



2024/1722

19.6.2024

COMMISSION RECOMMENDATION (EU) 2024/1722

of 17 June 2024

setting out guidelines for the interpretation of Article 4 of Directive (EU) 2023/1791 of the European Parliament and of the Council as regards energy efficiency targets and national contributions

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 292 thereof,

Whereas:

- (1) Directive 2012/27/EU of the European Parliament and of the Council ⁽¹⁾ introduced a requirement to achieve the headline target of at least 32,5 % energy savings at the Union level by 2030.
- (2) Directive (EU) 2023/1791 of the European Parliament and of the Council ⁽²⁾ was adopted on 13 September 2023. It recast Directive 2012/27/EU, keeping some of its provisions unchanged while, at the same time, introducing some new requirements. In particular, it significantly raised the level of ambition for 2030 in terms of energy efficiency, including on the Union's 2030 energy efficiency targets and national contributions.
- (3) Directive (EU) 2023/1791 sets a target for the Union to consume at least 11,7 % less energy by 2030 compared to the projected energy use for 2030 based on the 2020 EU reference scenario, which is 1 124 Mtoe for primary energy consumption and 864 Mtoe for final energy consumption. This translates into an indicative primary energy consumption target of 992,5 million tonnes of oil equivalent (Mtoe) and a binding final energy consumption target of 763 Mtoe at Union level by 2030.
- (4) For the Union to reach the final target by 2030, each Member State should notify an indicative national target for its 2030 final energy consumption, together with an indicative trajectory to achieve it, as part of its National Energy and Climate Plan by June 2024.
- (5) Directive (EU) 2023/1791 introduces a formula in its Annex I to calculate, in a fair and transparent manner, indicative national contributions for all Member States, and for both primary and final energy consumption. The formula takes into account the Member State's early efforts, wealth, energy intensity and potential for energy savings.
- (6) It follows from Directive (EU) 2023/1791 that Member States have full flexibility on how the national contribution is calculated. However, in accordance with Article 4(2) of Directive (EU) 2023/1791, they are to ensure that their national contribution in Mtoe is not more than 2,5 % above what it would have been as the result of the formula of Annex I. In any case, Member States are to provide a description of how they calculated that target and what data were used to do so.
- (7) To ensure the achievement of the Union's 2030 energy efficiency targets, Directive (EU) 2023/1791 strengthens the governance mechanisms that were introduced by Regulation (EU) 2018/1999 of the European Parliament and of the Council ⁽³⁾. Directive (EU) 2023/1791 introduces an ambition gap mechanism for the final energy consumption target that will be triggered in case the sum of the targets notified by the Member States does not meet the binding Union target. Finally, it introduces a gap-filling mechanism that will be used to ask Member States to design and notify new measures if they deviate from their trajectory to their 2030 final energy consumption target.

⁽¹⁾ Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC (OJ L 315, 14.11.2012, p. 1, ELI: <http://data.europa.eu/eli/dir/2012/27/oj>),.

⁽²⁾ Directive (EU) 2023/1791 of the European Parliament and of the Council of 13 September 2023 on energy efficiency and amending Regulation (EU) 2023/955 (recast) (OJ L 231, 20.9.2023, p. 1, ELI: <http://data.europa.eu/eli/dir/2023/1791/oj>).

⁽³⁾ Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council (OJ L 328, 21.12.2018, p. 1, ELI: <http://data.europa.eu/eli/reg/2018/1999/oj>).

- (8) The introduction of the formula of Annex I to Directive (EU) 2023/1791 and the governance mechanisms do not limit the flexibility of Member States to decide on what targets they would set or how they would achieve them. However, these mechanisms ensure that all Member States will do their fair share of effort to achieve the collective binding Union-level target for final energy consumption, and as much as possible the collective indicative Union-level target for primary energy consumption.
- (9) Member States can choose at their discretion the way of transposing and implementing the requirements regarding energy services, that is best suited to their national circumstances. In this context, it would be recommended to interpret the relevant provisions of Directive (EU) 2023/1791 in a consistent way which would contribute to a coherent understanding of Directive (EU) 2023/1791 across Member States as they prepare their transposition measures,

HAS ADOPTED THIS RECOMMENDATION:

Member States should follow the interpretative guidelines in the Annex to this Recommendation when transposing Article 4 of Directive (EU) 2023/1791 into their national law.

Done at Brussels, 17 June 2024.

For the Commission
Kadri SIMSON
Member of the Commission

ANNEX

1. INTRODUCTION

These guidelines provide guidance to Member States on how to interpret Article 4 of Directive (EU) 2023/1791 when transposing it into their national legislation.

In comparison to Directive 2012/27/EU, Directive (EU) 2023/1791 introduces a number of new provisions:

- a formula (Article 4(2)), which can be used to set the indicative national contribution (Annex I). The national contributions should not deviate more than 2,5 % compared to the result of this formula,
- an updated baseline (Article 4(1)) based on the 2020 Reference Scenario,
- an ambition-gap mechanism (Article 4(5)), to be used in case the sum of the national contributions of all Member States does not equal the Union's target for final energy consumption (FEC),
- a delivery gap-filling mechanism (Article 4(6)), which will be applied if insufficient progress has been made towards achieving the energy efficiency contributions,
- a new definition for the FEC (Article 2(6)) which is aligned with the new Eurostat methodology for the calculation of FEC but keeps the previous scope that excludes ambient energy and includes energy consumption in international aviation.

Nonetheless, the binding interpretation of Union legislation is the exclusive competence of the Court of Justice of the European Union.

2. LEGAL AND POLICY CONTEXT

By setting the overall binding Union target for energy efficiency, Article 4 of Directive (EU) 2023/1791 is closely interlinked with other Articles in Directive (EU) 2023/1791 that contribute to this target.

Furthermore, Article 4 of Directive (EU) 2023/1791 builds on Regulation (EU) 2018/1999 of the European Parliament and of the Council ⁽¹⁾ concerning:

- the draft integrated national energy and climate plans (NECP),
- the update of the integrated NECP,
- the integrated national energy and climate progress reports (NECPRs),
- the assessment of progress to achieve national objectives, targets, and contributions.

Last, Regulation (EC) No 1099/2008 of the European Parliament and of the Council ⁽²⁾ on energy statistics forms the basis for the annual reporting of the PEC and FEC by Member States.

3. KEY TERMS USED IN THESE GUIDELINES

The following key terms are the most relevant in the context of interpreting the scope of the obligations under Article 4.

Primary energy consumption

'Primary energy consumption' or 'PEC' is defined in Article 2, point (5) of Directive (EU) 2023/1791 to mean the gross available energy, excluding international maritime bunkers, final non-energy consumption and ambient energy.

⁽¹⁾ Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council (OJ L 328, 21.12.2018, p. 1, ELI: <http://data.europa.eu/eli/reg/2018/1999/oj>).

⁽²⁾ Regulation (EC) No 1099/2008 of the European Parliament and of the Council of 22 October 2008 on energy statistics (OJ L 304, 14.11.2008, p. 1, ELI: <http://data.europa.eu/eli/reg/2008/1099/oj>).

Final energy consumption

'Final energy consumption' or 'FEC' is defined in Article 2, point (6) of Directive (EU) 2023/1791 to mean all energy supplied to industry, to transport, including energy consumption in international aviation, to households, to public and private services, to agriculture, to forestry, to fishing and to other end-use sectors, excluding energy consumption in international maritime bunkers, ambient energy and deliveries to the transformation sector and to the energy sector, and losses due to transmission and distribution as defined in Annex A to Regulation (EC) No 1099/2008.

Ambient energy

'Ambient energy' is defined in Article 2, point (7) of Directive (EU) 2023/1791 to mean ambient energy as defined in Article 2, point (2), of Directive (EU) 2018/2001.

Energy efficiency

'Energy efficiency' is defined in Article 2, point (8) of Directive (EU) 2023/1791 to mean the ratio of output of performance, service, goods or energy to input of energy.

Energy savings

'Energy savings' is defined in Article 2, point (9) of Directive (EU) 2023/1791 to mean an amount of saved energy determined by measuring or estimating consumption, or both, before and after the implementation of an energy efficiency improvement measure, whilst ensuring normalisation for external conditions that affect energy consumption.

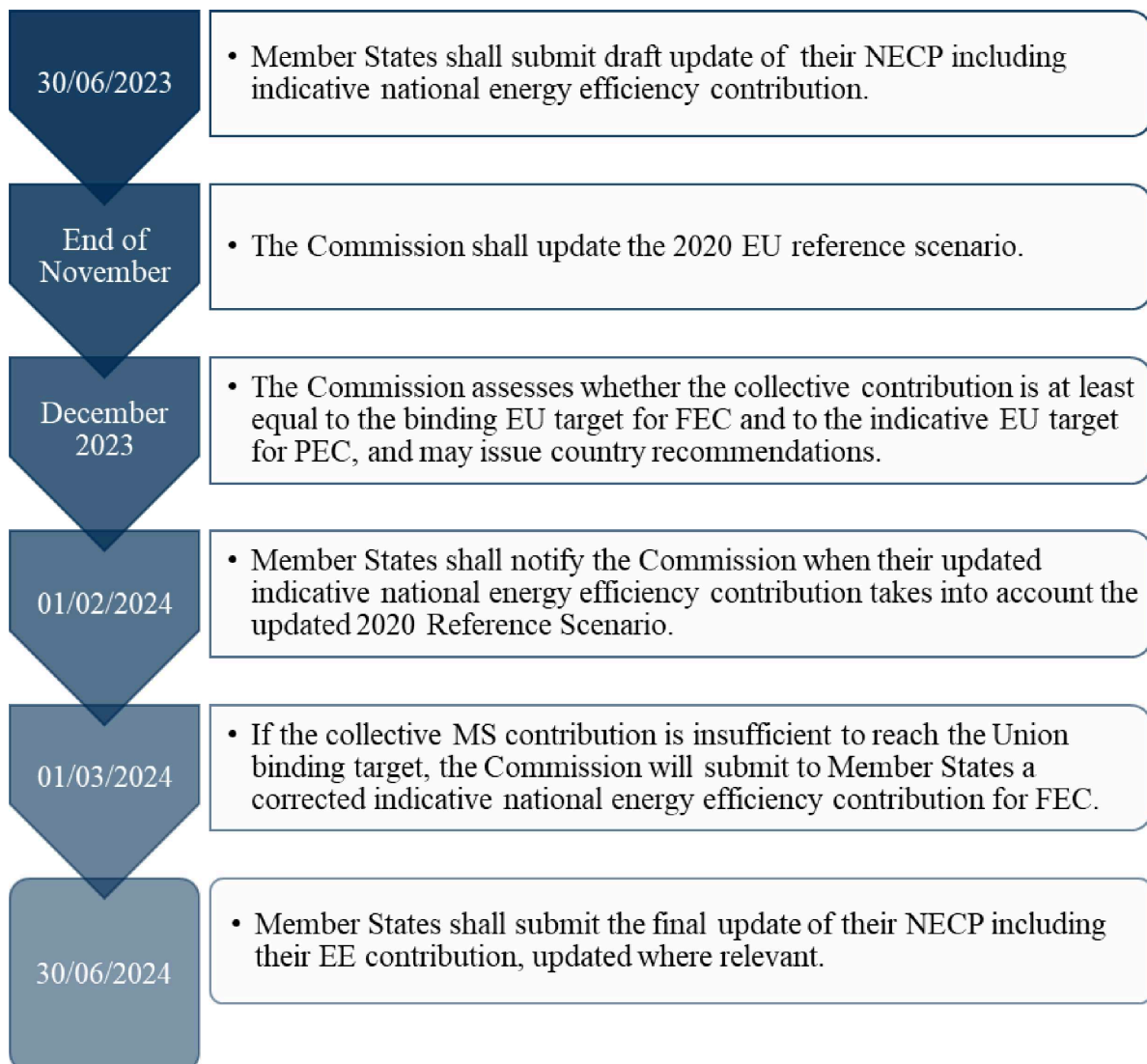
Energy efficiency improvement

'Energy efficiency improvement' is defined in Article 2, point (10) of Directive (EU) 2023/1791 to mean an increase in energy efficiency as a result of any technological, behavioural or economic changes.

4. OBLIGATIONS RELATED TO ARTICLE 4

Article 4 describes the sequence and timeline of steps that Member States and the Commission will take to set the indicative national contributions. These are described in Figure 1.

Figure 1

Timeline of Article 4⁽³⁾

4.1. Setting and notification of the national contributions

4.1.1. Target setting in Article 4

In accordance with Article 4(2) of Directive (EU) 2023/1791, each Member State is to set and notify an indicative national contribution for FEC together with an indicative trajectory to achieve it as part of their draft (updated) National Energy and Climate Plans (with a deadline for submission on 30 June 2023). In addition, they should have made efforts to contribute to the Union's indicative PEC target. To this end, they should have notified a national contribution for PEC together with an indicative trajectory to achieve it (latest opportunity was in their draft updated NECPs).

Article 4 of Directive (EU) 2023/1791 provides a list of factors and national circumstances that the Member States can use to calculate their contributions. Notably, the factors in Article 4(3), point (d), are reflected in the formula that is set out in Annex I to Directive (EU) 2023/1791 and which is explained in detail in Section 4.1.2 of this Annex.

In accordance with Article 4(4) of Directive (EU) 2023/1791, in setting its indicative national energy efficiency contribution for FEC, each Member State has to ensure that its contribution in Mtoe is not more than 2,5 % above what it would have been had it resulted from the formula set out in Annex I to Directive (EU) 2023/1791. As an example, if the formula of Annex I to that Directive indicates that the indicative national energy efficiency contribution of a Member State for FEC in 2030 should be 10 Mtoe (absolute level of FEC in 2030), the Member State has to notify a value below 10,25 Mtoe.

⁽³⁾ All the steps as listed in the timeline until March 2024 have been completed.

Finally, Member States are to provide the shares of primary energy consumption and final energy consumption for the different energy end-use sectors, as defined in Regulation (EC) No 1099/2008. The objective is to collect, in a consistent manner, the projections for each sector by 2030 and assess how the energy consumption in different sectors evolve. These sectors include at least industry, residential, services and transport.

Member States have also to indicate projections by 2030 for the total energy consumption of the ICT sector.

4.1.2. *The formula of Annex I to Directive (EU) 2023/1791*

Annex I to Directive (EU) 2023/1791 sets out a multi-factor formula that includes all the factors listed in Article 4(3), points (d) and (e), of Directive (EU) 2023/1791. The aim of the formula is to allow Member States to determine their contributions to the Union target in a fair and feasible manner.

Four factors affecting energy efficiency efforts are considered. Each factor has the same weight in the calculation of the national contributions:

- **Early actions factor:** the factor measures the average progress in historical energy consumption levels, relative to the Union average, between the periods 2007-2009 and 2017-2019. The early action factor is calculated by multiplying two metrics:
 - the amount of energy savings in the two periods, and
 - the improvements in energy intensity ⁽⁴⁾ achieved by each Member State during the same periods.

The reason for using two metrics is to better measure energy savings achieved due to energy-related action rather than other reasons (e.g. economic recession), and to avoid penalising those Member States that increased their energy consumption due to strong economic growth trends. As the early action factor is the product of the two metrics and the one should not cancel out or amplify the other. The two metrics are capped at 50 % and 100 % of the average for the Union. Then, pursuant to Annex I to Directive (EU) 2023/1791, the total early action factor is also capped at 50 % and 100 % of the average for the Union.

- **Wealth factor:** the factor measures each Member State's wealth in the period 2017-2019. The wealth of Member States is represented by the Gross Domestic Product (GDP) per capita. The GDP indicator is expressed in Purchasing Power Standard (PPS) ⁽⁵⁾ to eliminate the effect of price level differences across Member States. Member States with higher GDP per capita than the EU average have a relatively more ambitious target and vice versa. The level of ambition is capped at 50 % and 150 % of the EU average level of ambition.
- **Energy intensity factor:** the factor measures how energy intensive a Member State is against the EU average in the period 2017-2019. Member States with an energy intensity higher than the EU average will have a relatively more ambitious target and vice versa. According to Annex I to Directive (EU) 2023/1791, the level of ambition is capped at 50 % and 150 % of the EU average level of ambition.

It is worth noting that this energy intensity factor does not capture the same information as the second metric in the early actions factor. The energy intensity factor represents the average energy intensity of the economy in the period 2017-2019 as a proxy for the technical potential for energy efficiency measures. The factor does not measure what the starting point or the trajectory to this value of energy intensity was. In contrast, the second metric in the early actions factor represents the relative improvement of the energy intensity of the economy in a whole period (2007-2009 to 2017-2019) as a proxy for the efforts that a Member State made during this period.

- **Savings potential factor:** the factor measures each Member State's economic potential for energy efficiency. This potential is calculated by comparing the energy consumption of each Member State under the PRIMES MIX 55 % scenario for 2030 (policy target) to the energy consumption under the (updated) 2020 Reference Scenario projections for 2030 (baseline). Pursuant to Annex I to Directive (EU) 2023/1791, the level of ambition is capped at 50 % and 150 % of the EU average level of ambition.

⁽⁴⁾ The energy intensity data are used to calculate both the early action and the energy intensity factors. In the first case historical energy intensity improvement is applied, i.e. the average value between two periods (2007-2009 and 2017-2019) shall be calculated. For the energy intensity factor, only the average of the latter period (2017-2019) shall be considered.

⁽⁵⁾ The unit of measure, current prices, million purchasing power standards/cap (CP_MPPS_EU27_2020) is used from Eurostat.

The total factor for each member State is calculated as the average of the four factors mentioned in points (1) to (4). Then, the Member State's target, in percentage, is calculated by multiplying the total factor with the EU target set in Article 4(1) of Directive (EU) 2023/1791, which is at least – 11,7 %. The Member State's target, in Mtoe, is calculated by applying the Member State's target in percentage to its 2030 baseline under the 2020 Reference Scenario. As an example, a Member State applies the formula for FEC and obtains a total factor of 85,45 %. By multiplying by – 11,7 %, it finds that its target, in percentage, is -10 %. The Member State looks at its 2030 FEC baseline according to the 2020 Reference Scenario and finds that this is 10 Mtoe. It uses its target in percentage (-10 %) to calculate its target in Mtoe, i.e. 9 Mtoe.

As a final step, a correction factor is applied to all Member States to calibrate the sum of all national contributions, in Mtoe, to the EU 2030 target, in Mtoe. The correction factor is mentioned in Annex I to Directive (EU) 2023/1791 and its calculation is described in detail in point A.2.5 of this Annex. The correction factor is multiplied with each individual national contribution to give the final, corrected national contribution, in Mtoe. Each of the correction factors, one for the FEC calculations and one for the PEC calculations, is identical for all Member States.

Pursuant to Article 4(2) of Directive (EU) 2023/1791 when calculating the national contributions (for both FEC and PEC), a Member State has full flexibility on how this will be done. Article 4(3) of Directive (EU) 2023/1791 lists the requirements and characteristics that a Member State has to consider in this calculation. Point (d) of that paragraph refers to the factors of the formula set out in Annex I to Directive (EU) 2023/1791 while point (e) of that paragraph adds more relevant elements ('national circumstances') that Member States can use to justify their selection of a calculation methodology, and the data they will use. It should be mentioned that the list of Article 4(3), point (e), of Directive (EU) 2023/1791 is not exhaustive. Article 4 of Directive (EU) 2023/1791 implies, that a Member State that will not use the formula set out in Annex I to Directive (EU) 2023/1791 has to use the requirements set out in Article 4(3), points (a) to (e), of Directive (EU) 2023/1791 to calculate its national contributions.

In all cases, Member States have explained how the national contributions were calculated. In case a Member State used solely the formula set out in Annex I to Directive (EU) 2023/1791 and notified the result, it would suffice to explain that it used the formula set out in Annex I to Directive (EU) 2023/1791. In all other cases, the explanation has to include a description of both the calculation methodology and what data were used in this methodology.

4.2. Updated 2020 Reference Scenario

Pursuant to Article 4(5) of Directive (EU) 2023/1791, the Commission has updated the 2020 Reference Scenario based on the latest Eurostat data. Member States that wish to update their national contributions, as these should have been notified in their draft updated NECPs using the updated 2020 Reference Scenario instead of the existing one, shall notify that updated contribution at the latest by 1 February 2024.

The updated 2020 Reference Scenario affects the calculation of the national contributions in all steps described above and has resulted in a second set of formula results for all Member States as compared to the ones they had at their disposal when preparing their draft (updated) NECPs, for both FEC and PEC:

- (a) the updated 2020 Reference Scenario affects the savings potential factor, as the Reference Scenario is used in its calculation (see Section 3.2 for the savings potential factor formula). The other three factors will remain unchanged as they only use the Eurostat data;
- (b) consequently, both the total factor – calculated as the average of the four factors – and the Member State's target, in percentage, is different;
- (c) furthermore, a Member State's contribution, in Mtoe, is affected since the FEC and PEC baselines for 2030 have changed according to the updated Reference Scenario;
- (d) finally, the Commission has recalculated the correction factors for the results of the formula under the updated 2020 Reference Scenario, thus resulting in a second full set of indicative FEC and PEC contributions for all Member States.

In accordance with Article 4(5) of Directive (EU) 2023/1791, Member States that decide to use the results of the updated 2020 Reference Scenario, have to again ensure that their contribution in Mtoe is not more than 2,5 % above what it would have been had it resulted from the formula set out in Annex I to Directive (EU) 2023/1791 when using the updated 2020 Reference Scenario.

4.3. Ambition gap mechanism: assessment by the Commission and timeline

As part of the assessment of the draft updated NECP carried out in December 2023, in compliance with Regulation (EU) 2018/1999, the Commission has assessed whether the collective contribution is at least equal to the Union binding target for final energy consumption and whether the collective contribution is at least equal to the indicative Union target for primary energy consumption.

As the sum of the indicative national contributions for FEC is not sufficient to reach the Union's binding target, Commission issued country specific recommendations, in accordance with Article 34 of Regulation (EU) 2018/1999, including that the national contribution(s) of a Member States(s) should be increased.

One of the new provisions in Article 4 of Directive (EU) 2023/1791 is the introduction of an ambition gap mechanism for the energy efficiency Union target. This mechanism is to be based on the assessment that the Commission will perform to ensure that the collective contribution of Member States is at least equal to the Union's binding target for FEC set out in Article 4(1) of Directive (EU) 2023/1791. Thus, the ambition gap mechanism will be applied only if Member States' collective contributions do not add up to that Union target, as a result of the Commission assessment of the draft updated NECPs.

The starting point for the ambition gap mechanism are the national contributions notified by the Member States as part of their draft updated NECPs and the Union target for final energy consumption (in Mtoe) in Article 4(1) of Directive (EU) 2023/1791.

For the sole purpose of the ambition gap assessment, the Commission will assume, based on Article 31(2), third subparagraph of Regulation (EU) 2018/1999, the national contributions for the Member States that did not submit a national contribution as part of their updated draft NECP or until 1 February 2024.

Thus, the sequence for determining Member States' contributions was:

- (a) if a Member State notified an indicative national contribution for FEC as part of its draft updated NECP, the Commission has used this indicative national contribution (in Mtoe) in its assessment of draft updated NECPs;
- (b) if a Member State did not notify an indicative national contribution as part of its draft updated NECP, the Commission has assumed the indicative national contribution for FEC from the Member State's final NECP notified in 2020 (in Mtoe).

At the latest by 1 March 2024, the Commission can submit to each Member State a corrected indicative national energy efficiency contribution for FEC, taking into account the updated 2020 reference scenario, as compared to the contribution submitted by Member States in their draft updated NECPs or, in its absence, to the one assumed by the Commission in its assessment carried out in December 2023.

The Commission will assess the notified national contributions for all Member States but, in accordance with to Article 4(5) of Directive (EU) 2023/1791, it will only correct national contributions when the sum of the contributions by Member States is insufficient to reach the Union binding target; corrections will only be addressed to the Member States whose notified contribution for FEC (in Mtoe) is above the contribution that results from the application of the formula set out in Annex I to Directive (EU) 2023/1791.

Member States will then be required to include their final national contribution, considering the corrected one if relevant, as part of their final NECP to be submitted in June 2024.

4.4. Calculation of the corrected national contribution

Article 4(5) of Directive (EU) 2023/1791 requires the Commission to submit to each Member State a corrected indicative national energy efficiency contribution for FEC on the basis of three criteria:

- (a) the remaining collective reduction of final energy consumption needed to achieve the Union's binding target set out in Article 4(1) of Directive (EU) 2023/1791;
- (b) the relative GHG intensity per GDP unit in 2019 among the Member States concerned;
- (c) the GDP of those Member States in 2019.

The elements of Article 4(5) of Directive (EU) 2023/1791 give some indications on how the Commission should formulate the ambition gap mechanism. The Commission will employ a new formula to calculate the corrected national contributions for FEC and for Member States that fall under the ambition gap mechanism.

4.5. The delivery gap filling mechanism: Monitoring progress and tackling insufficient progress

Article 4(6) of Directive (EU) 2023/1791 deals with the monitoring of progress and the additional action that needs to be taken in case the progress of Member States is deemed insufficient.

Pursuant to Article 29 of Regulation (EU) 2018/1999, the Commission has to assess the progress made by Member States towards achieving the objectives of the Energy Union and the EU energy efficiency target, by 31 October 2021 and every two years thereafter.

Pursuant to the new provisions of Article 4(6) of Directive (EU) 2023/1791, if the above-mentioned assessment concludes that one or more Member States make insufficient progress towards their energy efficiency contributions, i.e. having a FEC above their indicative trajectory for 2030, Member States are due to implement additional measures to get back on track. These additional measures and the energy savings they are expected to yield should be included in their integrated national energy and climate progress report (NECPRs) pursuant to Article 17 of Regulation (EU) 2018/1999, which are submitted on a biennial basis (2025, 2027, 2029...).

The Commission will then assess whether it considers these measures to be sufficient to achieve the Union's energy efficiency targets. If this is not the case, the Commission can, as appropriate, propose measures and exercise its power at Union level to assure the achievement of the 2030 targets for energy efficiency.

It is important to stress that, pursuant to Article 4(6) of Directive (EU) 2023/1791 Member States shall ensure that additional measures are implemented within one year of the date of receipt of the Commission's assessment to get back on track to reach their energy efficiency contributions.

Directive (EU) 2023/1791 lists four types of actions that can be taken to tackle insufficient progress:

(1) **national measures delivering additional energy savings, including stronger project development assistance for the implementation of energy efficiency investment measures.**

Member States could assess the policies and measures already in place and evaluate their effectiveness. In case of implementation barriers, a first step could be to remove these barriers, so that the implemented measures will yield more savings. A potential second step could be, if feasible, to make conditions of policies and measures stricter, thus increasing the anticipated energy savings.

A third option would be to implement new policies and measures delivering additional savings. Inspiration for new, additional policies and measures is linked to the other articles of this Directive, and their recommendations. Moreover, examples of energy efficiency policies and measures implemented in the Member States are included in the MURE database ⁽⁶⁾.

Additionally, the EEA has a database on greenhouse gas policies and measures ⁽⁷⁾ (related to energy efficiency as well) that Member States have implemented, have adopted, or are planning in frame of their reporting obligations under Regulation (EU) 2018/1999.

(2) **increasing the energy savings obligation set out in Article 8**

Article 8 on the energy savings obligation sets the target for annual energy savings, which can be achieved either by establishing an energy efficiency obligation scheme (Article 9) or by adopting alternative policy measures (Article 10). A Member State could consider increasing the target for annual energy savings or implementing new measures under its obligation scheme in order to stimulate new savings in already included sectors or savings in new sectors that were not included in the obligation scheme until then.

(3) **adjusting the obligation for public sector**

Articles 5, 6 and 7 include obligations for the public sector. A Member State could consider additional measures like raising the 1,9 % target or expanding the scope of the public sector by including further entities. In addition, Article 29(4) refers to the energy performance contracting for public bodies' buildings and Article 29(5) to energy service offers in the public sector. Member States could further promote such measures to increase the savings stemming from Articles 5, 6 and 7.

⁽⁶⁾ <https://www.measures.odyssee-mure.eu/>.

⁽⁷⁾ <http://pam.apps.eea.europa.eu/>.

- (4) **making a voluntary financial contribution to the national energy efficiency fund referred to in Article 30 or another financing instrument dedicated to energy efficiency, where the annual financial contributions shall be equal to the investments required to reach the indicative trajectory.**

5. REPORTING REQUIREMENTS

5.1. Update of the integrated National Energy and Climate Plans

In accordance with Article 14(2) of Regulation (EU) 2018/1999, Member States are required to submit by 30 June 2024 an update of their latest notified integrated national energy and climate plan (NECP). Article 14(1) of Regulation (EU) 2018/1999 requires the Member States to provide a draft update of the NECP always a year prior to the submission deadline of Article 14(2) of that Regulation.

In accordance with Article 4(2) of Directive (EU) 2023/1791, Member States should have included their indicative national energy efficiency contribution and submitted by 30 June 2023. If they wish to use the updated scenario, Member States shall notify in their updated indicative national energy efficiency contribution to take into account the updated 2020 Reference Scenario by 1 February 2024, as provided for in Article 4(5) of Directive (EU) 2023/1791. Finally, Member States shall submit a final update of the NECP including their indicative national energy efficiency contribution, updated where relevant in line with the submission deadline of 30 June 2024, as provided for by Article 14(2) of Regulation (EU) 2018/1999.

Further details on the updating of the integrated national energy and climate plans are provided in the various sections of Chapter 4 of this Annex.

5.2. Reporting the progress on the energy efficiency targets

Article 17 of Regulation (EU) 2018/1999 requires Member States to submit every two years their National Energy and Climate Progress Reports. Additionally, Article 21 of that Regulation further expands on the reporting requirements of Member States regarding energy efficiency. As laid down in Article 21 of that Regulation, Member States have an obligation to annually report on the progress of the indicative trajectories for the national PEC and FEC from 2021 to 2030.

APPENDIX A

A.1. Data codes and indicators

The implementation of the Annex I formula is based on statistics extracted from the Eurostat database. In this section the necessary calculations will be described step by step, by:

- listing the Eurostat datasets and the data codes of the required indicators,
- analysing the individual steps for the calculation of the four factors and the total factors,
- including the Eurostat input data for all Member States to implement the formula.

For the calculation of the energy indicators, the Eurostat 'Complete_Energy_Balances', NRG_BAL_C, update of March 2023 has been used.

The FINAL ENERGY CONSUMPTION (FEC) indicator used in Directive (EU) 2023/1791 can be calculated from the following Eurostat data:

$$FEC = \text{Final consumption} - \text{energy use} + \text{International aviation} - \text{Ambient energy}$$

$$FEC = (NRG_BAL : FEC_E, SIEC : TOTAL) + (NRG_BAL : INTAVI, SIEC : TOTAL) \\ - (NRG_BAL : FEC_E, SIEC : RA600)$$

The Final Consumption could be disaggregated to Final Consumption – industry sector – energy use (FC_IND_E); Final Consumption – transport sector – energy use (FC_TRA_E); Final Consumption – other sectors – energy use (FC_OTH_E). Other sectors include commercial and public services, households, agriculture and forestry, fishing, and sectors not elsewhere specified.

The PRIMARY ENERGY CONSUMPTION (PEC) indicator used in the Directive 2023/1791/EU can be calculated based on the following Eurostat data:

$$PEC = \text{Primary energy consumption (Europe 2020 – 2030)}$$

$$PEC = (NRG_BAL : PEC2020_2030, SIEC : TOTAL)$$

The GROSS DOMESTIC PRODUCT PER CAPITA (GDP/cap) is calculated from the Eurostat data tables NAMA_10_GDP for GDP at purchasing power standards (PPS), unit of measure: current prices, million purchasing power standards (CP_MPPS_EU27_2020) and TPS00001 for population, demographic indicator: Population on 1 January (JAN).

The ENERGY INTENSITY indicator is given by the following equation:

$$\text{Primary energy intensity (PEI)} = \text{PEC} / \text{GDP (in PPS)}$$

$$\text{Final energy intensity (FEI)} = \text{FEC} / \text{GDP (in PPS)}$$

Finally, the source for PRIMES MIX 55 % Scenario and 2020 Reference Scenario projections for 2030 is the PRIMES model run by the E3MLab of National Technical University of Athens (NTUA).

A.2. Steps of implementing the formula

A.2.1. Early action factor

The EARLY ACTION FACTOR ($F_{\text{early action}}$) includes as metrics the primary and final energy savings generated in the period from 2007-2009 to 2017-2019 and the difference in energy intensity registered when comparing the same periods. It is composed by two sub-factors:

The SAVINGS SUB-FACTOR (% of FEC and PEC reduction) is calculated as:

$$\frac{\text{MS (Annual avg. 2017-2019 FEC/PEC} - \text{Annual avg. 2007-2009 FEC/PEC)}}{\text{MS Annual avg. of 2007-2009 FEC/PEC}}$$

This result is weighted with the respective EU value:

$$\text{Savings subfactor} = \frac{\text{EU FEC or PEC Reduction (\%)}}{\text{MS FEC or PEC Reduction (\%)}}$$

The result should be cropped between the limits of the 50 %-100 %. If the final value is negative the calculated value is 0 or negative (meaning that there are no generated savings in the selected timeframe), the cropped final value will be equal to 100 %.

The change in INTENSITY SUB-FACTOR (FEI or PEI reduction %) is calculated as:

$$\frac{\text{MS (Annual avg. 2017-2019 FEI/PEI} - \text{Annual avg. 2007-2009 FEI/PEI)}}{\text{MS Annual avg. of 2007-2009 FEI/PEI}}$$

This result is weighted with the respective EU value:

$$\text{Intensity subfactor} = \frac{\text{EU FEI or PEI Reduction (\%)}}{\text{MS FEI or PEI Reduction (\%)}}$$

The result should be cropped between the limits of the 50 %-100 %. The cropping rules are the same as in the case of savings sub-factor. The early action factor is the product of the final values of the savings sub-factor and the change in intensity sub-factor.

$$F_{\text{Early action}} = \text{Savings subfactor} \times \text{Intensity subfactor}$$

This product should be cropped again between the limits of 50 %-100 %.

A.2.2 Wealth factor

The WEALTH FACTOR (F_{wealth}) includes as main indicator the GDP per capita in Purchasing Power Parities. It could be given by the following formula:

$$F_{\text{wealth}} = \frac{\text{MS} \left(\text{Annual avg. 2017-2019} \frac{\text{GDP}}{\text{cap}} \right)}{\text{EU} \left(\text{Annual avg. of 2017-2019} \frac{\text{GDP}}{\text{cap}} \right)}$$

A.2.3 Energy intensity factor

The ENERGY INTENSITY FACTOR ($F_{intensity}$) includes as main indicator the primary and final energy intensity. Primary and final energy intensity are equal to the ratios of PEC and FEC to the GDP in PPS. It could be given by the following formula:

$$F_{Intensity} = \frac{MS \left(\text{Annual avg. 2017-2019} \frac{FEL}{PEI} \right)}{EU \left(\text{Annual avg. of 2017-2019} \frac{FEL}{PEI} \right)}$$

A.2.4 Savings potential factor

The SAVINGS POTENTIAL FACTOR ($F_{potential}$) includes as main indicator the potential cost-optimal savings calculated by the PRIMES model. More specifically, the savings are calculated based on the difference between the baseline 2030 projections of the 2020 Reference Scenario ⁽⁸⁾ and the PRIMES MIX 55 % scenario. These savings are weighted to EU ambition (11,7 %). This factor could be calculated with the following formula:

$$F_{potential} = \frac{MS \frac{PRIMES \text{ MIX } 55 \% - 2020 \text{ Ref. Scenario (2030)}}{MS \text{ 2020 Ref. Scenario (2030)}}}{11,7 \%}$$

F_{wealth} , $F_{intensity}$ and $F_{potential}$ should be capped between 50 % and 150 % in order to limit the effect of those values that could be extremely high or extremely low.

A.2.5 Total factor

The TOTAL FACTOR (F_{total}) (point 9 and point 2 of the Annex I) is equal to the weighted sum of the four previously analysed factors (early actions factor, wealth factor, intensity factor, and savings potential factor). All the factors have the same weight in the formula (0.25 each). As a result of that, the total factor can be calculated by the following formula:

$$F_{total}(\%) = 0,25 \times F_{early \text{ actions}} + 0,25 \times F_{wealth} + 0,25 \times F_{intensity} + 0,25 \times F_{potential}$$

The TARGET (point 9 of the Annex I) is equal to the product of the total factor and the EU target. Consequently, it can be provided by the following formula:

$$TARGET (\%) = F_{total} \times EU \text{ target} = F_{total} \times 11,7 \%$$

The CORRECTION FACTOR (C_{EU}) is calculated by the Commission, is identical for all the Member States and can be provided by the following formula:

$$C_{EU} = \frac{\text{Sum of MS } [(1 - TARGET) \times FECB2030 \text{ or } PECB2030]}{EU \text{ FEC or PEC Target}}$$

Annex I of the Directive 2023/1791/EU provides the following indicative formulas for calculating the FEC and PEC national contribution to the Union's 2030 targets:

$$FEC = C_{EU} \times (1 - TARGET) \times FECB2020$$

$$PEC = C_{EU} \times (1 - TARGET) \times PECB2020$$

FECB2030 and PECB2030 indicators are the 2030 FEC and PEC values calculated as baselines for the 2020 Reference Scenario projections.

A.3. Data for the formula

The following section provide data tables that can be used by the Member States as an input when implementing these formulas to calculate their contributions.

⁽⁸⁾ These values may change according to the Reference Scenario 2020 updates. See paragraph 2.3.

A.3.1. Early action factor

Table 1

FEC, in Mtoe

	2007	2008	2009	Average (2007-2009)	2017	2018	2019	Average (2017-2019)	Reduction (%)
EU	1 004,3	1 013,9	965,1	994,5	968,5	971,9	967,2	969,2	- 3
BE	33,8	35,3	34,2	34,4	34,5	34,8	34,2	34,5	0
BG	10,0	9,8	8,6	9,5	9,9	9,9	9,9	9,9	5
CZ	24,9	24,9	24,1	24,7	24,7	24,4	24,4	24,5	- 1
DK	15,7	15,5	14,8	15,3	14,6	14,6	14,3	14,5	- 6
DE	207,4	216,3	204,3	209,4	213,0	209,3	209,3	210,5	1
EE	3,1	3,1	2,8	3,0	2,9	3,0	2,9	2,9	- 2
IE	13,2	13,2	11,8	12,7	11,8	12,4	12,4	12,2	- 4
EL	22,1	21,4	20,6	21,4	16,4	15,9	16,2	16,2	- 24
ES	97,4	94,0	87,5	92,9	83,7	85,7	85,6	85,0	- 9
FR	149,6	151,8	146,6	149,3	145,5	143,6	142,4	143,8	- 4
HR	7,3	7,4	7,2	7,3	6,9	6,9	6,9	6,9	- 5
IT	132,4	132,4	124,9	129,9	114,4	115,5	114,6	114,8	- 12
CY	1,9	2,0	1,9	1,9	1,9	1,9	1,9	1,9	- 4
LV	4,4	4,2	4,0	4,2	4,0	4,2	4,1	4,1	- 2
LT	5,2	5,1	4,6	5,0	5,3	5,6	5,6	5,5	10
LU	4,3	4,4	4,1	4,3	4,2	4,3	4,4	4,3	1
HU	17,1	17,1	16,8	17,0	18,1	18,1	18,2	18,1	7
MT	0,5	0,5	0,5	0,5	0,6	0,7	0,7	0,7	38
NL	51,5	52,5	50,6	51,6	48,3	48,8	47,8	48,3	- 6
AT	26,0	26,0	25,2	25,7	26,9	26,5	26,8	26,8	4
PL	60,5	61,6	61,0	61,1	69,9	73,9	72,7	72,2	18
PT	19,0	18,4	18,2	18,5	16,6	16,9	17,1	16,9	- 9
RO	23,3	24,1	21,9	23,1	23,3	23,6	23,9	23,6	2
SI	5,1	5,5	4,9	5,2	4,9	5,0	4,9	4,9	- 5
SK	10,2	10,6	9,7	10,2	9,9	10,0	10,3	10,1	- 1
FI	25,8	24,9	23,3	24,7	24,8	25,2	25,1	25,0	1
SE	32,5	31,9	31,0	31,8	31,5	31,3	30,9	31,2	- 2

Table 2
PEC, in Mtoe

	2007	2008	2009	Average (2007-2009)	2017	2018	2019	Average (2017-2019)	Reduction (%)
EU	1 490,2	1 488,8	1 403,2	1 460,7	1 383,7	1 377,3	1 353,9	1 371,6	- 6
BE	50,4	51,2	50,1	50,6	48,5	46,5	48,4	47,8	- 5
BG	19,5	19,0	16,9	18,5	18,3	18,4	18,2	18,3	- 1
CZ	43,7	42,5	40,2	42,1	40,4	40,5	39,7	40,2	- 5
DK	20,4	19,8	19,1	19,8	17,4	17,4	16,8	17,2	- 13
DE	315,8	320,8	299,9	312,2	298,1	292,0	285,2	291,8	- 7
EE	6,2	5,4	4,3	5,3	5,8	5,7	4,8	5,4	3
IE	16,0	15,6	14,9	15,5	14,4	14,6	14,7	14,6	- 6
EL	30,3	30,5	29,4	30,1	23,2	22,6	22,3	22,7	- 24
ES	138,8	133,9	123,0	131,9	124,9	124,3	120,6	123,3	- 7
FR	252,7	255,5	246,4	251,5	239,1	238,6	235,1	237,6	- 6
HR	9,4	9,2	8,9	9,2	8,3	8,2	8,2	8,2	- 10
IT	178,7	176,1	164,1	173,0	148,9	147,2	145,9	147,4	- 15
CY	2,7	2,9	2,8	2,8	2,5	2,5	2,5	2,5	- 9
LV	4,8	4,6	4,4	4,6	4,5	4,7	4,6	4,6	0
LT	8,1	8,3	7,8	8,1	6,2	6,4	6,3	6,3	- 22
LU	4,6	4,6	4,3	4,5	4,3	4,5	4,5	4,4	- 2
HU	25,4	25,2	23,9	24,8	24,5	24,5	24,6	24,5	- 1
MT	0,9	1,0	0,9	0,9	0,8	0,8	0,9	0,8	- 10
NL	69,4	69,9	67,6	69,0	65,1	64,4	63,6	64,4	- 7
AT	32,2	32,5	30,6	31,8	32,8	31,8	32,3	32,3	2
PL	91,9	93,1	89,5	91,5	99,1	104,1	100,2	101,1	10
PT	23,9	23,6	23,6	23,7	22,8	22,7	22,1	22,5	- 5
RO	37,4	37,3	32,6	35,8	32,5	32,6	32,1	32,4	- 10
SI	7,3	7,7	6,8	7,3	6,7	6,7	6,5	6,6	- 9
SK	16,4	17,0	15,5	16,3	16,1	15,8	16,0	16,0	- 2
FI	36,0	34,5	32,3	34,3	32,2	32,8	32,1	32,4	- 6
SE	47,4	47,2	43,1	45,9	46,3	47,3	45,8	46,5	1

Table 3
Final energy intensity (FEI), in ktoe/millionPPS

	2007	2008	2009	Average (2007-2009)	2017	2018	2019	Average (2017-2019)	Reduction (%)
EU	93,5	91,5	91,2	92,0	74,1	71,8	69,0	71,6	- 22
BE	109,6	112,1	111,2	111,0	87,5	85,5	80,8	84,6	- 24

	2007	2008	2009	Average (2007-2009)	2017	2018	2019	Average (2017-2019)	Reduction (%)
BG	130,7	117,6	107,8	118,7	94,8	90,5	85,0	90,1	- 24
CZ	116,7	110,6	110,1	112,5	87,3	82,4	78,5	82,7	- 26
DK	93,5	88,3	88,0	89,9	66,5	64,5	62,3	64,4	- 28
DE	88,0	89,8	89,8	89,2	70,7	67,5	66,5	68,2	- 24
EE	131,2	129,2	133,8	131,4	93,7	90,6	84,8	89,7	- 32
IE	81,3	85,9	83,0	83,4	46,0	44,3	42,4	44,2	- 47
EL	86,4	80,8	80,9	82,7	77,6	73,8	73,4	74,9	- 9
ES	84,0	79,2	77,8	80,3	66,1	66,4	63,8	65,4	- 19
FR	86,7	86,6	86,6	86,6	71,0	67,8	63,4	67,4	- 22
HR	109,7	105,6	109,2	108,1	89,9	85,5	81,6	85,6	- 21
IT	84,1	81,6	80,9	82,2	66,2	65,5	63,5	65,1	- 21
CY	96,8	92,9	93,9	94,5	82,2	77,4	73,6	77,7	- 18
LV	137,4	125,6	146,7	136,6	104,9	103,5	98,1	102,2	- 25
LT	107,0	99,8	107,3	104,7	81,5	80,6	75,4	79,2	- 24
LU	134,6	127,1	124,9	128,9	88,8	90,6	89,8	89,7	- 30
HU	113,0	106,2	107,1	108,8	91,2	85,7	81,6	86,2	- 21
MT	59,7	59,5	54,6	57,9	44,5	44,1	42,6	43,8	- 24
NL	90,7	88,6	91,0	90,1	74,5	72,2	69,4	72,0	- 20
AT	100,5	97,4	97,6	98,5	82,3	77,8	76,7	78,9	- 20
PL	119,7	113,8	110,1	114,6	89,5	89,6	83,0	87,3	- 24
PT	88,5	84,4	86,4	86,4	70,8	69,2	67,7	69,3	- 20
RO	103,1	90,0	85,7	93,0	64,3	60,4	56,5	60,4	- 35
SI	117,1	118,5	114,7	116,8	95,5	90,3	83,6	89,8	- 23
SK	113,6	107,0	103,3	108,0	88,3	86,0	85,2	86,5	- 20
FI	163,4	150,7	152,2	155,5	137,9	136,1	132,8	135,6	- 13
SE	109,9	105,8	109,6	108,4	87,7	84,8	80,7	84,4	- 22

Table 4

Primary energy intensity (PEI), in ktoe/millionPPS

	2007	2008	2009	Average (2007-2009)	2017	2018	2019	Average (2017-2019)	Reduction (%)
EU	138,8	134,3	132,5	135,2	105,8	101,8	96,6	101,4	- 25
BE	163,2	162,6	162,8	162,9	123,0	114,2	114,4	117,2	- 28
BG	255,5	228,0	212,2	231,9	175,6	167,5	157,2	166,8	- 28
CZ	204,3	188,6	183,4	192,1	142,8	136,5	127,7	135,7	- 29
DK	121,1	112,8	113,3	115,7	79,4	76,9	73,0	76,5	- 34
DE	134,0	133,2	131,7	133,0	98,9	94,1	90,6	94,6	- 29

	2007	2008	2009	Average (2007-2009)	2017	2018	2019	Average (2017-2019)	Reduction (%)
EE	261,8	227,3	209,7	233,0	188,7	174,6	140,4	167,9	- 28
IE	98,4	101,7	104,9	101,7	55,8	52,3	50,3	52,8	- 48
EL	118,5	114,9	115,6	116,3	110,0	104,9	101,1	105,3	- 9
ES	119,8	112,9	109,5	114,1	98,7	96,2	90,0	95,0	- 17
FR	146,5	145,7	145,4	145,9	116,7	112,6	104,7	111,3	- 24
HR	142,0	131,1	136,1	136,4	108,1	102,0	96,9	102,3	- 25
IT	113,4	108,6	106,3	109,4	86,2	83,5	80,8	83,5	- 24
CY	135,8	134,2	134,0	134,6	111,7	106,1	98,9	105,6	- 22
LV	150,6	138,4	161,1	150,0	116,7	116,3	109,6	114,2	- 24
LT	166,3	160,7	180,7	169,2	93,9	92,2	85,2	90,4	- 47
LU	142,9	133,8	132,9	136,5	91,2	92,9	92,1	92,1	- 33
HU	167,3	155,9	152,7	158,6	123,4	115,7	110,0	116,4	- 27
MT	117,9	113,7	106,5	112,7	57,6	55,1	53,3	55,3	- 51
NL	122,1	118,0	121,6	120,6	100,4	95,3	92,3	96,0	- 20
AT	124,6	121,7	118,9	121,7	100,3	93,2	92,3	95,3	- 22
PL	181,7	171,9	161,5	171,7	126,8	126,2	114,4	122,4	- 29
PT	111,4	108,0	111,9	110,5	97,6	93,1	87,2	92,6	- 16
RO	165,7	139,6	127,6	144,3	89,5	83,4	75,9	82,9	- 43
SI	165,8	166,4	160,9	164,4	129,9	121,3	112,5	121,2	- 26
SK	182,4	171,5	165,4	173,1	143,4	136,3	132,8	137,5	- 21
FI	228,1	208,9	211,3	216,1	178,8	177,0	169,9	175,2	- 19
SE	160,5	156,7	152,3	156,5	129,2	128,0	119,7	125,6	- 20

Table 5

Early action factor

							(%)
	Cropped Savings subfactor		Cropped intensity subfactor		Early action factor		
	PEC	FEC	PEI	FEI	PEC	FEC	
BE	100	100	89	93	89	93	
BG	100	100	89	92	89	92	
CZ	100	100	85	84	85	84	
DK	50	50	74	78	50	50	
DE	93	100	87	94	81	94	
EE	100	100	90	70	90	70	
IE	100	61	52	50	52	50	
EL	50	50	100	100	50	50	
ES	93	50	100	100	93	50	

(%)						
	Cropped Savings subfactor		Cropped intensity subfactor		Early action factor	
	PEC	FEC	PEI	FEI	PEC	FEC
FR	100	69	100	100	100	69
HR	59	50	100	100	59	50
IT	50	50	100	100	50	50
CY	71	63	100	100	71	63
LV	100	100	100	88	100	88
LT	50	100	54	91	50	91
LU	100	100	77	73	77	73
HU	100	100	94	100	94	100
MT	59	100	50	91	50	91
NL	91	50	100	100	91	50
AT	100	100	100	100	100	100
PL	100	100	87	93	87	93
PT	100	50	100	100	100	50
RO	64	100	59	63	50	63
SI	69	52	95	96	66	50
SK	100	100	100	100	100	100
FI	100	100	100	100	100	100
SE	100	100	100	100	100	100

A.3.2. *Wealth factor*

Table 6

Gross Domestic Product/population (GDP/cap), in thousandsPPS/person

	2017	2018	2019	Average (2017-2019)	Wealth factor (%)
EU	29,3	30,3	31,4	30,4	
BE	34,7	35,7	36,9	35,8	118
BG	14,7	15,6	16,5	15,6	51
CZ	26,7	28,0	29,2	28,0	92
DK	38,1	39,1	39,6	38,9	128
DE	36,5	37,5	37,9	37,3	123
EE	23,3	24,7	25,8	24,6	81
IE	53,8	57,9	59,6	57,1	150
EL	19,6	20,1	20,6	20,1	66
ES	27,2	27,7	28,6	27,8	92
FR	30,7	31,6	33,4	31,9	105
HR	18,6	19,5	20,8	19,6	65
IT	28,5	29,2	30,2	29,3	96

	2017	2018	2019	Average (2017-2019)	Wealth factor (%)
CY	26,5	27,8	29,3	27,9	92
LV	19,6	20,9	21,7	20,7	68
LT	23,0	24,6	26,4	24,7	81
LU	79,7	79,8	79,7	79,7	150
HU	20,2	21,6	22,9	21,6	71
MT	30,4	31,5	33,2	31,7	104
NL	37,9	39,3	39,9	39,0	129
AT	37,3	38,7	39,5	38,5	127
PL	20,6	21,7	23,1	21,8	72
PT	22,7	23,7	24,6	23,7	78
RO	18,5	20,0	21,8	20,1	66
SI	25,1	26,5	27,9	26,5	87
SK	20,7	21,3	22,1	21,4	70
FI	32,7	33,6	34,2	33,5	110
SE	35,9	36,5	37,4	36,6	121

A.3.3. Intensity factor

Table 7

Final energy intensity (FEI), in ktoe/millionPPS

	2017	2018	2019	Average (2017-2019)	Final intensity factor (%)
EU	74,1	71,8	69,0	71,6	
BE	87,5	85,5	80,8	84,6	118
BG	94,8	90,5	85,0	90,1	126
CZ	87,3	82,4	78,5	82,7	115
DK	66,5	64,5	62,3	64,4	90
DE	70,7	67,5	66,5	68,2	95
EE	93,7	90,6	84,8	89,7	125
IE	46,0	44,3	42,4	44,2	62
EL	77,6	73,8	73,4	74,9	105
ES	66,1	66,4	63,8	65,4	91
FR	71,0	67,8	63,4	67,4	94
HR	89,9	85,5	81,6	85,6	120
IT	66,2	65,5	63,5	65,1	91
CY	82,2	77,4	73,6	77,7	109
LV	104,9	103,5	98,1	102,2	143
LT	81,5	80,6	75,4	79,2	111
LU	88,8	90,6	89,8	89,7	125
HU	91,2	85,7	81,6	86,2	120

	2017	2018	2019	Average (2017-2019)	Final intensity factor (%)
MT	44,5	44,1	42,6	43,8	61
NL	74,5	72,2	69,4	72,0	101
AT	82,3	77,8	76,7	78,9	110
PL	89,5	89,6	83,0	87,3	122
PT	70,8	69,2	67,7	69,3	97
RO	64,3	60,4	56,5	60,4	84
SI	95,5	90,3	83,6	89,8	125
SK	88,3	86,0	85,2	86,5	121
FI	137,9	136,1	132,8	135,6	150
SE	87,7	84,8	80,7	84,4	118

Table 8

Primary energy intensity (PEI), in ktoe/millionPPS

	2017	2018	2019	Average (2017-2019)	Primary intensity factor (%)
EU	105,8	101,8	96,6	101,4	
BE	123,0	114,2	114,4	117,2	116
BG	175,6	167,5	157,2	166,8	150
CZ	142,8	136,5	127,7	135,7	134
DK	79,4	76,9	73,0	76,5	75
DE	98,9	94,1	90,6	94,6	93
EE	188,7	174,6	140,4	167,9	150
IE	55,8	52,3	50,3	52,8	52
EL	110,0	104,9	101,1	105,3	104
ES	98,7	96,2	90,0	95,0	94
FR	116,7	112,6	104,7	111,3	110
HR	108,1	102,0	96,9	102,3	101
IT	86,2	83,5	80,8	83,5	82
CY	111,7	106,1	98,9	105,6	104
LV	116,7	116,3	109,6	114,2	113
LT	93,9	92,2	85,2	90,4	89
LU	91,2	92,9	92,1	92,1	91
HU	123,4	115,7	110,0	116,4	115
MT	57,6	55,1	53,3	55,3	55
NL	100,4	95,3	92,3	96,0	95
AT	100,3	93,2	92,3	95,3	94
PL	126,8	126,2	114,4	122,4	121
PT	97,6	93,1	87,2	92,6	91

	2017	2018	2019	Average (2017-2019)	Primary intensity factor (%)
RO	89,5	83,4	75,9	82,9	82
SI	129,9	121,3	112,5	121,2	120
SK	143,4	136,3	132,8	137,5	136
FI	178,8	177,0	169,9	175,2	150
SE	129,2	128,0	119,7	125,6	124

A.3.4. Savings potential factor

Table 9

PRIMES MIX 55 % and PRIMES EU Reference Scenario 2020, in Mtoe

	MIX 55 (PEC)	PEC baseline 2030	Savings potential (%)	MIX 55 (FEC)	FEC baseline 2030	Savings potential (%)
BE	36,0	38,3	- 6,0	30,5	33,1	- 7,8
BG	14,0	15,6	- 10,5	9,2	10,0	- 8,0
CZ	30,1	32,8	- 8,0	21,2	22,9	- 7,5
DK	16,4	17,2	- 4,6	14,7	15,4	- 4,3
DE	198,3	221,4	- 10,4	162,8	178,7	- 8,9
EE	4,0	4,5	- 12,7	2,7	2,9	- 4,3
IE	11,4	12,6	- 8,9	10,1	11,1	- 9,2
EL	18,0	18,8	- 4,4	15,0	16,2	- 7,8
ES	86,0	91,5	- 6,0	68,6	72,4	- 5,3
FR	164,8	179,2	- 8,0	105,5	118,1	- 10,7
HR	6,7	7,6	- 11,5	5,7	6,6	- 13,4
IT	110,9	125,4	- 11,6	94,5	102,8	- 8,1
CY	2,1	2,3	- 10,2	1,8	2,0	- 9,4
LV	4,0	4,2	- 5,0	3,6	3,7	- 3,9
LT	5,3	5,7	- 6,3	4,4	4,8	- 7,6
LU	3,0	3,2	- 7,6	2,9	3,1	- 7,7
HU	24,6	26,1	- 5,5	16,9	18,4	- 7,8
MT	0,9	0,9	- 4,6	0,7	0,8	- 5,8
NL	49,8	52,3	- 4,7	40,9	43,2	- 5,2
AT	26,0	28,4	- 8,7	22,8	24,6	- 7,4
PL	73,8	89,1	- 17,2	58,7	66,0	- 11,1
PT	15,9	16,9	- 6,0	13,9	14,8	- 6,7
RO	30,0	33,2	- 9,7	23,0	25,3	- 8,9
SI	6,1	6,5	- 6,5	4,5	4,8	- 6,0

	MIX 55 (PEC)	PEC baseline 2030	Savings potential (%)	MIX 55 (FEC)	FEC baseline 2030	Savings potential (%)
SK	14,6	15,4	- 5,3	8,8	9,6	- 8,3
FI	32,0	34,3	- 6,9	21,5	24,1	- 10,6
SE	37,2	40,8	- 8,8	26,4	29,0	- 9,0

Table 10

PRIMES MIX 55 % and PRIMES updated EU Reference Scenario 2020, in Mtoe

	MIX 55 (PEC)	PEC baseline 2030	Savings potential (%)	MIX 55 (FEC)	FEC baseline 2030	Savings potential (%)
BE	36,0	40,2	- 10,5	30,5	33,1	- 7,8
BG	14,0	16,5	- 15,6	9,2	9,2	- 0,7
CZ	30,1	33,8	- 10,8	21,2	23,1	- 8,4
DK	16,4	16,4	0,0	14,7	14,2	3,6
DE	198,3	219,4	- 9,6	162,8	176,7	- 7,8
EE	4,0	3,6	10,1	2,7	2,8	- 3,4
IE	11,4	12,8	- 10,8	10,1	12,0	- 15,8
EL	18,0	19,6	- 8,2	15,0	16,3	- 8,0
ES	86,0	93,3	- 7,8	68,6	71,8	- 4,6
FR	164,8	183,6	- 10,2	105,5	122,3	- 13,8
HR	6,7	7,5	- 9,9	5,7	6,5	- 12,1
IT	110,9	125,6	- 11,7	94,5	103,8	- 9,0
CY	2,1	2,2	- 4,4	1,8	1,9	- 3,4
LV	4,0	4,3	- 6,8	3,6	3,9	- 9,4
LT	5,3	6,2	- 13,8	4,4	5,0	- 11,3
LU	3,0	3,3	- 9,7	2,9	3,2	- 8,6
HU	24,6	26,5	- 6,8	16,9	18,2	- 7,1
MT	0,9	0,8	2,9	0,7	0,7	- 1,2
NL	49,8	51,8	- 3,7	40,9	42,8	- 4,4
AT	26,0	27,5	- 5,5	22,8	23,1	- 1,6
PL	73,8	93,3	- 21,0	58,7	67,2	- 12,6
PT	15,9	19,4	- 18,2	13,9	16,3	- 14,7
RO	30,0	31,8	- 5,5	23,0	23,8	- 3,1
SI	6,1	6,4	- 5,4	4,5	4,9	- 7,2
SK	14,6	16,0	- 9,3	8,8	9,8	- 10,1
FI	32,0	34,7	- 7,8	21,5	23,8	- 9,4
SE	37,2	42,0	- 11,4	26,4	28,3	- 6,8

A.3.5. Total factor

Table 11

Calculation of the total factor (EU Reference Scenario 2020)

(%)

	Early action factor		Wealth factor	Intensity factor		Savings Potential factor		Total factor	
	PEC	FEC		PEC	FEC	PEC	FEC	PEC	FEC
BE	89	93	118	116	118	52	67	94	99
BG	89	92	51	150	126	89	68	95	84
CZ	85	84	92	134	115	69	65	95	89
DK	50	50	128	75	90	50	50	76	80
DE	81	94	123	93	95	89	76	96	97
EE	90	70	81	150	125	109	50	107	82
IE	52	50	150	52	62	76	78	83	85
EL	50	50	66	104	105	50	66	68	72
ES	93	50	92	94	91	51	50	82	71
FR	100	69	105	110	94	69	91	96	90
HR	59	50	65	101	120	98	115	81	87
IT	50	50	96	82	91	99	69	82	77
CY	71	63	92	104	109	87	81	89	86
LV	100	88	68	113	143	50	50	83	87
LT	50	91	81	89	111	53	65	68	87
LU	77	73	150	91	125	65	66	96	104
HU	94	100	71	115	120	50	66	82	89
MT	50	91	104	55	61	50	50	65	77
NL	91	50	129	95	101	50	50	91	82
AT	100	100	127	94	110	74	63	99	100
PL	87	93	72	121	122	147	95	107	96
PT	100	50	78	91	97	52	57	80	70
RO	50	63	66	82	84	83	76	70	72
SI	66	50	87	120	125	55	51	82	79
SK	100	100	70	136	121	50	71	89	91
FI	100	100	110	150	150	59	91	105	113
SE	100	100	121	124	118	75	77	105	104

Table 12

Calculation of the total factor (updated EU Reference Scenario 2020)

(%)

	Early action factor		Wealth factor	Intensity factor		Savings Potential factor		Total factor	
	PEC	FEC		PEC	FEC	PEC	FEC	PEC	FEC
BE	89	93	118	116	118	90	67	103	99
BG	89	92	51	150	126	133	50	106	80
CZ	85	84	92	134	115	92	71	101	91
DK	50	50	128	75	90	50	50	76	80
DE	81	94	123	93	95	82	67	95	95
EE	90	70	81	150	125	50	50	93	82
IE	52	50	150	52	62	92	135	87	99
EL	50	50	66	104	105	70	69	72	72
ES	93	50	92	94	91	67	50	86	71
FR	100	69	105	110	94	88	118	101	97
HR	59	50	65	101	120	85	104	77	84
IT	50	50	96	82	91	100	77	82	78
CY	71	63	92	104	109	50	50	79	78
LV	100	88	68	113	143	58	80	85	95
LT	50	91	81	89	111	118	97	85	95
LU	77	73	150	91	125	83	73	100	105
HU	94	100	71	115	120	58	60	85	88
MT	50	91	104	55	61	50	50	65	77
NL	91	50	129	95	101	50	50	91	82
AT	100	100	127	94	110	50	50	93	97
PL	87	93	72	121	122	150	108	107	99
PT	100	50	78	91	97	150	126	105	88
RO	50	63	66	82	84	50	50	62	66
SI	66	50	87	120	125	50	62	81	81
SK	100	100	70	136	121	79	86	96	94
FI	100	100	110	150	150	67	80	107	110
SE	100	100	121	124	118	97	58	110	99

Table 13

Annex I formula results (EU Reference Scenario 2020 & updated EU Reference Scenario 2020), in Mtoe

	EU Reference Scenario 2020				Updated EU Reference Scenario 2020			
	Formula results		Formula results after correction factor		Formula results		Formula results after correction factor	
	PEC	FEC	PEC	FEC	PEC	FEC	PEC	FEC
BE	34,14	29,24	33,77	28,78	35,39	29,24	34,66	28,82
BG	13,86	8,99	13,71	8,85	14,49	8,38	14,20	8,25
CZ	29,13	20,53	28,81	20,21	29,79	20,66	29,18	20,36
DK	15,70	13,95	15,52	13,73	14,98	12,88	14,67	12,69
DE	196,38	158,42	194,23	155,95	195,05	157,05	191,06	154,75
EE	3,97	2,60	3,93	2,56	3,21	2,57	3,14	2,53
IE	11,35	10,01	11,23	9,86	11,53	10,61	11,29	10,45
EL	17,32	14,87	17,13	14,64	17,91	14,90	17,55	14,68
ES	82,69	66,41	81,78	65,38	83,90	65,90	82,19	64,94
FR	159,09	105,65	157,34	104,01	161,97	108,52	158,67	106,93
HR	6,91	5,96	6,83	5,87	6,81	5,89	6,67	5,81
IT	113,40	93,57	112,16	92,12	113,50	94,27	111,18	92,89
CY	2,06	1,84	2,04	1,81	1,96	1,74	1,92	1,71
LV	3,77	3,34	3,73	3,28	3,83	3,50	3,75	3,45
LT	5,21	4,32	5,16	4,25	5,55	4,45	5,44	4,38
LU	2,85	2,75	2,82	2,71	2,90	2,77	2,84	2,73
HU	23,57	16,45	23,31	16,19	23,84	16,36	23,35	16,12
MT	0,84	0,70	0,83	0,69	0,78	0,67	0,76	0,66
NL	46,72	39,03	46,21	38,42	46,25	38,70	45,30	38,13
AT	25,15	21,69	24,88	21,35	24,50	20,49	24,00	20,19
PL	78,01	58,64	77,16	57,73	81,60	59,40	79,93	58,53
PT	15,33	13,62	15,16	13,41	17,06	14,58	16,71	14,37
RO	30,49	23,12	30,16	22,76	29,46	21,92	28,86	21,60
SI	5,85	4,35	5,79	4,29	5,79	4,40	5,68	4,33
SK	13,77	8,59	13,62	8,46	14,23	8,72	13,94	8,59
FI	30,11	20,92	29,78	20,60	30,33	20,71	29,71	20,41
SE	35,82	25,50	35,42	25,10	36,59	25,05	35,84	24,69

APPENDIX B

Energy Balance	NRG_BAL
Final Energy Consumption	FEC
Final Energy Consumption, PRIMES 2030 projection from 2020 Reference Scenario	FECB2030
Final Energy Intensity	FEI
Gross Inland Consumption	GIC
Million Tonnes of Oil Equivalent	Mtoe
Primary Energy Consumption	PEC
Primary Energy Consumption, PRIMES 2030 projection from 2020 Reference Scenario	PECB2030
Primary Energy Intensity	PEI
Standard International Energy Product Classification	SIEC
Thousand Tonne of Oil Equivalent	ktoe