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|  | EUROPEAN COMMISSION  DIRECTORATE-GENERAL  CLIMATE ACTION  Directorate A - Strategy, Analysis and Planning  **CLIMA.A.2 - Foresight, Economic Analysis & Modelling** |

**Recommended parameters for reporting on GHG projections in 2025**

1. Recommended harmonised values for key supra-nationally determined parameters.

Annex I, Part 2 of the Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action (the Governance Regulation) calls on the Commission to provide recommendations for key parameters for projections for the integrated national energy and climate plans, at least covering oil, gas, and coal import prices as well as carbon prices under the EU Emission Trading System (EU ETS). Similarly, Article 38(3) of the Implementing Regulation[[1]](#footnote-2) states that in reporting GHG projections, pursuant to Article 18(1) of the Governance Regulation[[2]](#footnote-3), Member States shall take into account the harmonised values for key parameters for projections – at least for oil, gas, and coal import prices as well as for carbon prices under the European Emission Trading System pursuant to Directive 2003/87/EC.

Article 2 of the Governance Regulation establishes that GHG projections should include at least the next six future years ending with 0 or 5 immediately following the reporting year (2025 in this exercise). Consequently, the recommended parameters are provided for the year 2025 and the following six years ending with 0 or 5: 2030, 2035, 2040, 2045, 2050, and 2055.

Through this document, the Commission puts forward the recommended harmonised values for the international oil, gas and coal import prices and carbon prices set out in Annex I, for the 2025 GHG projections. The base year to communicate recommended prices throughout this document is 2023. It is important to be very clear in the reporting on the year used to express the values in constant prices, and to use the same unit across all monetary values reported.

The Commission recommends Member States to use these harmonised values in their projections. Should a Member State decide to use other values than the recommended ones, the reasons for doing so should be clearly provided in the report accompanying the data submission files, together with a sensitivity analysis, which uses the values of the recommended harmonised parameters in Annex I.

**International Fuel Prices**

International fuel prices decreased significantly from the extreme values experienced at the high of the 2022 energy crisis. While gas prices remain above historical averages, market indicators point at a stabilisation brought about by fuel switch, consumption reduction and diversification of supply. However, the energy crisis highlighted the extreme volatility of fossil fuel prices.

In this context, any long-term trajectory for fuel prices should be viewed with caution and put into perspective. A very high degree of uncertainty remains on the future evolution of international fuel prices in the coming years.

The recommended trajectories for oil, gas and coal import prices combine recent market developments with long-term trends:

* updated historical data for 2018-2023 combined with estimates of price in 2024 and 2025 based on the market price of futures contracts, and
* an interpolation to long term trajectory derived from the Global Climate and Energy Outlook 2023[[3]](#footnote-4), developed by the JRC and based on comprehensive world energy modelling with the POLES model.

For Member States that perform the sensitivity analysis mentioned in point (d) of Annex VII of the Governance Regulation on gas prices, a range for gas prices with the purpose of sensitivity analysis is provided – see Annex I of this note.

**Carbon price**

The carbon price trajectory for sectors under ETS I for 2018-2030 is based on:

* historical data for 2018-2023,
* an estimate up to 2030 consistent with the 55% objective of GHG emission reduction and considering the proposed gas and coal price trajectories.

The proposed trajectory beyond 2030 makes a distinction between:

* a “With Existing Measures” (WEM) trajectory of the ETS carbon price for use in scenarios representing a baseline policy context without any additional measure and, for this reason, not compatible with the 2050 climate neutrality objective. This trajectory follows the REF2020 trajectory.
* a “With Additional Measures” (WAM) trajectory for use in scenarios with additional policy measures, that would be compatible with the 2050 climate neutrality objective (and thus follow trajectories compatible with the Commission’s FF55 analysis). It must be noted that the trajectory departs from an explicit “ETS carbon price” to become a “shadow cost of GHG mitigation”, representing in the modelling the “dual value” of GHG abatement in the absence of further sectoral policies beyond 2030[[4]](#footnote-5).

The ETS II carbon price trajectory for 2027-2030 is based on the recommendations shared with MS on March 2023 in the context of the update of NECPs (see Annex III). Compared to the prices indicated in the document shared in March 2023, prices have been updated to from EUR2020 to 2023EUR to ensure consistency throughout this document. For long term values beyond 2030, Member States can assume in their WAM scenarios for ETS2 sectors carbon values in line with EU climate neutrality.

1. Consistent other assumptions

In view of facilitating a meaningful EU-wide aggregation of projections, Member States are invited to use the assumptions provided in Annex II on:

Population

Gross Domestic Product (GDP) growth

This will further enhance the robustness of the EU aggregation of the projections needed for progress reporting in the EU and to the UN, as well as the comparability of the analytical projections across Member States. At the same time the data shared serves as concrete suggestions when corresponding information at national level is not available.

If there are reasons for national deviations and country-specific estimates are available, it is suggested to use the listed assumptions for a sensitivity analysis and to include related information in the report accompanying the GHG projection data files.

The data on population is aligned with the latest European Commission 2024 Ageing Report[[5]](#footnote-6), which is based to the Eurostat EUROPOP2023 population projections and it includes updated values for the historical data (2020-2021) as from the most recent release of Eurostat population dataset (Eurostat, [TPS00001] Persons having their usual residence in a country on 1 January of the respective year).

The assumptions on real GDP growth are based on:

* for the years up to 2025: the latest economic and budgetary projections from DG ECFIN (Winter 2024 European Economic Forecast),
* from 2026 onward the values used in the 2024 Ageing Report.

**Annex I: Recommended harmonised values for key supra-nationally determined parameters**

**International oil, gas and coal fuel import prices**

Table 1 shows the proposed central harmonised trajectories for oil, gas, and coal fuel international prices.

Table 1. Proposed harmonised central trajectories for international fuel prices (EUR2023)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| EUR2023 | Oil | | | Gas (NCV) | | Coal | |
| €/GJ | €/toe | €/boe | €/GJ | €/toe | €/GJ | €/toe |
| 2018\* | 13 | 543 | 74 | 9.3 | 338 | 3.6 | 151 |
| 2019\* | 12.1 | 508 | 69 | 5.4 | 226 | 2.5 | 104 |
| 2020\* | 7.6 | 320 | 44 | 3.7 | 155 | 1.9 | 80 |
| 2021\* | 12.5 | 523 | 71 | 18.1 | 758 | 4.5 | 188 |
| 2022\* | 16.7 | 701 | 102 | 35.1 | 1,469 | 10.9 | 457 |
| 2023\* | 12.5 | 523 | 76 | 10.9 | 455 | 4.4 | 183 |
| 2024 | 13.1 | 547 | 80 | 8.3 | 349 | 4.1 | 172 |
| 2025 | 12.4 | 520 | 76 | 9.4 | 394 | 4.1 | 172 |
| 2030 | 13.9 | 582 | 85 | 9.0 | 377 | 4.0 | 169 |
| 2035 | 15.4 | 645 | 94 | 8.2 | 344 | 3.8 | 161 |
| 2040 | 15.8 | 663 | 97 | 10.1 | 422 | 3.8 | 160 |
| 2045 | 17.2 | 718 | 105 | 9.9 | 412 | 4.0 | 166 |
| 2050 | 19.7 | 825 | 121 | 9.6 | 403 | 4.0 | 166 |
| 2055 | 23.8 | 996 | 146 | 9.6 | 403 | 4.1 | 170 |

*Note: \* 2018-2023 data are yearly average of daily value expressed in current EUR of dated Brent for oil, TTF day ahead for gas, steam coal CIF ARA 6000k for coal. The conversion from current EUR to EUR2023 uses the ESTAT HICP index (data extracted in March 2024).*

Table 2 shows the proposed range for the international gas price trajectory.

Table 2. Proposed range for the gas price trajectory (EUR2023)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| EUR2023 | Gas (min) | | Gas (Max) | |
| €/GJ | €/toe | €/GJ | €/toe |
| 2025 | 9.4 | 394 | 9.4 | 394.1 |
| 2030 | 6.8 | 284 | 12.6 | 527.4 |
| 2035 | 6.6 | 275 | 12.6 | 527.4 |
| 2040 | 6.7 | 279 | 12.6 | 527.4 |
| 2045 | 6.4 | 268 | 12.6 | 527.4 |
| 2050 | 6.1 | 256 | 13.2 | 551.6 |
| 2055 | 5.8 | 244 | 13.5 | 564.2 |

**Carbon prices**

Table 2 shows the trajectory of the carbon price for sectors under the existing ETS in its current scope (power, industry, centralised heat, aviation sectors, and maritime industry) up to 2030, corresponding to the legally binding -55% climate target context.

For long-term values beyond 2030, Table 3 shows two trajectories: a trajectory based on the EU Reference Scenario 2020 for the carbon value in “WEM” scenarios, and an indicative carbon value trajectory across the economy to reaching the EU climate neutrality*[[6]](#footnote-7)* for national (“WAM”) scenarios.

Table 3. Harmonised trajectory for the carbon price / value in sectors under ETS1 (EUR2023 / tCO2)

|  |  |  |
| --- | --- | --- |
| EUR 2023 / tCO2 | Common trajectory carbon price existing ETS up to 2030 | |
| 2018\* | 19 | |
| 2019\* | 30 | |
| 2020\* | 29 | |
| 2021\* | 65 | |
| 2022\* | 90 | |
| 2023\* | 92 | |
| 2024 | 95 | |
| 2025 | 95\*\*\* | |
| 2030 | 95\*\*\* | |
|  | WEM trajectory | WAM trajectory |
| 2035 | 100 | 140\*\* |
| 2040 | 100 | 290\*\* |
| 2045 | 160 | 430\*\* |
| 2050 | 190 | 490\*\* |
| 2055 | 220 | 520\*\* |

*Note: \* 2018-2023 data are yearly average of daily value expressed in current EUR of dated EUX EUA. The conversion from current EUR to EUR2023 uses the ESTAT HICP index (data extracted in February 2024). \*\** *The indicative post-2030 “WAM” trajectory is a modelling driver to reach the EU 2050 climate neutrality in the FF55 package analysis. It is acknowledged that national analyses projecting economy-wide GHG emissions compatible with the EU 2050 climate neutrality objective may provide a different carbon value trajectory.*

*\*\*\* The corresponding carbon prices expressed in nominal values are about 100 and 102 EUR / tCO2 for 2025 and 2030, assuming an index of 126.38 in 2023, 132 in 2025 and 145.74 in 2030, compared to 100 in 2015[[7]](#footnote-8).*

Table 4 shows the trajectory of the carbon price for sectors under the ETS2 up to 2030.

Table 4. Harmonised trajectory for the carbon price / value in sectors under ETS2 (EUR2023 / tCO2)

|  |  |
| --- | --- |
| EUR 2023 / tCO2 | Common trajectory carbon price ETS II up to 2030 |
| 2027 | 30\* |
| 2028 | 50\* |
| 2029 | 55\* |
| 2030 | 55\* |

*Note: \* The corresponding carbon prices expressed in nominal values are about 32, 53, 61 and 62 and EUR / tCO2 for 2027, 2028, 2029 and 2030, assuming an index of 126.38 in 2023, 137.33 in 2027, 140.08 in 2028 and 142.88 in 2029, 145.74 in 2030 compared to 100 in 2015[[8]](#footnote-9).*

For long term values beyond 2030, Member States can assume in their WAM scenarios for ETS2 sectors carbon values in line with EU climate neutrality. ETS2 carbon values can be the same as those recommended for ETS1 in the WAM scenario, i.e., the strengthened ETS1 in line with the EU climate neutrality objective, or those ETS carbon values modelled in national scenarios to reflect the national objectives, in line with the national long-term strategies. The Commission may come back with updated recommendations.

**Annex II: Population and GDP growth**

Assumptions on population and GDP growth by Member State is provided in an associated Microsoft Excel file: [GHG projection parameters 2025 Annex II 30 pop&GDP.xlsx].

**Annex III: ETS Recommended parameters to model ETS2**

Letter sent to MS in March 2023 on the recommended parameters to model ETS II in the context of the update of NECP is provided in an associated PDF file: [ETS2 recommendation.pdf]

1. Regulation (EU) 2020/1208 [↑](#footnote-ref-2)
2. Regulation (EU) 2018/1999 [↑](#footnote-ref-3)
3. <https://joint-research-centre.ec.europa.eu/scientific-activities-z/geco/geco-2023_en> [↑](#footnote-ref-4)
4. See the Section 8.5.3 of the “Common analytical framework” Annex of the ETS impact assessment SWD(2021) 557 final, which discusses carbon values (including the role of foresight in modelling) in the context of reaching climate neutrality at EU level. [↑](#footnote-ref-5)
5. 2024 Ageing Report. Underlying Assumptions and Projection Methodologies. 2024 Ageing Report. Underlying Assumptions and Projection Methodologies - European Commission (europa.eu). <https://economy-finance.ec.europa.eu/publications/2024-ageing-report-underlying-assumptions-and-projection-methodologies_en> [↑](#footnote-ref-6)
6. See “SWD(2021) 557 final”, section 8.5.3 [↑](#footnote-ref-7)
7. Combining ESTAT HICP index for data until 2023 (data extracted in February 2024) and ECB HICP Survey of Professional Forecasters (Q1 2024) for data in 2024-2028:

   <https://www.ecb.europa.eu/stats/ecb_surveys/survey_of_professional_forecasters/html/ecb.spf2022q1~082bc1deaa.en.html> [↑](#footnote-ref-8)
8. ECB HICP Survey of Professional Forecasters (Q1 2024) for data in 2024-2028:

   <https://www.ecb.europa.eu/stats/ecb_surveys/survey_of_professional_forecasters/html/ecb.spf2022q1~082bc1deaa.en.html> [↑](#footnote-ref-9)