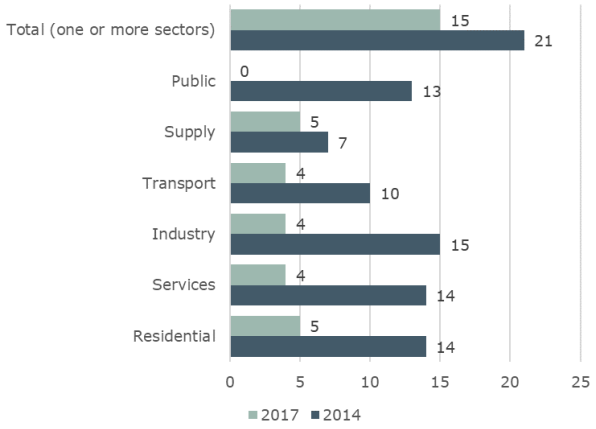
Figure 11 provides an overview of the market-based instruments (including white certificates) that were operational in 2017 compared to 2014 in selected sectors.

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.

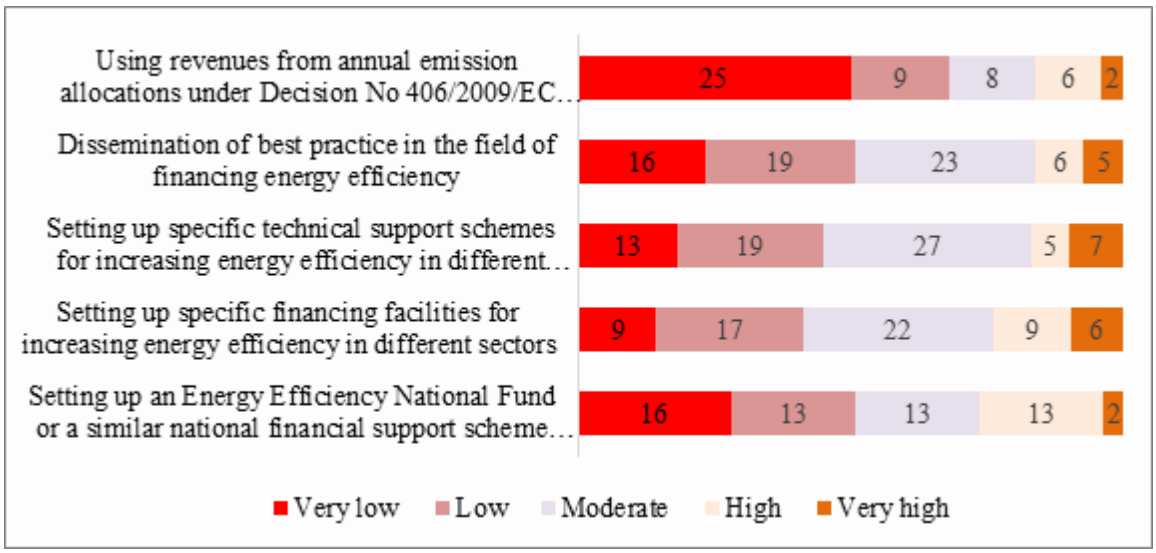
118 JRC assessment of the first and second NEEAPs under the EED, see: https://publications.jrc.ec.europa.eu/repository/bitstream/JRC110304/110304_neeap_2017_synthesis_final.pdf and http://publications.jrc.ec.europa.eu/repository/bitstream/JRC102284/jrc102284_jrc%20synthesis%20report_online%20template.pdf

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.

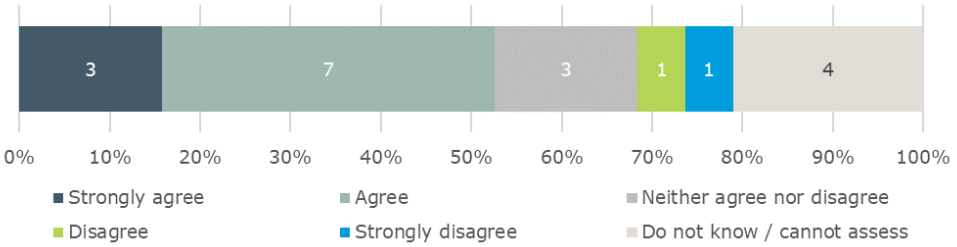
Feedback received from stakeholders, as part of the targeted consultation, suggests that the costs and benefits of implementing Article 5 are well balanced (see Figure 13). Stakeholders also highlighted that the benefits arising from energy efficiency measures in

[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.

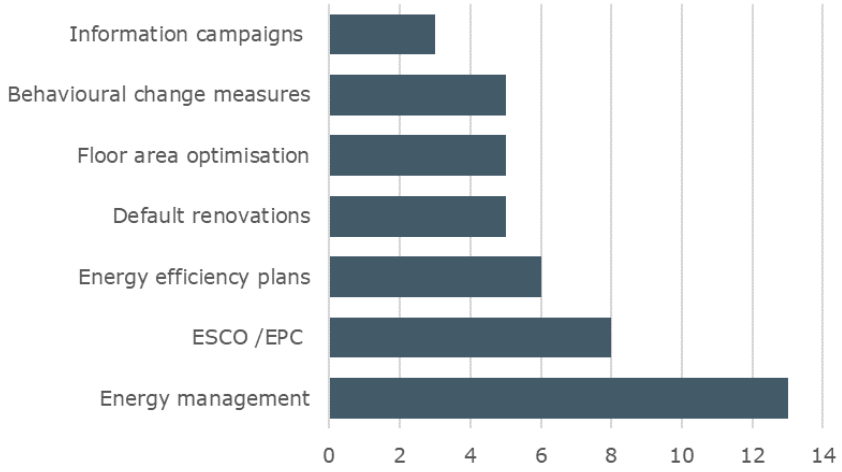
Figure 13 - To what extent do you agree with the following statement "The costs and benefits of implementing Article 5 are well balanced"?



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

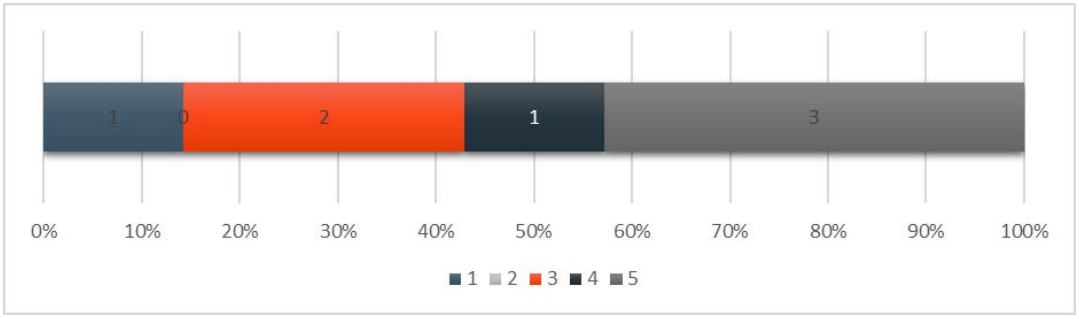
[133] https://www.eiif.org/tipcheck/tipcheck-benefits-industry

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

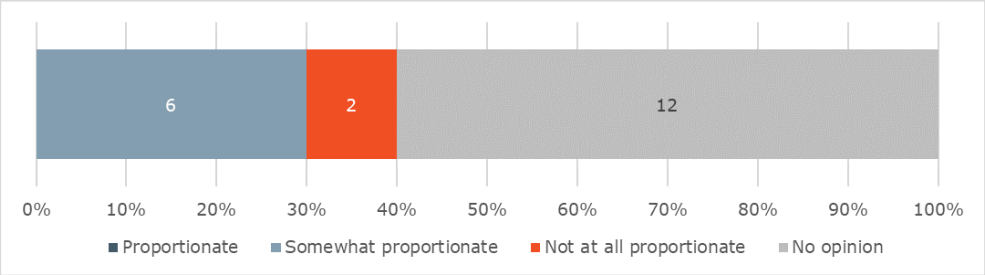
[137] https://publications.jrc.ec.europa.eu/repository/handle/JRC101251

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?

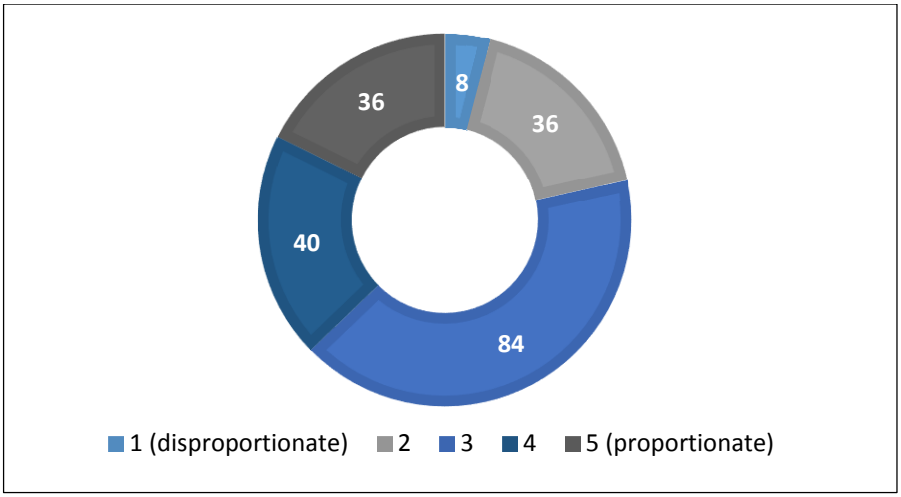


Source: Technical assistance study on evaluating the EED (2020)

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].

Conclusions on efficiency:

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[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

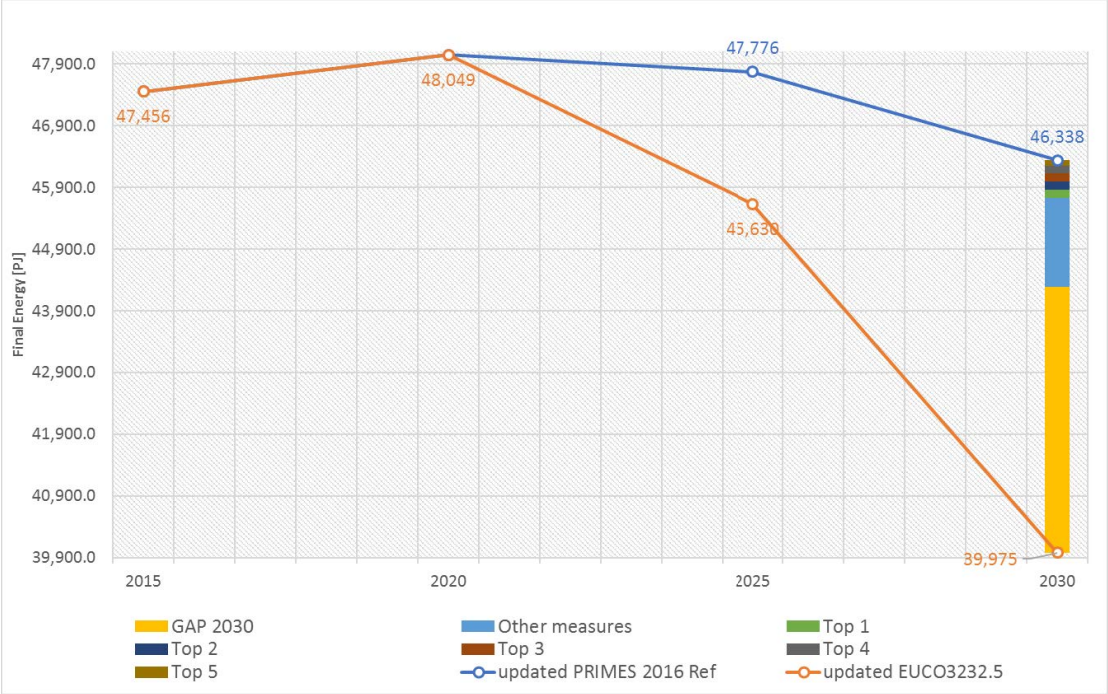
[146] EEA, 2020

[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

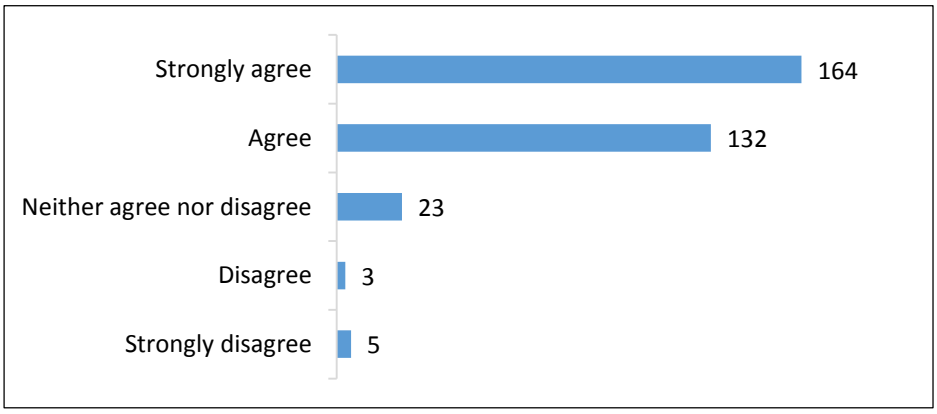


Source: Fraunhofer technical assistance study on assessing the energy efficiency policies (2020)

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

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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

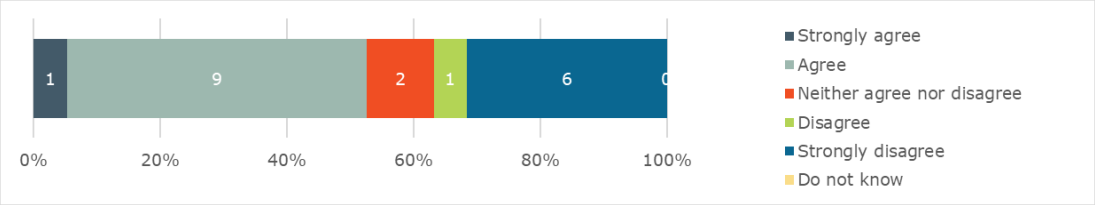
[158] Assessment of the Second NEEAPs under the Energy Efficiency Directive, JRC 2018

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

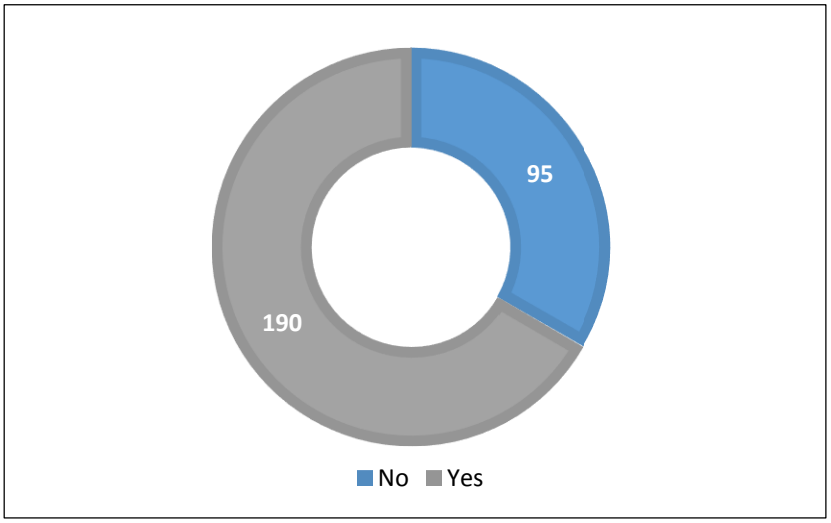
[164] The Energy Efficiency First Principle includes giving priority to demand-side solutions whenever they are more cost effective than investments in energy supply infrastructure in meeting policy objectives, but also properly factoring in energy efficiency in generation adequacy assessments.

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?

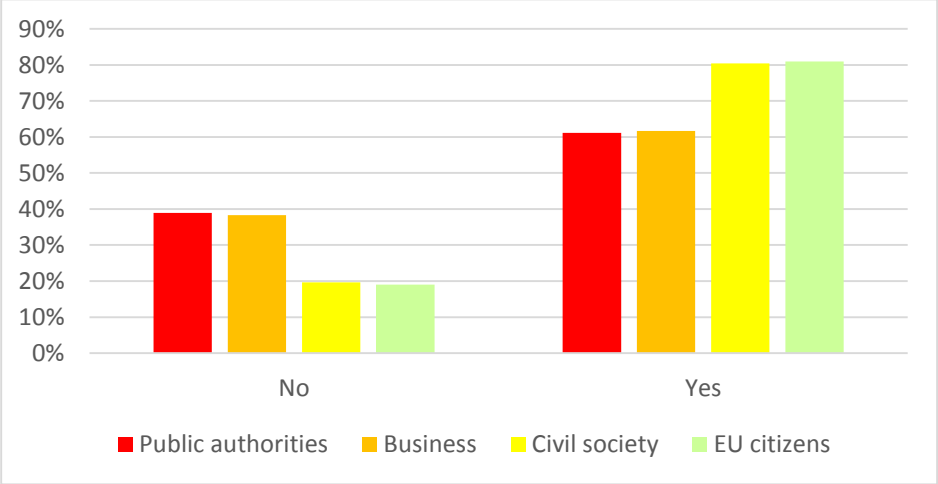


Source: Feedback from the public consultation

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.

Conclusions on relevance:

[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.

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[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.

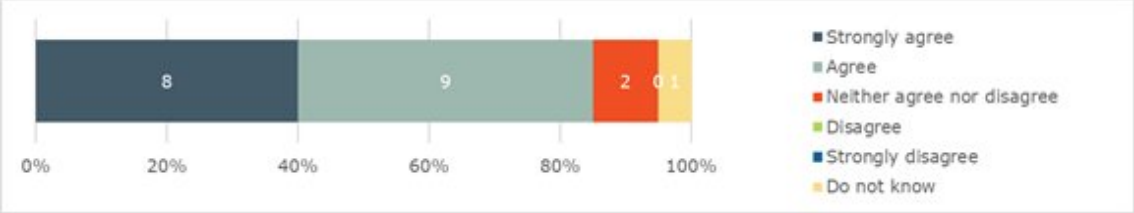
5.5. EU added value

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.

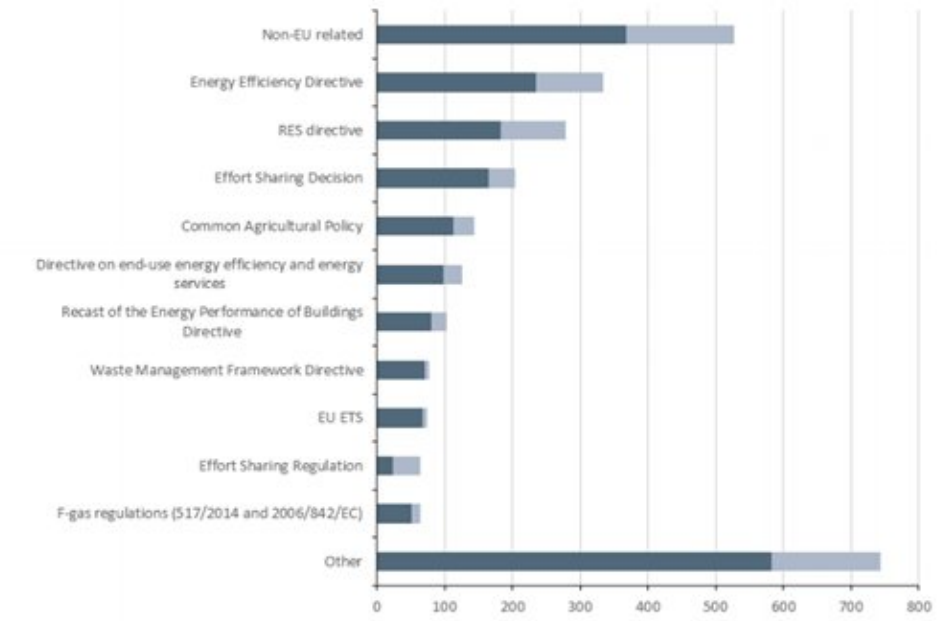
Overall, the information received from Member States in line with the reporting requirements illustrates that the Energy Efficiency Directive is one of the key Union policy driving the implementation of national climate policies and measures as can be seen in Figure 24 below (ETC/CME, 2019)[199].

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

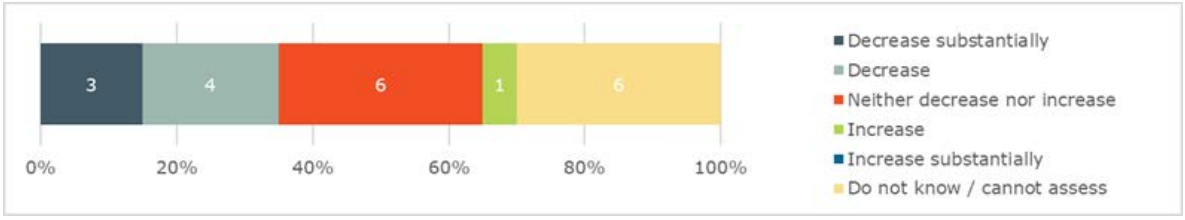


Note: Only EU-28 countries, data from Austria and Romania from 2017.
Source: ETC/CME, 2019.

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?

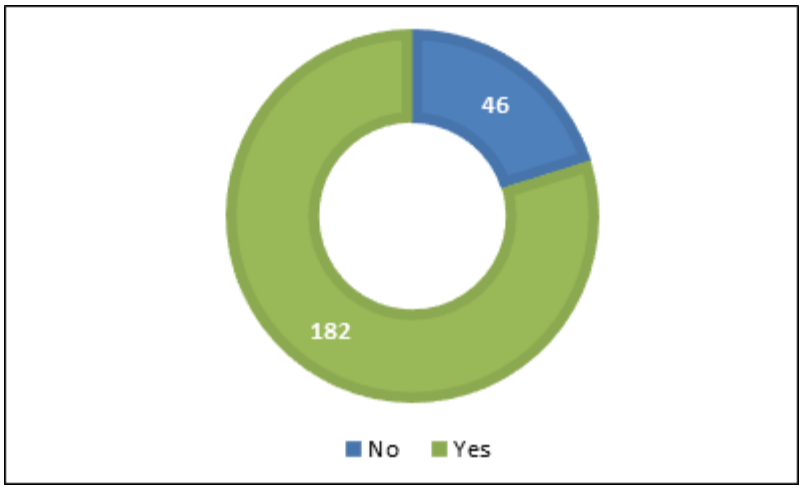
Overall, the feedback received from stakeholders in the targeted consultation suggests that certain provisions have become obsolete (e.g. requirement under Article 8 on energy audits for households and Article 14 on certificates of origin) need to be integrated in

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

Summary of the findings on 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 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

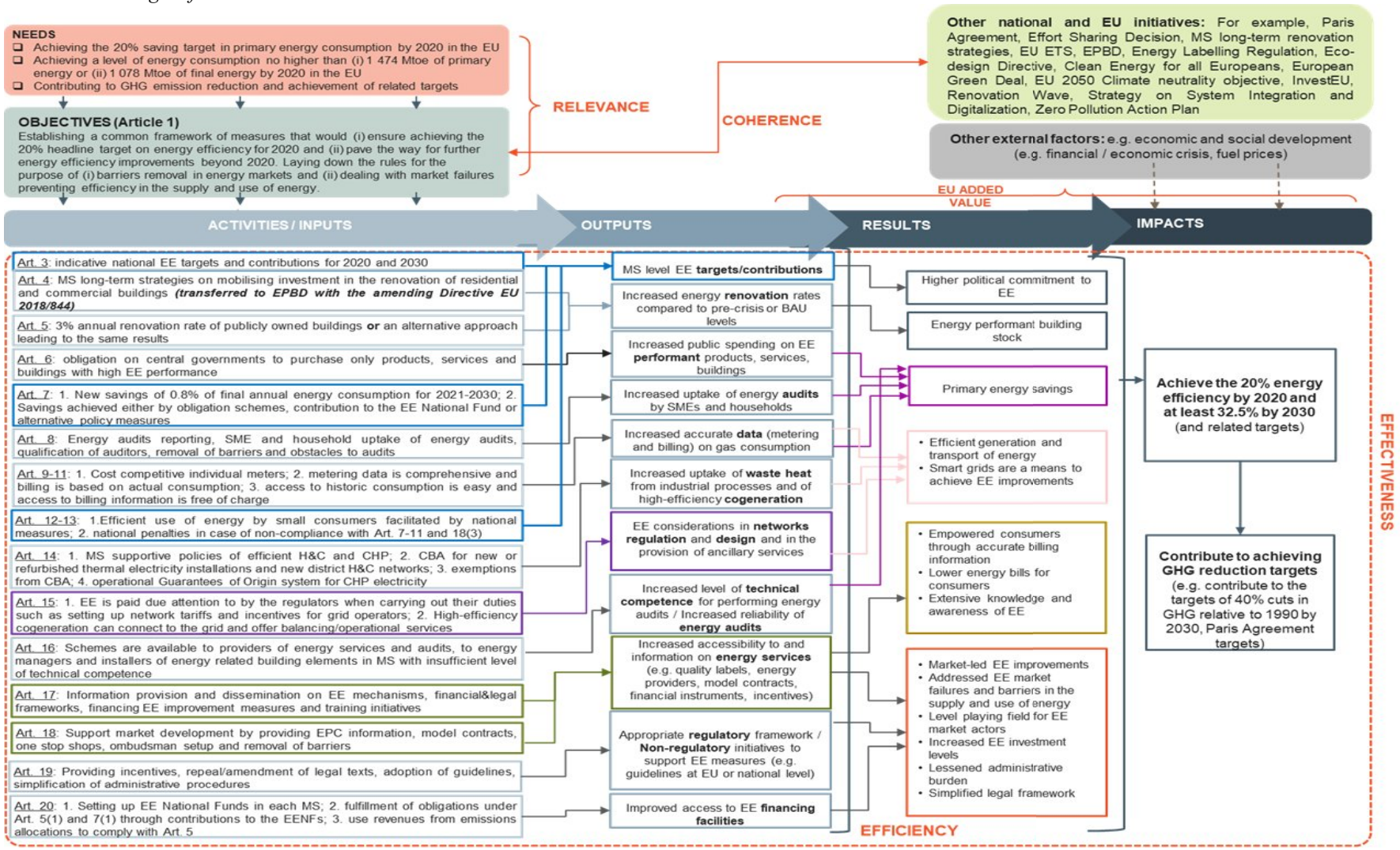
- EQ 12: To what extent is the EED internally coherent?
- EQ 13: To what extent is the EED coherent with other interventions with similar objectives?

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?

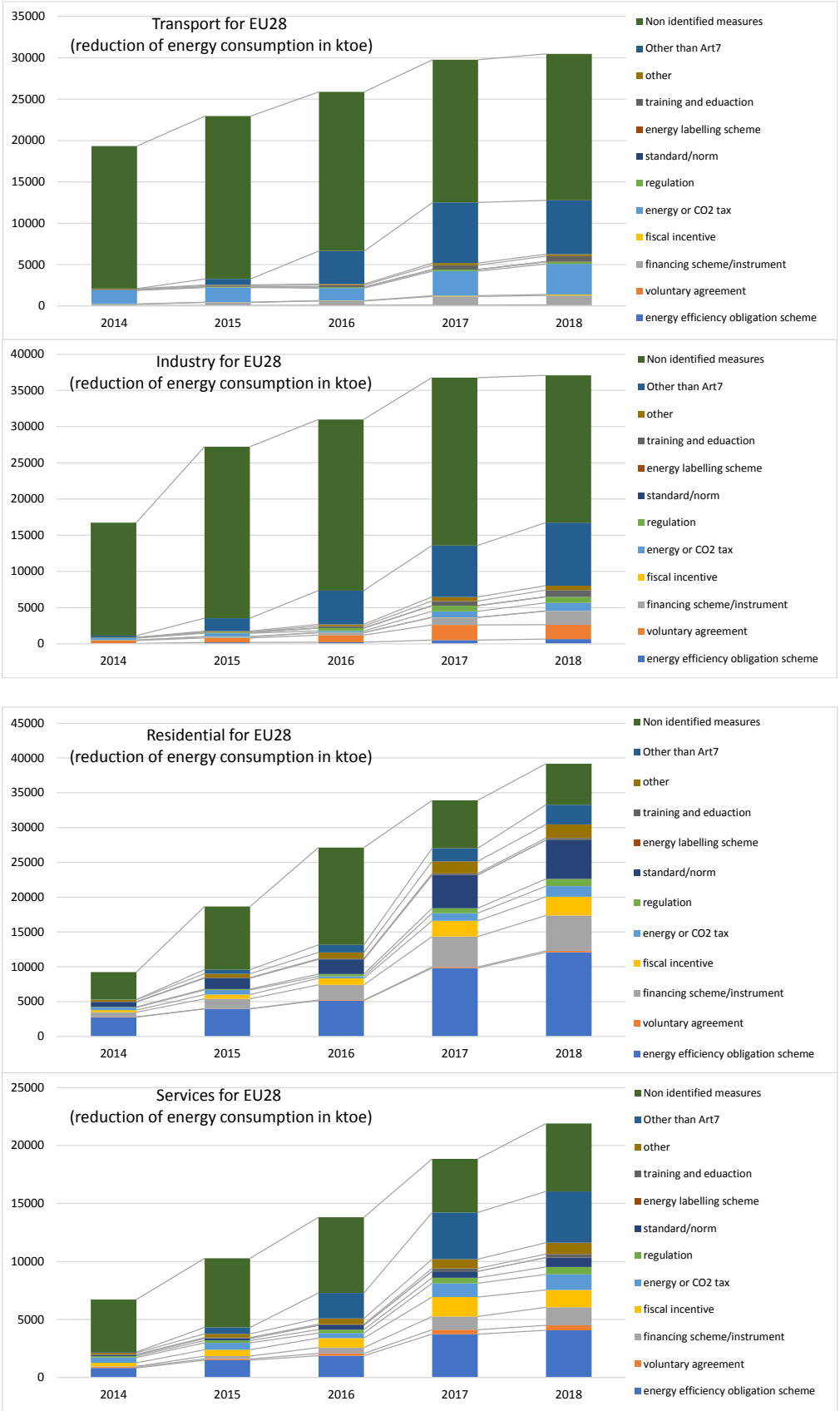
Annex 4: Figures and Tables

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 2017209. 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 2019210.
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.