Council of the European Union

Brussels, 17 December 2021
(OR. en)

15141/21

Interinstitutional File:
2021/0203(COD)

LIMITE

ENER 567
ENV 1026
TRANS 765
ECOFIN 1265
RECH 574
CLIMA 462
IND 391
COMPET 921
CONSOM 297
CODEC 1675

NOTE

From:	General Secretariat of the Council
To:	Delegations
Subject:	Proposal for a recast of the Energy Efficiency Directive The energy efficiency target, its interlinkages with the other targets of the 'Fit for 55' package and the role of Article 8

In view of the Working Party on Energy on 6th January 2022, Delegations will find in the Annex an explanatory background paper from the Commission on the above-mentioned topic.

Proposal for a recast of the Energy Efficiency Directive

The energy efficiency target, its interlinkages with the other targets of the 'Fit for 55' package and the role of Article 8

1. Article 4 draft EED

1.1. Energy efficiency and its role in 'Fit for 55'

The 2030 Climate Target Plan (CTP) highlighted that, to attain a gradual and balanced transition to a climate neutral EU economy by 2050, Greenhouse Gas (GHG) emissions need to be reduced to at least 55% below 1990 levels by 2030. In this context, the impact assessment accompanying the Climate Target Plan (CTP)[1] assessed the interaction and expected contribution of the different policy instruments to the overall carbon GHG emissions objective for 2030 showing that contributions from all **relevant policies are needed to reach in a cost effective way the 55% increased ambition and, ultimately, the carbon neutrality target set for 2050.**

To achieve this, the Commission adopted the 'Fit for 55' package comprising a number of legislative proposals, including the proposal for a recast of the Energy Efficiency Directive (EED recast). The 'Fit for 55' package brings together the relevant policy instruments that will contribute to the 55% GHG reduction target in a coherent and proportional manner among other relevant policies and legal instruments.

Regulatory policies, such as renewables, energy efficiency, and CO_2 standards for vehicles aim at addressing market failures and other barriers to decarbonisation. At the same time, they also create a coherent enabling framework for investment, which supports cost-effective achievement of the climate targets by reducing perceived risks, increasing the efficient use of public funding and helping to mobilise and leverage private capital. These regulatory policies also pave the way for the future transition needed to achieve the EU climate-neutrality objective.

The enhanced energy efficiency and renewable energy framework will thus contribute to achieving the climate target in a cost-efficient manner through the increased headline targets and strengthened measures, which are aimed at addressing existing weaknesses and intensifying the needed efforts. Investments in energy efficiency and renewable energy promote growth, jobs, competitiveness, fairness, and have co-benefits such as increased energy security and better health, through for example improved air quality. Besides, energy efficiency helps alleviate energy poverty and brings tangible benefits to households and consumers.

The EED is coherent with the Effort Sharing Regulation as energy efficiency measures contribute to the achievement of effort sharing targets. Similarly, energy efficiency policy works in synergy with renewable energy target and measures by avoiding the needs for excessive (and thus likely costly) deployment of renewables in power, heating, transport and other sectors and by promoting electrification and waste heat uptake in line with Energy System Integration strategy.

[1] COM(2020) 562 final; SWD/2020/176 final

All CTP policy scenarios[2] included a combination of a pricing mechanism and of sector specific measures to ensure the required uptake of energy efficiency measures and the deployment of renewable energy. This approach helped avoid the risk of incoherence or regulatory overshoot among the initiatives under the 'Fit for 55' package.

Modelling results for all policy scenarios of the CTP showed that energy efficiency efforts need to be intensified at the level of 36-37% for final energy and 39-41% for primary energy consumption compared to the 2007 reference scenario to allow the EU to reach the 55% reduction in greenhouse gas emissions by 2030 in a cost-efficient way (see table below). As regards final energy consumption, this corresponds to an additional decrease of 30 up to 50 Mtoe (EU27), depending on the scenario.

EU27 2030	**BSL**	**MIX-50**	**REG**	**MIX**	**MIX nonCO_2 variant**	**CPRICE**	**ALLBNK**
GHG reduction (incl. LULUCF and intra EU aviation and maritime) vs 1990	-46.9%	-51.0%	-55.0%	-55.0%	-55.1%	-55.0%	-57.9%
RES share	32.0%	35.1%	38.7%	38.4%	37.5%	37.9%	40.4%
PEC energy savings	-34.2%	-36.8%	-40.1%	-39.7%	-39.3%	-39.2%	-40.6%
FEC energy savings	-32.4%	-34.4%	-36.6%	-35.9%	-35.9%	-35.5%	-36.7%

1.2. Baseline for the EU energy efficiency target (Article 4 EED recast)

As indicated above, the EED proposal and other 'Fit for 55' package proposals used as a starting point the impact assessment for the CTP. In addition, the EU Reference Scenario 2020 (REF2020), derived from the CTP BSL scenario, was the common starting point for energy system modelling in the specific impact assessments for all the initiatives of the 'Fit for 55' package.

[2] The CTP analysed a multitude of policy options that are explained in pages 19-42 of the CTP IA. These options were coherently combined and translated into policy scenarios so that a quantitative assessment could be performed. The main policy scenarios include: **BSL** (achieving the existing 2030 GHG, RES and EE EU targets), **REG** (a regulatory-based measures scenario that achieves around 55% GHG reductions), **CPRICE** (a carbon-pricing based scenario that achieves around 55% GHG reductions), **MIX** (a combined approach of REG and CPRICE, which achieves around 55% GHG reductions, both expanding carbon pricing and moderately increasing the ambition of policies), **MIX-50** (an increased ambition scenario achieving at least 50% GHG reductions, similar to MIX in that it combines both expanding carbon pricing and increasing the ambition of energy and transport policies), **MIX-nonCO2** (a variant of MIX which looks at a stronger contribution of non-CO2 emissions to the GHG reduction objective) and **ALLBNK** (the most ambitious scenario in GHG emissions reduction, based on MIX and further intensifying fuel mandates for aviation and maritime sectors). A detailed presentation of the policy scenarios can be found in pages 43-47 of the CTP IA.

Compared to previous reference scenarios, REF2020 includes a full update of the statistical basis and model updates, and new techno-economic assumptions, following large-scale stakeholder consultation. REF2020 builds on the information contained in the NECPs. It incorporates all the policies and measures included in the national plans, including the Long-Term Renovation Strategies under the Energy Performance of Buildings Directive. This scenario assumes the achievement of the national energy targets for energy efficiency and renewable energy by 2030.

All the assumptions used in the REF2020 and the MIX scenarios can be found in the REF2020 scenario[3] published on Europa website.

- It should be noted that: The use of the projections as the baseline continues since the adoption of the EED in 2012, and its targeted revision in 2018.
- REF2020 is based on the PRIMES model, which incorporates projections of the economic growth in Member States, thus ensuring that Member States with less mature and less decoupled (energy consumption in relation to economic growth) economies will not be required to achieve a disproportionally higher contribution due to their economic growth.
- Historical values, e.g. 2005, in fact, do not reflect in the same way the situation of national economies, in particular considering that such a year would reflect a reality before the financial crisis. The recitals of the EED proposal translate the level of ambition using the 2005 baseline.
- The EU climate targets, based on the REF2020 results, take into account the projections for the economic growth of Member States. If the historical values had been used as the baseline, this would not have been the case.
- Using REF2020 allows having 9% as a single level of ambition for PEC and FEC (which corresponds to a reduction of 36% for FEC and 38.5% for PEC compared to the 2007 Reference Scenario in line with the ambition assessed in the Climate Target Plan).
- The methodology for the calculation of FEC and PEC is aligned with the new Eurostat methodology for calculation[4], but the scope of the two indicators corresponds to the previous approach, i.e. ambient heat is excluded and energy consumption in international aviation is included in the final energy consumption.
- The EU target continues being expressed in both FEC and PEC, as this is needed to assess all sectors contributing to the achievement of the EU target.

1.3. The EU energy efficiency target

As indicated above, the EED recast proposal sets the reduction in the energy consumption of at least 9% in 2030 compared to the projections of REF2020 so that EU's final energy consumption (FEC) amounts to no more than **787 Mtoe** and its primary energy production (PEC) to no more than **1023 Mtoe**.

[3] https://ec.europa.eu/energy/data-analysis/energy-modelling/eu-reference-scenario-2020_en
[4] https://ec.europa.eu/eurostat/documents/38154/4956218/ENERGY-BALANCE-GUIDE-DRAFT-31JANUARY2019.pdf/cf121393-919f-4b84-9059-cdf0f69ec045

The EU energy efficiency target for 2030 becomes binding to reflect the importance of energy efficiency efforts and the fact that the reduction of energy consumption is indispensable for the achievement of the climate objectives. It also puts the energy efficiency target on an equal footing with the other EU targets – for RES and GHG emissions reduction, which are also binding at EU level.

The binding nature of the EU target does not change the current approach, as there are already existing mechanisms in the Governance Regulation requiring that the Commission takes action in case of insufficient progress. With the EED proposal, these mechanisms are strengthened with enhanced gap filling elements that aim to ensure that national contributions collectively achieve the overall EU energy efficiency target.

1.4. National contributions to the EU energy efficiency target of 9%

The national contributions remain indicative and, to be able to monitor all sectors and measures supporting their achievement, need to be expressed in PEC and FEC.

To reach the 2030 EU energy efficiency target of 9%, and to remedy to the insufficient contributions in the NECPs a top-down approach is proposed. A formula was developed to calculate the reduction target for each Member State. In this way, the targets for the different Member States represent more clearly a common effort, and are expected to lead to the collective achievement of the 9% energy efficiency targets for 2030. Any lower contributions or underperformance would need to be compensated either by other Member States or by increases in existing measures or by the establishment of new measures.

Calculating national contributions using a different starting point than the formula, for example only the NECPs, would not reflect the same situation or level of ambition for all Member States. Such a method would lead to very divergent contributions considering that some Member States were not even assuming a reduction of energy consumption up to 2030 in the NECPs. In addition, the formula offers a method to calculate in a similar manner the national contributions for all Member States and the co-legislators can adjust its factors and weights during the negotiations to accommodate different common perspectives and considerations that Member States consider important.

1.5. The formula

The formula that Member States shall use is set out in Annex I of the EED Recast and includes criteria (wealth, energy intensity, energy efficiency potential) that take into account national specificities.

Member States may add to the formula taking into account other national circumstances such as, for example, GDP evolution and forecast; changes of energy imports and exports; development of all sources of renewable energies, nuclear energy, carbon capture and storage; and decarbonisation of energy intensive industries. Should a Member State decide to take into account other factors, the data used and factors affecting the final level of the contributions need to be explained. In fact, lowering the national contribution below the result of the formula may result into the national contribution not delivering on the EU target.

The multi-factor formula is as follows:

- $FEC_{C_{2030}} = C_{EU}(1 - Target)\, FEC_{B_{2030}}$
- $PEC_{C_{2030}} = C_{EU}(1 - Target)\, PEC_{B_{2030}}$

Where:

$$C_{EU} = \frac{(1 - 9\%) \times FEC_{B_{2030}(EU)}}{\sum_1^{27}(1 - Target)\, FEC_{B_{2030}}}$$

$$Target = f_{multi} \times 9\%$$

$$f_{multi} = w_1 \times f_{flat} + w_2 \times f_{wealth} + w_3 \times f_{intensity} + w_4 \times f_{potential}$$

w_1, w_2, w_3 and $w_4 = 0.25$

The four factors have the same weights and are used in the formula to represent the objective criteria and factors contained in Article 4(2):

1) f_{flat}: emphasises that the same additional level of efforts is requested from all Member States;
2) f_{wealth}: reflects GDP per capita, and this factor is also used in both the RES and ESR formulas. More affluent countries can afford more efforts;
3) $f_{intensity}$: reflects the efficiency performance of the economy. It is not only industry, where weight of difference sectors makes a difference, but also the performance of buildings stock and transport. This factor to some extent reflects the possibility to make additional efforts in energy efficiency to improve the energy intensity in each Member State;
4) $f_{potential}$: represents the cost-optimal savings potential, as this is obtained from the results of the PRIMES modelling for the MIX scenario. Again, this is a factor that is also used in the RES formula.

f_{wealth}, $f_{intensity}$ and $f_{intensity}$ can only take values in the [50%, 150%] interval in order to exclude outlying positive or negative values.

- $f_{flat} = 100\%$
- $f_{wealth} = \frac{(GDP/P)_{2017-2019}}{(GDP/P)_{EU2017-2019}}$ $\qquad 50\% < f_{wealth} < 150\%$
- $f_{intensity} = \frac{(FEC/GDP)_{2017-2019}}{(FEC/GDP)_{EU2017-2019}}$ $\qquad 50\% < f_{intensity} < 150\%$
- $f_{potential} = \left(1 - \frac{FEC_{MIX2030}}{FEC_{B2030}}\right)/9\%$ $\qquad 50\% < f_{potential} < 150\%$

Source: Energy Efficiency Directive proposal, Annex I

The calculated values for the four factors for each Member State and information about the data used can be found in the first Annex of this paper.

2. Energy saving obligations - Main changes in relation to the energy savings obligation under Article 8

2.1. The increase of the rate of new annual energy savings to 1.5% in Article 8

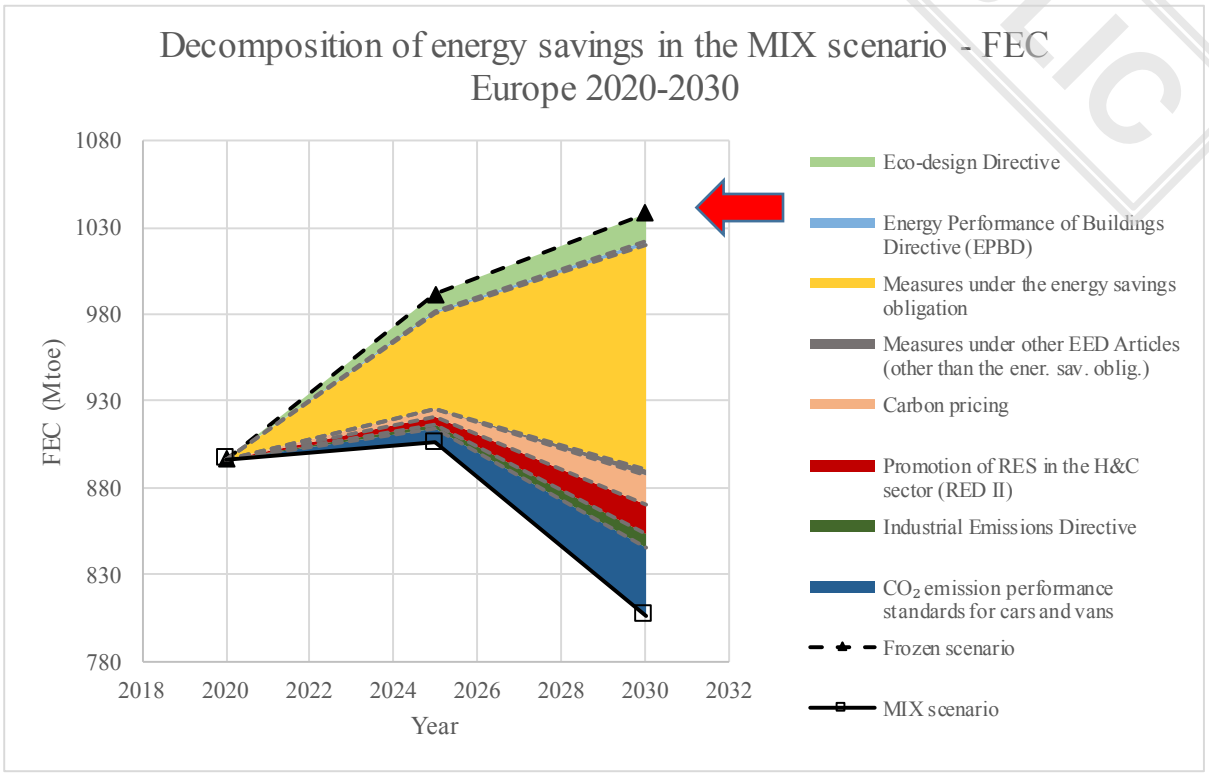
As identified in the Impact Assessment accompanying the proposal for an EED recast, current policies and measures are not sufficient to meet a higher energy efficiency target, in view of the higher 55% GHG emission reduction ambition. The energy savings obligation is one of the key instruments in the EED to deliver the energy efficiency targets.

The Commission prepared different scenarios to support the analysis in the impact assessment of the EED proposal and, based on the best equilibrium between regulatory and pricing measures, decided to base all proposals of the Fit for 55 package on the results of the MIX scenario, cf. explanations under point 1. The MIX scenario is one of the EU core policy scenarios to deliver the European Green Deal[5]. Consequently, also the assessment of the savings rate in the proposal for an EED recast was based on this scenario.

As a first step, the Commission assessed the projections of the final energy consumption[6] per sector (i.e. buildings, industry and transport) in five-years steps for the period 2021 to 2050 based on a bottom-up engineering approach, cf. graphs per sector below[7].

[5] https://ec.europa.eu/energy/data-analysis/energy-modelling/policy-scenarios-delivering-european-green-deal_en.
[6] Final energy consumption is based on the FEC 2020 2030 EUROSTAT calculation as defined in Article 2 of the Directive 2012/27/EU.
[7] To improve readability, the graphs show the developments up to 2030 only.

For each sector, the Commission analysed the development of the final energy consumption based on different scenarios, *inter alia* on the MIX scenario. The resulting final energy consumption from the MIX policy scenario is compared to a "frozen policy" scenario, which assumes that policies and measures provided in the relevant EU legislative framework do not show effects and technical specifications of equipment, building stock, etc. remain unchanged. While the projected final energy consumption decreases over time in the MIX scenario, it increases in the "frozen" scenario. The following graph shows the decomposition of energy savings in the MIX scenario based on the Eurostat indicator FEC 2020-2030.[8]

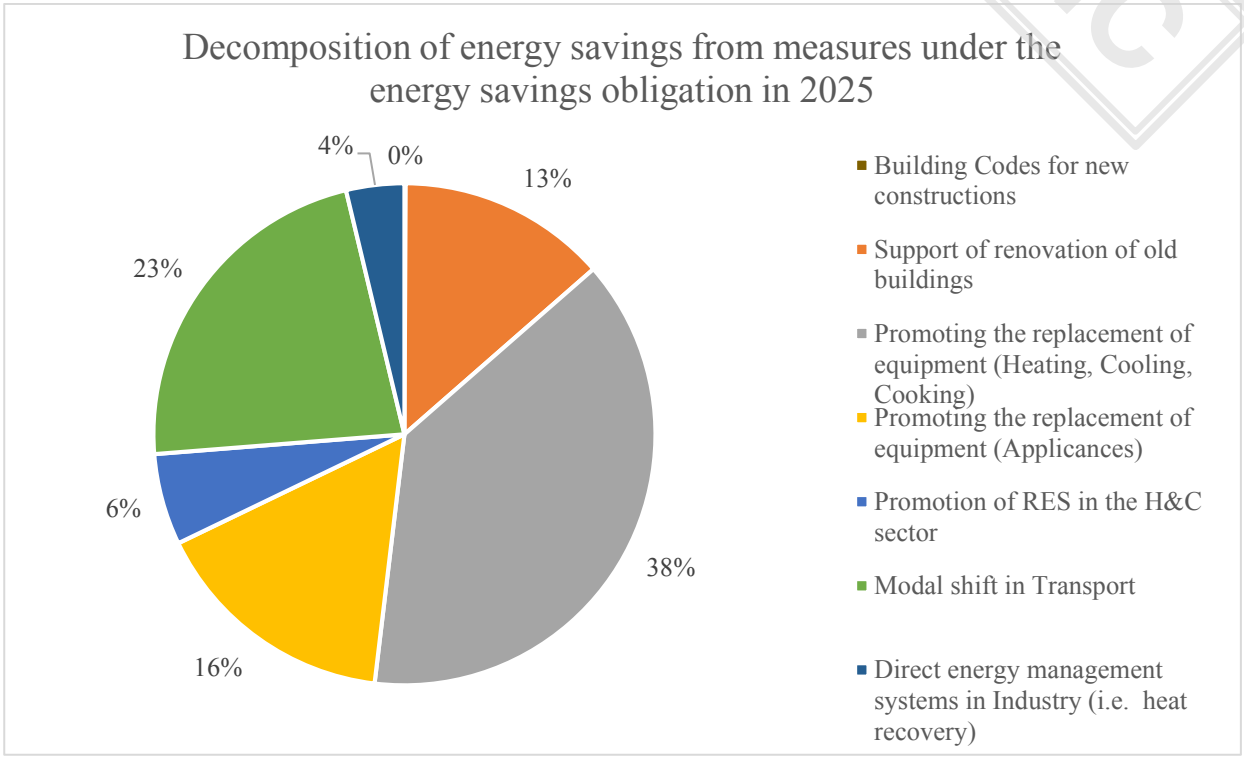


Source: Based on results from Commission assessment, IA EED.

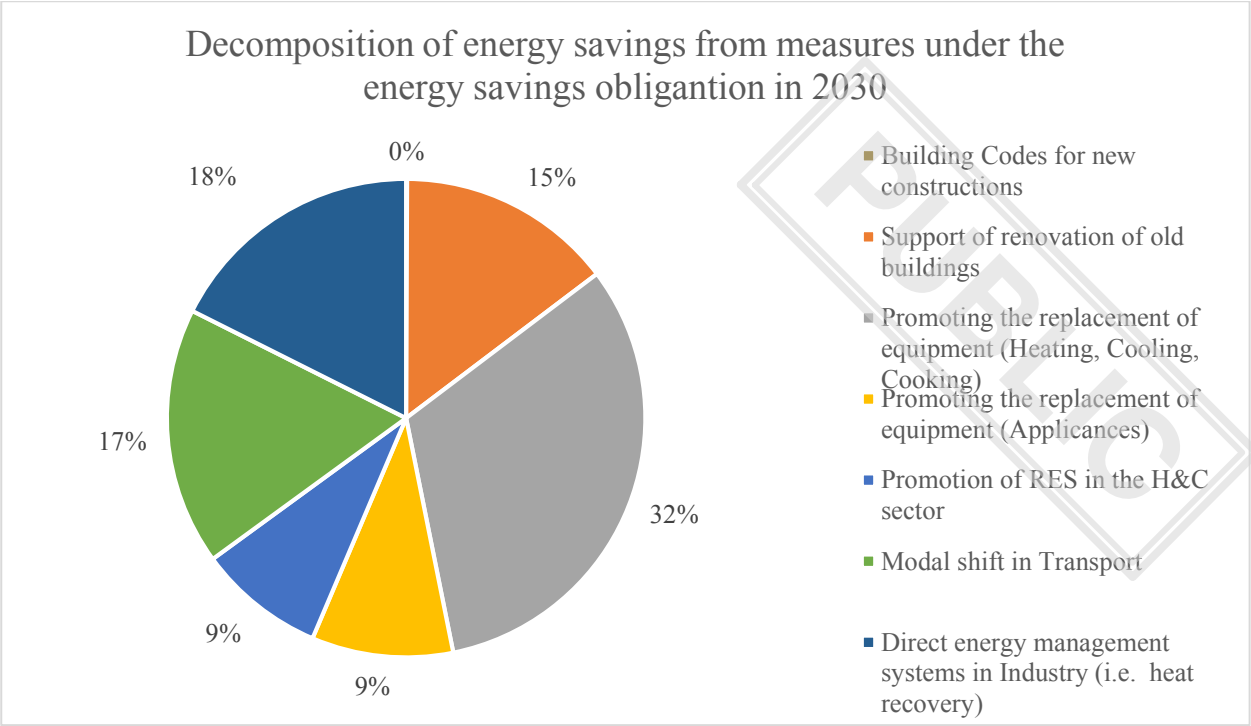
This exercise detected a gap of 229[9] Mtoe of final energy consumption (FEC 2020 2030) in 2030 and a gap of 102[10] Mtoe in 2025.

[8] Decompositions of energy savings in the MIX scenario in the residential, transport, industrial and tertiary sector are provided in the Annex B (see 3.2).
[9] This is the 2029-2030 annual energy savings value at the end of the obligation period. It corresponds to a cumulative amount of 1146 Mtoe for 2022-2030.
[10] In the same logic, this is the 2025 annual energy savings value. In accordance, it corresponds to a cumulative amount of 254.7 Mtoe for the 2022-2025 period.

As a second step, the Commission assessed the possible policies and measures[11] responsible for closing the gap between the "frozen" scenario and the MIX scenario. For this purpose, the Commission assessed the effects of relevant EU legislations, e.g. changes in the final energy consumption resulting from the penetration of more efficient building stock or of higher efficient electric equipment driven partly by the Eco-design Directive. In the industry sector, increased equipment efficiency and energy savings relative to the frozen scenario case were calculated, for example, by isolating the effect of the ETS in the applicable sectors. The Commission attributed different weights for each relevant EU legislation per demand sector (i.e. buildings, industry and transport). The Commission assessed the effects of actions resulting from relevant EU legislation on the energy savings obligation, cf. graphs below.



[11] Including EU directives, regulations and policy measures.



This exercise resulted in 131 Mtoe of new annual savings needed[12], corresponding to a cumulative amount of 657 Mtoeto be covered by the energy savings obligation between 2022 and 2030 period.

To assess the effort needed under the energy savings obligation in the five-year periods, the above energy savings were then distributed over the period from 2022 to 2025 and 2026 to 2030 annually. This means that the five-year effort (i.e. the five-year period new energy savings) is spread out in the annual values (i.e. new annual energy savings). Since experience from the implementation of the energy savings obligation in the past indicates that some policy measures, especially long-term policy measures, do not show immediate effects in the years when they are implemented, the Commission phased the efforts needed. To do so, the cumulative energy savings were then calculated by year This exercise resulted in assumptions for new energy savings needed in each year amounting to 14.6 Mtoe.

[12] This is the 2029-2030 annual energy savings obligation value, meaning at the end of the energy savings obligation period. These correspond to a cumulative amount of 657 Mtoe for 2022-2030 period under Art 8.

Table 1 Required new annual energy savings in Mtoe

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
New annual energy savings required in Mtoe			14.6								
				14.6							
					14.6						
						14.6					
							14.6				
								14.6			
									14.6		
										14.6	
											14.6

Table 2 Required cumulative energy savings over the period 2022-2030, Mtoe

Year	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
New annual energy savings	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6
		14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6
			14.6	14.6	14.6	14.6	14.6	14.6	14.6
				14.6	14.6	14.6	14.6	14.6	14.6
					14.6	14.6	14.6	14.6	14.6
						14.6	14.6	14.6	14.6
							14.6	14.6	14.6
								14.6	14.6
									14.6
Total annual energy savings	14.6	29.2	43.8	58.4	73.0	87.6	102.2	116.8	**131.4**
Cumulative energy savings for 2022-2030									**657.2**

Following the approach of the current energy savings obligation, the new annual energy savings were then converted into a share of energy savings (in %) relative to the baseline, which was calculated as the average final energy consumption between 2016 and 2018 (Eurostat Energy Balances, indicator FEC 2020-2030). The baseline averaged over the three years amounts to 986 Mtoe.

Table 3 Energy savings obligation ambition relative to the baseline

Article 8 ambition - % relative to the baseline	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Savings rateunder Article 8			1.48 %	1.48 %	1.48 %	1.48 %	1.48%	1.48%	1.48%	1.48%	1.48%

Therefore, the energy savings obligation under Article 8 for the obligation period 2021 to 2030 can be visualised as follows:

2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
									1,5
								1,5	1,5
							1,5	1,5	1,5
						1,5	1,5	1,5	1,5
					1,5	1,5	1,5	1,5	1,5
				1,5	1,5	1,5	1,5	1,5	1,5
			1,5	1,5	1,5	1,5	1,5	1,5	1,5
		0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8
	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8
0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8

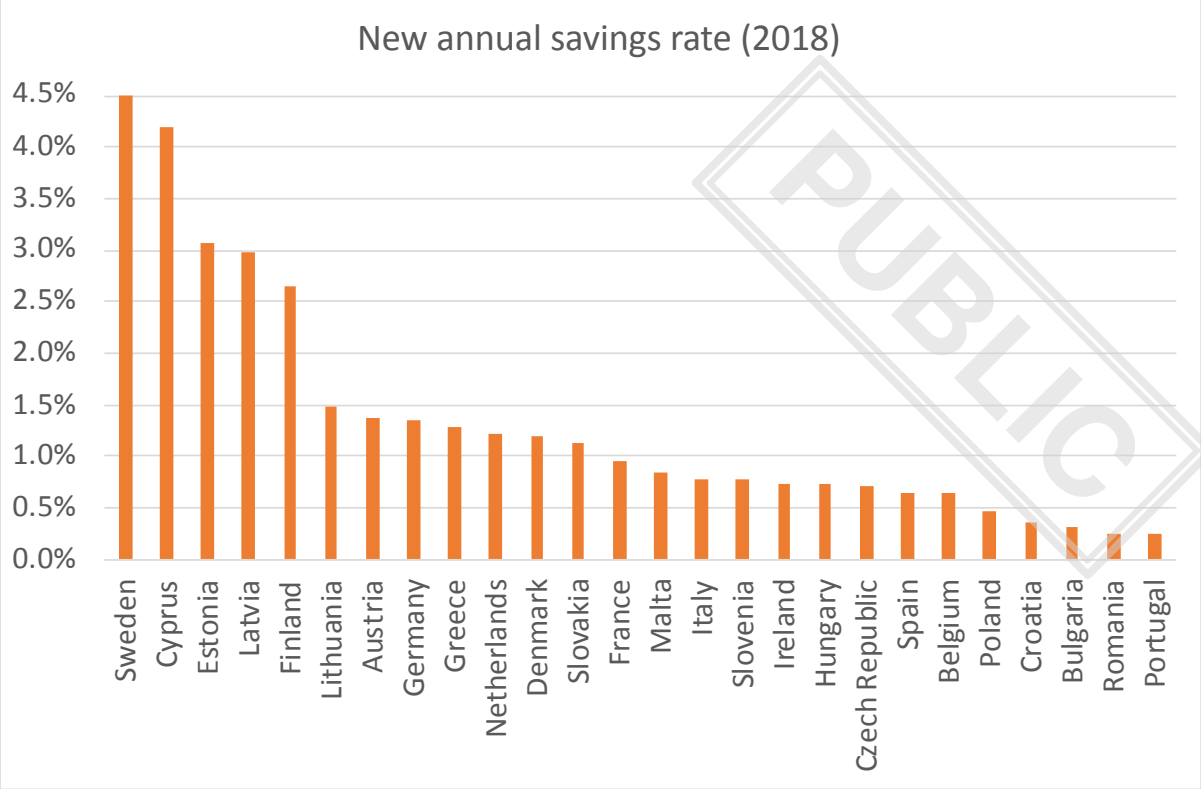
2.2. Energy savings potentials across Member States

The 2030 Climate Target Plan, the Impact Assessment accompanying the proposal for revising the EED and the explanations of the decomposition of the new energy savings rate (cf. 2.1) show that there is still a significant energy savings potential to realise in various sectors.

The latest Commission's Energy Efficiency Progress Report[13] published in October 2020, shows that the energy savings obligation delivers the energy savings. In fact, in 2018, some Member States were already achieving new annual savings at an annual rate well above the 1.5% level required as of 2024. Seven Member States were delivering between 1.0 and 1.5% of annual energy savings. Nine Member States were delivering between 0.5 and 1.0% of annual energy savings. Only five Member States achieved less than 0.5%.

With regard to the National Energy and Climate Plans (NECP), the chart below shows the ratio of new annual savings in 2018 and the baseline consumption (average of 2016-2018) reported by each Member State.[14]

[13] COM(2020) 326 final, https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2020:0326:FIN:EN:PDF.
[14] Luxembourg has not provided yet a baseline energy consumption figure and is therefore not listed.



The actual impact of the new savings rate for each Member States will also depend on how many energy savings will be achieved between 2021-2023. It is likely that Member States that have already their major policies in place in 2021 will achieve more than 0.8% per year of new annual energy savings in years 2021-2023, especially if they boost their existing measures with some budget from the Recovery Plans. These Member States would need fewer efforts to achieve the cumulative savings needed for 2024-2030. Member States, which started delayed with the implementation of policy measures might need to be more ambitious. Therefore, Member States can influence the level of efforts needed already today.

In addition, studies[15] show the energy savings potentials for all Member States in various sectors. Table below shows the economic and technical savings potential in 2030. While the technical potential means that the savings can be unlocked without further interventions by simply making best use of e.g. existing technologies, the economic potential requires unlocking the potential in a cost-effective way. The results of the studies show that all Member States could achieve the required cumulative amount based on the new, increased energy savings rate (see Article 7 Rev2´ in the table in Annex C, 3.3) by unlocking the technical potential. In addition, the increase of energy prices allows technical potential and also the economic potential to be reaped in all Member States. In this context, policy measures will remain cost-effective even with a higher savings rate.

[15] Cf. ICF, CE Delft and eclareon (2021): Technical assistance services to assess the energy savings potentials at national and European level; Stefan Scheuer Consulting, Fraunhofer ISI (2021): Will the Fit for 55 package step up energy savings policies? A high-level assessment. https://www.isi.fraunhofer.de/content/dam/isi/dokumente/ccx/2021/EED%20Target%20Governance%20-%20an%20assessment%20of%20the%2055%20package%20by%20Stefan%20Scheuer%20and%20Fraunhofer%20ISI.pdf. https://op.europa.eu/de/publication-detail/-/publication/511bb328-f8b9-11eb-b520-01aa75ed71a1/language-en

Whereas the energy savings obligation has always been an important measure, encouraging Member States to carry our actions targeting the building sector, Member States will also benefit from the Renovation Wave, which aims at doubling the weighted energy renovation rate from 1% to 2% during the 2020s.16 In addition, the shift from fossil fuels to renewable heating, which is needed to meet the decarbonisation target in 2030, is expected to drive a heating system replacement rate of 4% per year during the second half of the 2020s in both, the residential and service sectors[17].

The ODYSSEE-MURE project[18] provides an overview on effective policies and measures, which could serve as good practices and could support Member States in implementing effective policy measures to achieve energy savings in the building sector.

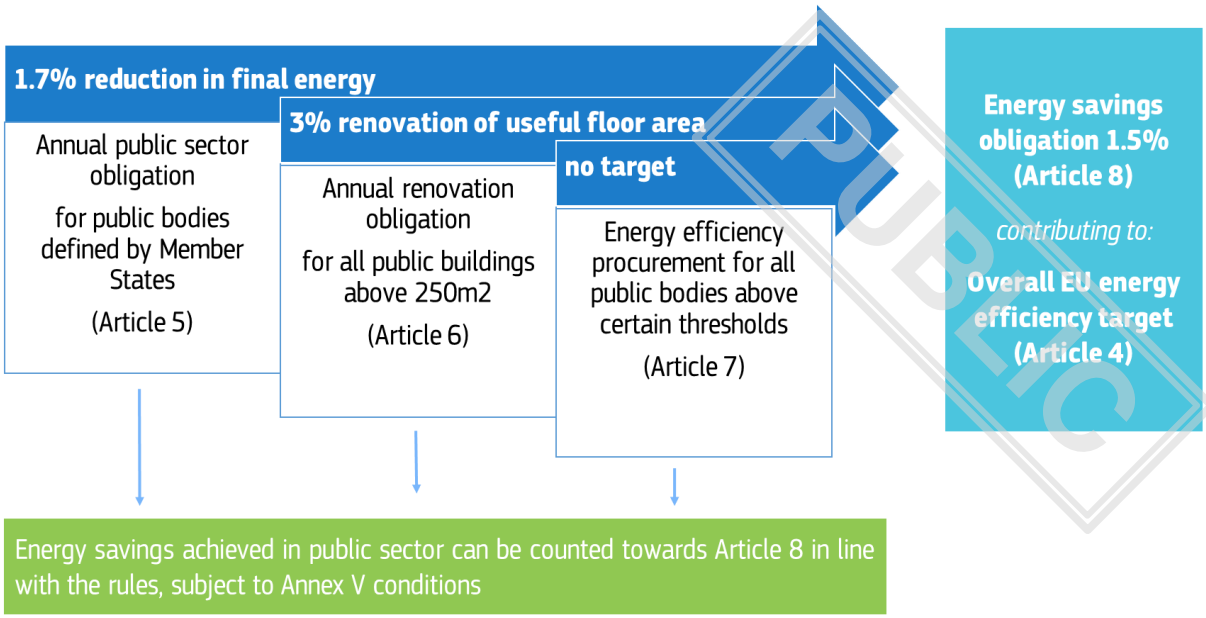
Furthermore, Member States might take advantage of combined effect of building fabric and heating system replacement actions reducing energy demand in residential buildings. Finally, the buildings sector constitutes around 1/3 of final energy consumption. A 3% per year reduction in buildings sector energy consumption from policy measures would thus deliver 1 percentage point of the energy savings obligation.

2.3. Other measures under the EED contributing to Article 8 and to the overall energy efficiency target

The EED proposal contains a number of binding measures that contribute to the overall energy efficiency target of Article 4 and the energy savings obligation (Article 8). A set of measures relates to the obligations on the exemplary role of the public sector (Articles 5-7). The energy savings achieved under Articles 5 to 7 can be counted towards the increased energy savings obligation under Article 8, if they are calculated in line with the specific rules of Annex V. Article 8 contains a specific derogation from the additionality requirement in this regard to promote renovations in line with the Renovation Wave. Annex V(2)(c) retains the approach allowing Member States to count all energy savings from building renovation fully, regardless of the minimum standards provided in the Energy Performance of Buildings Directive (EPBD).

All energy efficiency measures, including measures based on other legislation such as the EPBD or CO_2 standards of vehicles contribute to the achievement of the overall energy efficiency target as this is described in EED proposal Article 4.
The interlinks between the obligations for the public sector and Article 8 are depicted below.

[16] This is reflected in the 2030 Climate Target Plan Impact Assessment, which shows a doubling of the fabric renovation rate to 2% in the residential sector and 1.1% in the services sector.
[17] Most likely through the uptake of electrically-drive heat pumps that transfer ambient heat to buildings.
[18] ODYSSEE-MURE, EU Energy Efficiency Scoreboard, https://www.odyssee-mure.eu/data-tools/scoring-efficiency-countries.html.



Article 6 on renovation of public buildings requires renovating 3% of public buildings every year. This will contribute by about half of the public savings required under Article 5. It can also be counted within the 1.5% of savings obligation under Article 8. The baseline of the articles was increased. The 3% shall be calculated now from the floor area of buildings above 250 m2 in all public bodies (contracting authorities subject to EU public procurement rules). Historical religious and military buildings are not excluded from the base line.

Article 5 on energy savings in public sector requires the public sector to consume 1.7% less final energy each year. This is less than the average final energy consumption reduction in the overall EU economy. The public sector was lagging behind in terms of measures and energy management. This article will oblige the public sector to make efforts comparable to the rest of the economy.

The energy savings from the public buildings renovations are expected to contribute to this reduction by about a half. Further contributions can be expected from the enhanced energy efficient procurements (new Article 7), from what was so far done under the alternative measures in public buildings and other public sector activities, such as public transport, social housing, street lighting, water management, etc.

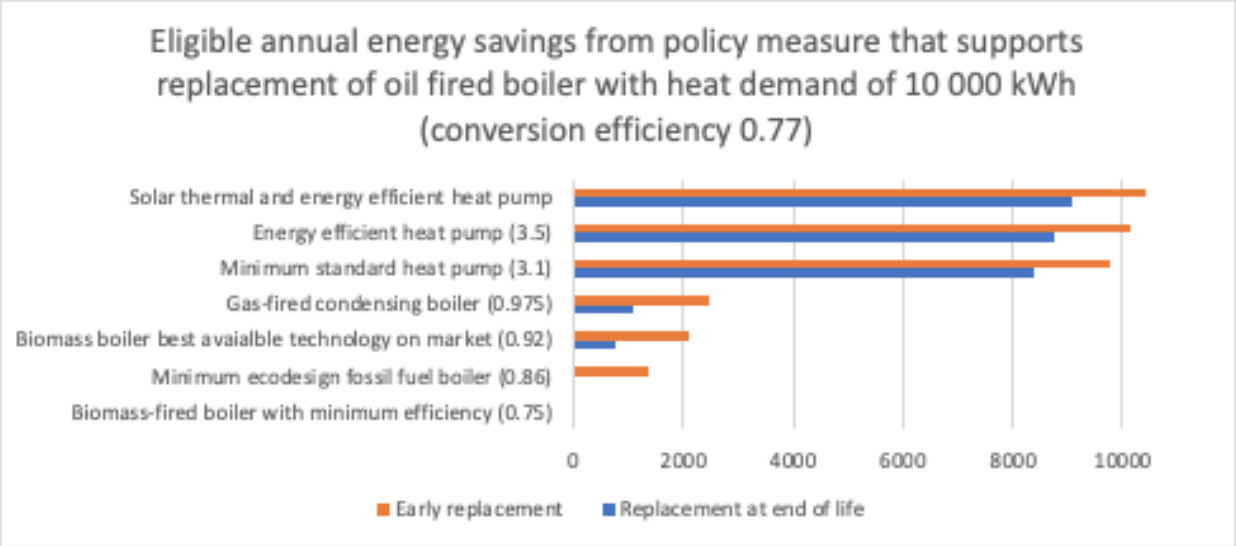
Energy savings achieved from national carbon taxes or carbon pricing can be counted towards the energy savings calculation. In determining the energy savings that can be claimed as additional, Annex V(2)(b) provides that 'Member States shall have regard to how energy use and demand would evolve in the absence of the policy measure in question by taking into account at least the following factors: energy consumption trends, changes in consumer behaviour, technological progress and changes caused by other measures implemented at Union and national level'. In addition, Member States should take into account the requirements of Annex V(4) when calculating the effect of carbon measures.

With regard to the Commission´s proposal for a revised EU ETS Directive, Member States would need to reassess their national carbon taxes or national carbon pricing measures as soon as the new EU ETS applies, in particular with regard to, but not limited to the additionality requirement. After the transposition deadline of the revised EU ETS Directive, Member States could count only the delta of energy savings resulting from national carbon taxes or carbon pricing measures exceeding the minimum levels provided in the relevant EU law.

2.4. Impact of the restriction of energy savings from direct fossil fuel combustion technologies (Annex V, points 2 (g), (h) and (k))

The impact of the provisions restricting energy savings from direct fossil fuel combustion technologies are not expected to be significant and might be outweighed by renewable heat opportunities. Whereas the restriction might affect a limited number of Member States, the assessment of existing policy measures show that the overall amount of energy savings achieved from direct fossil fuel combustion technologies is not significant and does not represent a large share of energy savings under the energy savings obligation. For example, in France, only 6% of White Certificates in the period 2018-2021 were from the installation of direct fossil fuel combustion technologies. In Czechia, only 3% of the energy savings reported resulted from the boiler replacement programme.

Switching support schemes from fossil fuel boilers to heat pumps should far outweigh any negative impacts on the eligible energy savings. As can be seen from the chart below, the annual energy savings from the replacement of fossil fuel fired boiler with a heat pump are between four and eight times higher than for other options. Combining a heat pump and a solar thermal water heater would yield the most eligible savings.



Source: Commission Recommendation on transposing the energy savings obligations under the Energy Efficiency Directive, C(2019) 6621 final[19]

[19] https://ec.europa.eu/energy/sites/ener/files/documents/c_2019_6621_-_annex_com_recom_energy_savings.pdf

2.5. Benefitting from policy measures promoting solar thermal technologies

Annex V(2), point (j) draft EED provides that: *`measures promoting the installation of solar thermal technologies may be eligible to be taken into account for the fulfilment of energy savings required under Article 8(1) provided that they result in verifiable, and measurable or estimable, end-use energy savings. The ambient heat captured by solar thermal technologies can be excluded from their end-use energy consumption.´*

Solar thermal installations effectively reduce the final energy demand of a building. Other than for PV installations, where the produced electricity could be fed into the grid and easily used by other market actors, the low temperature heat of a solar thermal installation can only be used on-site or nearly on-site. Therefore, the proposal for an EED recast allows the exclusion of the ambient heat captured by solar thermal technologies from the end-use energy consumption of a building or an installation.

Within the energy balances of Eurostat, ambient energy (solar radiation) is considered final energy. Without the provisions set in the proposed EED recast, solar thermal installations would lead to no final energy savings. The solar energy which is used for the hot water preparation would be lost if not used. The hot water generated by the installation cannot contribute to the energy supply of the overarching energy system (other than solar-PV, which can be fed into the grid). The energy demand on the energy system level is reduced by the solar thermal installation.

2.6. Determining the share of the required amount of cumulative end-use energy savings among energy-poor under Article 8(3)

With the proposal provided in Article 8(3) EED recast, the Commission aims at ensuring that Member States take advantage of one of the existing key measures to alleviate energy poverty. A number of stakeholders identified the energy savings obligation as the most effective solution to alleviate energy poverty, and to mitigate social impacts from pricing measures, e.g. from carbon pricing. Stakeholders called upon the Commission to ensure that policy measures alleviating energy poverty are planned and implemented throughout the EU by all Member States. 61% of respondents voiced some to a high degree of importance to requiring a specific share of measures to address energy poverty. Policy measures that could serve as good practices are provided, for example, in the MURE database on energy efficiency measures[20] and the Energy Poverty Advisory Hub Atlas [21]. To determine the minimum share of energy savings to be achieved among vulnerable customers, people affected by energy poverty and, where applicable people living in social housing, Member States shall use the figure providing the proportion of households in energy poverty in its NECPs. The share shall at least equal that indicated proportion. If a Member State has not notified this proportion, the minimum share of energy savings to be achieved according to Article 8(3) EED recast shall equal the arithmetic average of the three indicators provided in the EED. This approach works as a fall back option. The figures for the indicators are available at the Eurostat website. The table in Annex D (cf. 3.4) provides a preliminary overview of minimum shares to be achieved by each Member States based on the indicators.

[20] https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/
[21] https://energy-poverty.ec.europa.eu/discover/epah-atlas_en

3. Annexes

3.1. Annex A on the data used in the formula

The data for the calculation of the four factors and the national contributions' formula come from Eurostat and the MIX and REF2020 scenarios.

Data from Eurostat include:

- Purchasing power parities (PPPs), price level indices and real expenditures for ESA 2010 aggregates, Real expenditure per capita (in PPS_EU27_2020)
- Population on 1 January by age and sex
- Current prices, million purchasing power standards (PPS, EU27 from 2020)
- Final consumption - energy use + international aviation - ambient heat (Simplified energy balances)
- Primary energy (Gross inland consumption (Europe 2020-2030) minus FC_NE) - Simplified energy balances

Data from REF2020 include:

- Main results on energy, transport and GHG emissions (https://ec.europa.eu/energy/sites/default/files/ref2020_energy-transport-ghg.xlsx)

To calculate the **wealth** factor, "the average of the 2017-2019 PPS per capita" is used, based on data from Eurostat.

MS	PPS per capita
BE	35.667
BG	15.567
CZ	27.833
DK	39.167
DE	37.067
EE	24.700
IE	57.300
EL	20.167
ES	27.733
FR	31.733
HR	19.333
IT	29.400
CY	27.133
LV	20.700
LT	24.600
LU	79.033
HU	21.533
MT	30.267
NL	39.000
AT	38.433

PL	21.500
PT	23.733
RO	20.033
SI	26.400
SK	21.333
FI	33.667
SE	36.400
EU27_2020	30.267

To calculate the **intensity** factor, "the average of the 2017-2019 ratio of FEC/(PPS*population) against the EU average" is used, based on data from Eurostat. Similarly, for the calculation of the PEC.

MS	Final energy intensity - PPS	Primary energy intensity - PPS
BE	85	119
BG	90	167
CZ	83	136
DK	64	76
DE	69	95
EE	89	169
IE	44	53
EL	75	105
ES	66	95
FR	68	112
HR	87	104
IT	65	83
CY	80	108
LV	102	114
LT	79	91
LU	90	93
HU	86	117
MT	46	58
NL	73	96
AT	79	95
PL	86	122
PT	69	92
RO	60	83
SI	90	122
SK	87	138
FI	135	174
SE	85	126
EU27_2020	72	102

To calculate the **potential** factor, "the ratio (FEC_{MIX55} – $FEC_{REF2020}$)/$FEC_{REF2020}$" is used, based on data from for the REF2020 and the MIX55 scenarios. Similarly, for the calculation of the PEC.

Reference scenario	PRIMES 2020 - PEC	PRIMES 2020 - FEC	PRIMES MIX55 - PEC	PRIMES MIX55 - FEC
AT	28.439	24.561	25.976	22.750
BE	38.342	33.066	36.023	30.493
BG	15.591	9.975	13.961	9.178
CY	2.300	2.041	2.064	1.848
CZ	32.763	22.915	30.136	21.185
DE	221.367	178.731	198.341	162.814
DK	17.225	15.378	16.430	14.722
EE	4.541	2.869	3.962	2.747
EL	18.800	16.235	17.972	14.972
ES	91.504	72.408	86.046	68.569
FI	34.321	24.105	31.955	21.550
FR	179.191	118.063	164.781	105.467
HR	7.625	6.636	6.748	5.745
HU	26.083	18.368	24.648	16.944
IE	12.569	11.119	11.446	10.102
IT	125.424	102.781	110.925	94.487
LT	5.669	4.804	5.314	4.438
LU	3.212	3.134	2.967	2.893
LV	4.171	3.715	3.964	3.568
MT	907	766	865	722
NL	52.303	43.184	49.839	40.920
PL	89.147	66.020	73.772	58.689
PT	16.920	14.845	15.898	13.855
RO	33.225	25.254	29.999	23.019
SE	40.831	29.023	37.227	26.407
SI	6.472	4.795	6.053	4.506
SK	15.373	9.614	14.551	8.812
EU27_2020	1.124.315	864.408	1.021.864	791.404

The correction factor represents the ratio of the EU target against the sum of all national contributions, which we then use to multiply to the each individual national contribution. This way, it can be ensured that the final sum of all national contributions indeed corresponds to the EU target. Its values are close to 1 and do not affect the formula.

	Correction factor
FEC	0.99973
PEC	1.00087

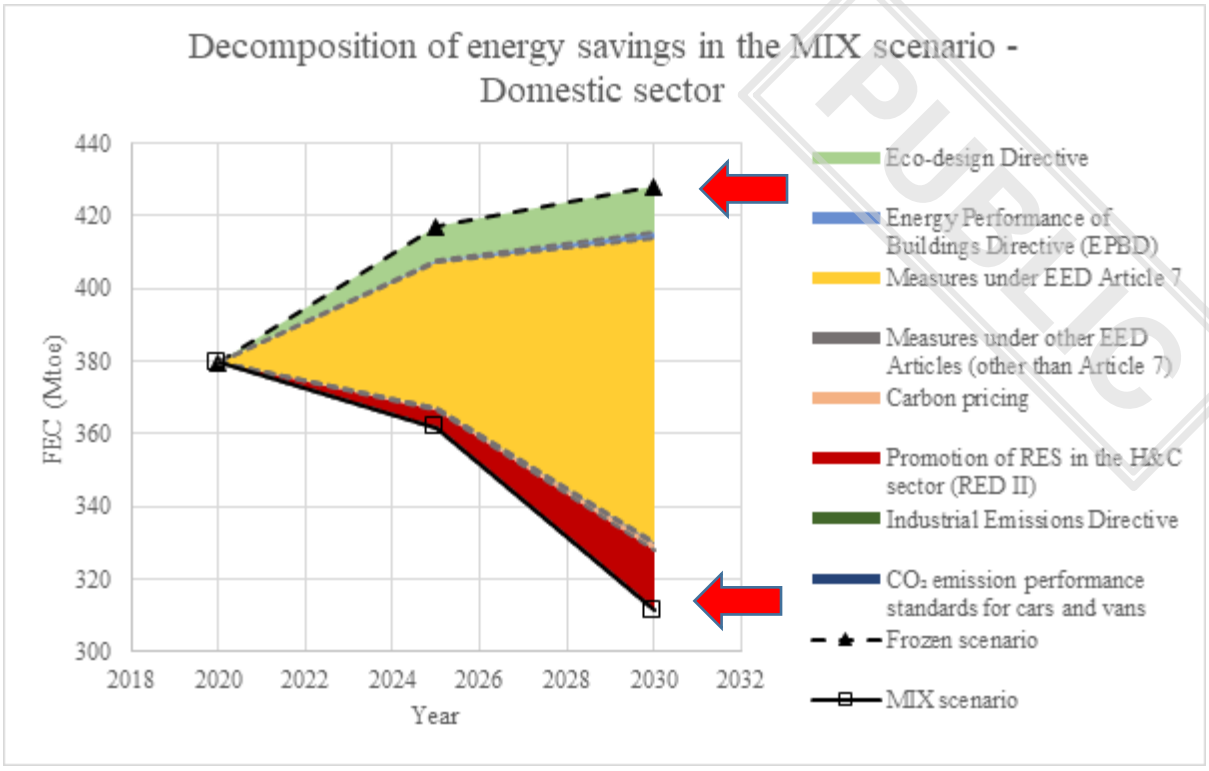
The calculated national contributions are:

	Calibrated FEC	Calibrated PEC	Final energy savings against REF2020	Primary energy savings against REF2020
	[ktoe]	[ktoe]	[%]	[%]
BE	29 915	34 902	-9.5%	-9.0%
BG	9 151	14 139	-8.3%	-9.3%
CZ	20 890	29 728	-8.8%	-9.3%
DK	14 098	15 860	-8.3%	-7.9%
DE	161 915	200 050	-9.4%	-9.6%
EE	2 639	4 061	-8.0%	-10.6%
IE	10 083	11 445	-9.3%	-8.9%
EL	14 926	17 462	-8.1%	-7.1%
ES	66 817	84 333	-7.7%	-7.8%
FR	106 929	163 024	-9.4%	-9.0%
HR	5 986	6 956	-9.8%	-8.8%
IT	94 035	114 024	-8.5%	-9.1%
CY	1 854	2 089	-9.2%	-9.1%
LV	3 412	3 859	-8.1%	-7.5%
LT	4 396	5 240	-8.5%	-7.6%
LU	2 808	2 906	-10.4%	-9.5%
HU	16 803	24 067	-8.5%	-7.7%
MT	709	845	-7.4%	-6.9%
NL	39 398	47 924	-8.8%	-8.4%
AT	22 240	25 793	-9.5%	-9.3%
PL	59 847	80 367	-9.4%	-9.8%
PT	13 676	15 652	-7.9%	-7.5%
RO	23 266	30 592	-7.9%	-7.9%
SI	4 384	5 925	-8.6%	-8.4%
SK	8 781	14 121	-8.7%	-8.1%
FI	21 501	30 967	-10.8%	-9.8%
SE	26 151	36 796	-9.9%	-9.9%
EU27	786 611	1 023 127	-9.0%	-9.0%

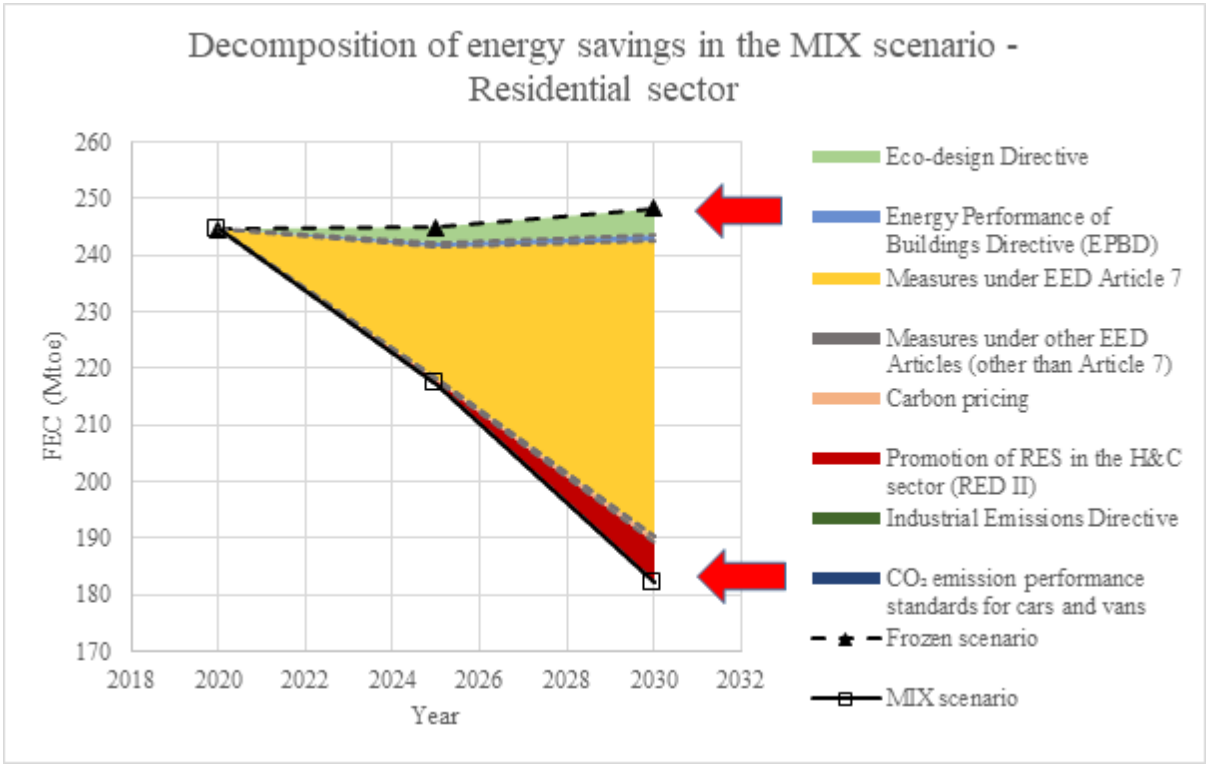
The next table includes the final values for the four factors that are used to calculate the national contributions.

	Fixed rate	Wealth factor	Intensity factor		Savings potential factor		Total factor	
		-	Final energy	Primary energy	Final energy	Primary energy	Final energy	Primary energy
BE	100%	118%	118%	117%	86%	67%	106%	101%
BG	100%	51%	126%	150%	89%	116%	91%	104%
CZ	100%	92%	116%	134%	84%	89%	98%	104%
DK	100%	129%	90%	75%	50%	51%	92%	89%
DE	100%	122%	96%	93%	99%	116%	104%	108%
EE	100%	82%	124%	150%	50%	142%	89%	118%
IE	100%	150%	61%	52%	102%	99%	103%	100%
EL	100%	67%	104%	103%	86%	50%	89%	80%
ES	100%	92%	92%	94%	59%	66%	86%	88%
FR	100%	105%	95%	110%	119%	89%	105%	101%
HR	100%	64%	121%	102%	149%	128%	109%	98%
IT	100%	97%	90%	82%	90%	128%	94%	102%
CY	100%	90%	111%	107%	105%	114%	101%	103%
LV	100%	68%	142%	112%	50%	55%	90%	84%
LT	100%	81%	111%	89%	85%	69%	94%	85%
LU	100%	150%	126%	91%	86%	85%	115%	107%
HU	100%	71%	120%	115%	86%	61%	94%	87%
MT	100%	100%	64%	57%	64%	52%	82%	77%
NL	100%	129%	101%	94%	58%	52%	97%	94%
AT	100%	127%	110%	94%	82%	96%	105%	104%
PL	100%	71%	120%	120%	123%	150%	104%	110%
PT	100%	78%	96%	91%	74%	67%	87%	84%
RO	100%	66%	84%	82%	98%	108%	87%	89%
SI	100%	87%	126%	120%	67%	72%	95%	95%
SK	100%	70%	121%	136%	93%	59%	96%	91%
FI	100%	111%	150%	150%	118%	77%	120%	109%
SE	100%	120%	118%	124%	100%	98%	110%	111%

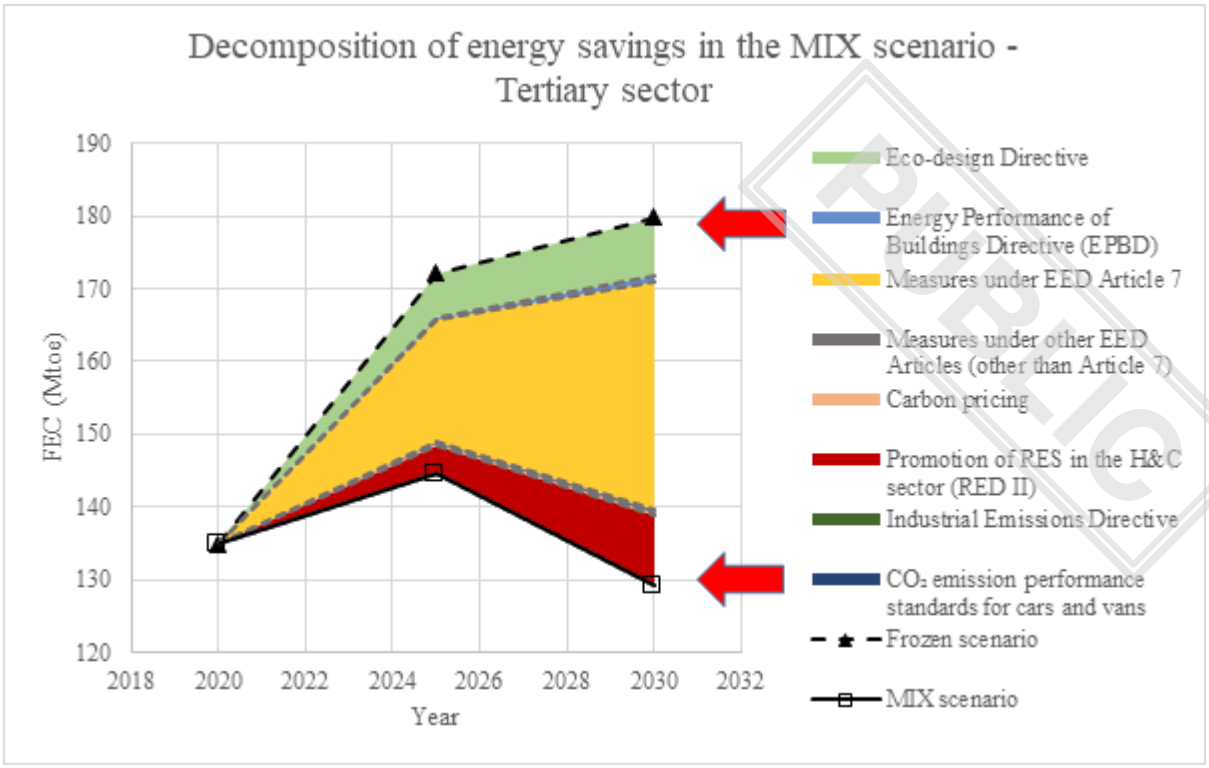
3.2. Annex B: Decompositions of energy savings in different sectors



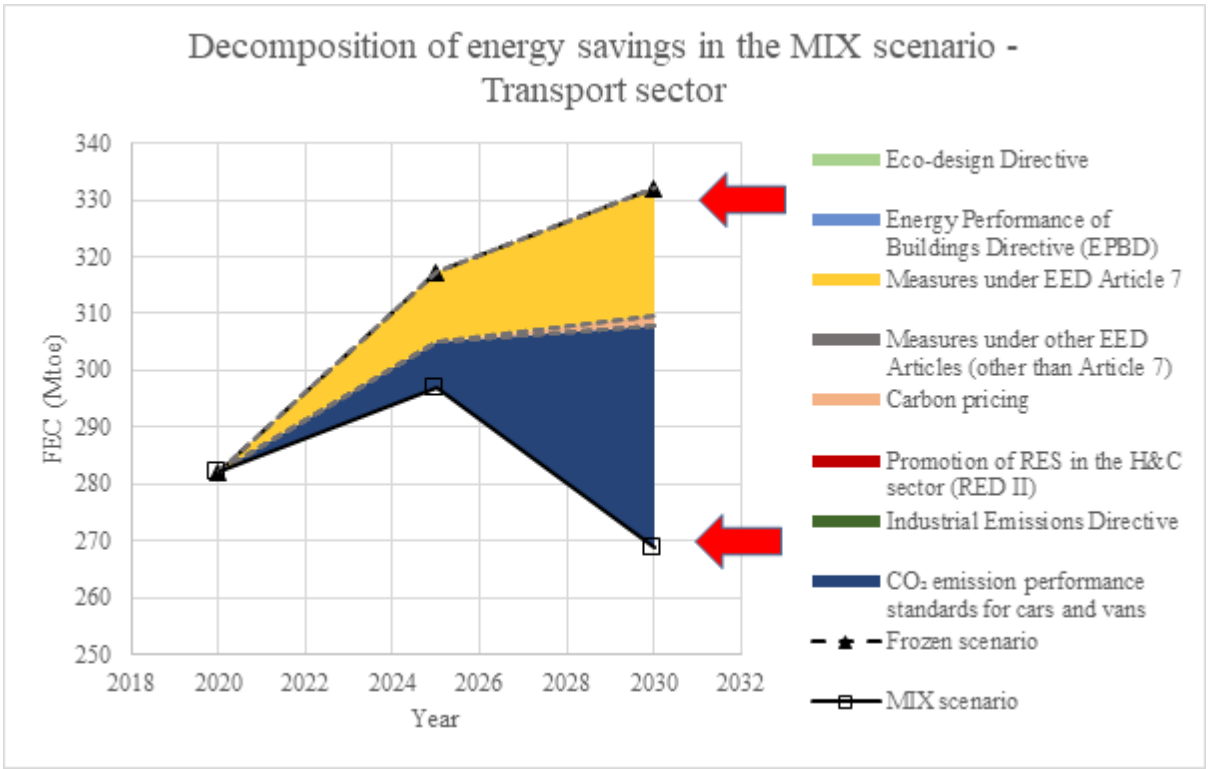
Source: Based on results from Commission assessment, IA EED.



Source: Based on results from Commission assessment, IA EED.



Source: Based on results from Commission assessment, IA EED.



Source: Based on results from Commission assessment, IA EED.

3.3. Annex C: Economic and technical energy savings potentials in the Member States in 2030

	Potential savings in 2030 in %		Target savings in 2030 in %		Difference between savings potential and targets in % Art7 Rev1		Art7 Rev2	
Country	*Economic*	*Technical*	*Art7 Rev1*	*Art7 Rev2*	*Economic*	*Technical*	*Economic*	*Technical*
Austria	21,7	25,3	7,7	12,2	14,0	17,6	9,5	13,1
Belgium	20,8	25,2	7,7	12,2	13,1	17,5	8,6	13,0
Bulgaria	15,5	21,0	7,7	12,2	7,8	13,3	3,4	8,8
Croatia	14,0	23,0	7,7	12,2	6,3	15,3	1,9	10,8
Cyprus	8,5	14,2	2,4	10,7	6,2	11,8	-2,2	3,5
Czechia	13,1	22,7	7,7	12,2	5,4	15,0	0,9	10,5
Denmark	18,6	22,5	7,7	12,2	10,9	14,8	6,4	10,3
Estonia	14,0	19,9	7,7	12,2	6,2	12,2	1,8	7,7
Finland	16,2	19,2	7,7	12,2	8,5	11,5	4,0	7,0
France	17,7	22,2	7,7	12,2	10,0	14,5	5,5	10,0
Germany	20,1	23,5	7,7	12,2	12,4	15,8	7,9	11,3
Greece	15,7	22,2	7,7	12,2	8,0	14,5	3,5	10,0
Hungary	16,7	24,3	7,7	12,2	8,9	16,6	4,5	12,1
Ireland	19,4	23,5	7,7	12,2	11,7	15,8	7,3	11,3
Italy	18,0	24,1	7,7	12,2	10,3	16,4	5,8	11,9
Latvia	11,4	17,8	7,7	12,2	3,6	10,1	-0,8	5,7
Lithuania	10,3	17,1	7,7	12,2	2,6	9,4	-1,8	5,0
Luxembour	22,6	25,0	7,7	12,2	14,9	17,3	10,4	12,8
Malta	11,6	16,7	2,4	10,7	9,3	14,3	1,0	6,0
Netherland	20,2	24,4	7,7	12,2	12,4	16,7	8,0	12,2
Poland	11,2	19,6	7,7	12,2	3,5	11,9	-1,0	7,4
Portugal	16,1	19,0	7,7	12,2	8,4	11,3	3,9	6,8
Romania	14,4	24,6	7,7	12,2	6,7	16,9	2,2	12,4
Slovakia	15,6	23,5	7,7	12,2	7,9	15,8	3,4	11,3
Slovenia	16,0	20,0	7,7	12,2	8,3	12,2	3,8	7,8
Spain	16,8	21,3	7,7	12,2	9,1	13,6	4,6	9,1
Sweden	18,8	20,8	7,7	12,2	11,1	13,1	6,6	8,7

Sources: ICF, CE Delft and eclareon (2021), Stefan Scheuer Consulting, Fraunhofer ISI (2021)

3.4. Annex D: Preliminary overview of minimum shares to be achieved by each Member States according to Article 8(3) EED recast based on indicators

The table provides a preliminary overview of minimum shares to be achieved by each Member States based on the indicators. The arithmetic average, and thus the minimum share per Member State in bold.

	Inability to keep home adequately warm - EU-SILC survey [ILC_MDES01]	**Arrears on utility bills - EU-SILC survey [ILC_MDES07]**	**Structure of consumption expenditure by income quintile and COICOP consumption purpose [HBS_STR_T223]**	**Average (1+2+3)**
	2019 (%)	**2019 (%)**	**2015 (%)**	
Austria	1,8	2,4	5,7	**3,3**
Belgium	3,9	4,1	7,4	**5,1**
Bulgaria	30,1	27,6	14,2	**24,0**
Croatia	6,6	14,8	12,3	**11,2**
Cyprus	21,0	10,4	4,6	**12,0**
Czechia	2,8	1,8	17,7	**7,4**
Denmark	2,8	3,6	10,8	**5,7**
Estonia	2,5	7,2	15,7	**8,5**
Finland	1,8	7,8	3,2	**4,3**
France	6,2	5,6	5,5	**5,8**
Germany	2,5	2,2	8,2	**4,3**
Greece	17,9	32,5	7,5	**19,3**
Hungary	5,4	10,2	13,3	**9,6**
Ireland	4,9	8,9	7,4	**7,1**
Italy	11,1	4,5	8,8	**8,1**
Latvia	8,0	8,7	14,4	**10,4**
Lithuania	26,7	7,5	10,0	**14,7**
Luxembourg	2,4	2,4	5,1	**3,3**
Malta	7,8	6,5	3,9	**6,1**
Netherlands	3,0	1,5	5,8	**3,4**
Poland	4,2	5,8	11,7	**7,2**
Portugal	18,9	4,3	9,5	**10,9**
Romania	9,3	13,7	12,6	**11,9**
Slovakia	7,8	8,4	16,1	**10,8**
Slovenia	2,3	11,2	11,6	**8,4**
Spain	7,5	6,5	5,3	**6,4**
Sweden	1,9	2,3	3,5	**2,6**