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 2023

Version after consultation of WG2 under the Climate Change Committee on 10 March 2022, sharing of draft recommendation on 30 March 2022 and consultation of National Experts designated by members of WG2 on 26 April 2022

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 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] states that in reporting GHG projections, pursuant to Article 18(1) of the Governance Regulation[2], 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.

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 2023 GHG projections. In line with the Implementing Regulation (EU) 2020/1208, the Commission also recommends updating the base year for expressing monetary values from 2016 to 2020[3]. The conversion from EUR2016 to EUR2020 uses the ESTAT HICP index[4]. 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

With global instability linked to the war in Ukraine and the on-going global economic recovery from the pandemic and its impact on supply chains, the past two years have seen a high degree of volatility

[1] Regulation (EU) 2020/1208

[2] Regulation (EU) 2018/1999

3 Footnote 8 of Table 3 of Implementing Regulation (EU) 2020/1208

4 data extracted in May 2022

of energy prices. A very high degree of uncertainty remains on the future evolution of international fuel prices in the coming years.

In this context, the recommended trajectories for oil, gas and coal import prices aim at combining recent developments with long-term trends:

- updated historical data for 2018-2021 combined with estimates of price in 2022 and for the next couple of years, and
- a linear interpolation to long term trajectory from 2035 onwards derived from the EU Reference Scenario 2020 (REF2020)[5], itself based on comprehensive world energy modelling.

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 uncertainty on the international energy markets will also affect the market ETS price in the coming years, as fossil fuel prices are a factor contributing to substitutions across fuels and options in the current EU energy system. Consequently, the trajectories proposed in this document cannot be considered as forecasts of future ETS prices.

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

- updated historical data for 2018-2021,
- 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[6].

[5] https://energy.ec.europa.eu/data-and-analysis/energy-modelling/eu-reference-scenario-2020_en

[6] 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.

2. 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 fully consistent with the assumptions used and made available to Member States in the preparation of the Commission's EU Reference Scenario 2020. The data stems from the Eurostat EUROPOP2019 population projections and it includes updated values for the historical data (2020-2021) as from the most recent release of Eurostat population dataset.

The assumptions on real GDP growth are based on:

- for the years up to 2023: the latest economic and budgetary projections from DG ECFIN (Spring 2022 European Economic Forecast[7]),
- from 2025 onward the values made available to Member States in the preparation of the Commission's EU Reference Scenario 2020. They are based on GDP per capita from DG ECFIN's latest available Ageing Report (European Commission, DG ECFIN: The 2021 Ageing Report) and population growth from EUROPOP2019.

[7] https://ec.europa.eu/info/business-economy-euro/economic-performance-and-forecasts/economic-forecasts/spring-2022-economic-forecast_en

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 (EUR2020)

	Oil			Gas (NCV)		Coal	
EUR2020	€/GJ	€/toe	€/boe	€/GJ	€/toe	€/GJ	€/toe
2018*	10,9	454	62	7,8	325	3,0	126
2019*	10,2	425	58	4,5	189	2,1	87
2020*	6,4	268	37	3,1	130	1,6	67
2021*	10,5	438	60	15,1	634	3,8	157
2022	15,4	643	88	33,2	1391	5,3	220
2023	15,4	643	88	24,0	1005	4,2	176
2024	15,4	643	88	14,6	611	3,2	132
2025	15,4	643	88	13,2	554	3,1	128
2030	15,4	643	88	11,3	473	3,1	130
2035	15,4	643	88	11,3	473	3,1	131
2040	16,3	680	93	11,3	473	3,3	139
2045	17,6	738	101	11,3	473	3,5	146
2050	19,7	824	112	11,8	494	3,7	153

*Note: The conversion toe/GJ is 41.868, the conversion boe/toe is 7.33. * 2018-2021 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 and EUR2016 to EUR2020 uses the ESTAT HICP index (data extracted in May 2022).*

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

Table 2. Proposed range for the gas price trajectory (EUR2020)

EUR 2020	Gas (NCV) – Low		Gas (NCV) – High	
	€/GJ	€/toe	€/GJ	€/toe
2024	14,6	611	15,4	643
2025	5,0	209	14,6	611
2030	6,7	281	13,8	579
2035	7,4	308	13,1	547
2040	8,6	361	13,0	544
2045	9,3	391	13,2	553
2050	9,5	397	13,8	577

Note: The conversion toe/GJ is 41.868, the conversion boe/toe is 7.33

Carbon prices

Table 3 shows the trajectory of the carbon price of the existing ETS in its current scope (power, industry, centralised heat and aviation sectors) up to 2030, corresponding to the legally binding -55% climate target context and considering the central trajectory for international fuel prices.

For long-term values beyond 2030, Table 3 shows two trajectories: a trajectory based on the EU Reference Scenario 2020 for the EU ETS carbon price in "WEM" scenarios, and an indicative carbon value trajectory across the economy to reaching the EU climate neutrality[8] for national ("WAM") scenarios.

Table 3. Harmonised trajectory for the carbon price / value (EUR2020 / tCO2)

EUR 2020 / tCO2	Common trajectory carbon price existing ETS up to 2030	
2018*	16	
2019*	25	
2020*	24	
2021*	54	
2022	75	
2023	77	
2024	78	
2025	80***	
2030	80***	
	WEM trajectory	WAM trajectory
2035	82	120**
2040	85	250**
2045	130	360**
2050	160	410**

*Note: * 2018-2021 data are yearly average of daily value expressed in current EUR of dated EUX EUA. The conversion from current EUR and EUR2016 to EUR2020 uses the ESTAT HICP index (data extracted in May 2022).** 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 90 and 100 EUR / tCO2 for 2025 and 2030, assuming an index of 105.76 in 2020, 118.6 in 2025 and 130.9 in 2030, compared to 100 in 2015[9].*

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 2023 Annex II 30 pop&GDP.xlsx].

[8] See "SWD(2021) 557 final", section 8.5.3

[9] Combining ESTAT HICP index for data until 2021 (data extracted in May 2022) and ECB HICP Survey of Professional Forecasters (Q1 2022) for data in 2022-2030:

https://www.ecb.europa.eu/stats/ecb_surveys/survey_of_professional_forecasters/html/ecb.spf2022q1~082bc1deaa.en.html