

# Final Review Report

## 2022 annual review of national greenhouse gas inventory data

pursuant to Article 19(2) of Regulation (EU) No 525/2013

Romania  
30 June 2022

European Environment Agency



Reference: 340201/ 2020/838280/SER/CLIMA.C  
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## Contents

Conclusions from the 2022 annual ESD review .....	3
Step 1 conclusions .....	3
Step 2 conclusions .....	3
National totals for the purpose of Article 3 of Decision No 406/2009/EC (ESD) .....	5
Greenhouse gas emissions covered by Decision 406/2009/EC.....	6
Statement from Romania on the conclusions presented by the TERT.....	7
Recommendations from the TERT including revised estimates.....	8
Revised estimates provided by Romania and accepted by the TERT .....	10
Annex I: Legal background and procedures of the 2022 annual ESD review .....	14
Annex II: Checks carried out during the 2022 annual ESD review in line with Art.29 and 32 of the Commission Implementing Regulation (EU) No 749/2014 .....	16

## List of tables

Table 1: Overview of issues raised with Romania during the first and the second step.....	4
Table 2: National totals for the purpose of Article 3 of Decision No 406/2009/EC .....	5
Table 3: Greenhouse gas emissions covered by Decision 406/2009/EC.....	6
Table 4: Recommendations from the TERT (RE = Revised estimate <sup>1</sup> ; TC = Technical correction <sup>2</sup> ).....	8
Table A.1.1: Scope of the 2022 annual ESD review .....	15

## Conclusions from the 2022 annual ESD review

This Review Report presents the findings from the 2022 annual review of the greenhouse gas (GHG) emission inventory of Romania, pursuant to Article 19(2) of Regulation (EU) No 525/2013, with a view to monitoring Romania's achievement of its GHG emission reduction or limitation target pursuant to Article 3 of Decision No 406/2009/EC (the 'Effort Sharing Decision', ESD) in 2020.

The reviewers carried out checks to verify the transparency, accuracy, consistency, comparability and completeness of the national GHG inventory for the year 2020 submitted in 2022 by Romania pursuant to Articles 7(1) and 7(3) of Regulation (EU) No 525/2013.

The review consisted of two steps:

1. The EU inventory team (European Environment Agency (EEA), European Topic Centre on Climate Change Mitigation (ETC/CM), Joint Research Centre (JRC) and Eurostat) performed the initial checks under Step 1.
2. A Technical Expert Review Team (TERT) performed Step 2 of the 2022 annual ESD review.

More information on the ESD legislation and the procedures for the 2022 annual ESD review is presented in the annexes to this review report.

### Step 1 conclusions

The checks performed identified 12 significant issues, therefore Romania was subject to a second step of the 2022 annual ESD review. Only significant issues were subject to the second step review checks.

### Step 2 conclusions

1. The reviewers raised 37 issues with Romania during the first and the second step of the 2022 annual ESD review (see Table 1). The TERT provided a recommendation for 4 of these issues. Other issues raised during the annual review were clarified and are considered resolved.
2. The TERT identified cases where inventory data were prepared in a manner which is inconsistent with UNFCCC guidance documentation or Union rules. In particular, the TERT identified a number of under- or over-estimates exceeding the threshold of significance pursuant to Article 31 of Commission Implementing Regulation (EU) No 749/2014.
3. Romania provided 4 revised estimates. The TERT agreed to all revised estimates. Table 2 below summarises the revised estimates and further information is provided at the end of this report.
4. On that basis, the TERT did not deem necessary any technical corrections within the meaning of Article 19(3)(c) of Regulation (EU) No 525/2013 in consultation with Romania.
5. The TERT identified non-binding recommendations in order to improve the national inventory data of Romania (see Table 4).
6. The TERT considers that it received a response from Romania that was sufficient in order to undertake the review appropriately.

**Table 1: Overview of issues raised with Romania during the first and the second step**

	Issues raised <sup>1</sup>	Recommendations <sup>2</sup>	Revised estimates <sup>3</sup>	Technical corrections <sup>4</sup>
<b>Total</b>	<b>37</b>	<b>4</b>	<b>4</b>	<b>-</b>
Energy	18	3	3	-
IPPU	6	1	1	-
Agriculture	9	-	-	-
Waste	4	-	-	-
Cross-cutting	-	-	-	-

<sup>1</sup> Excluding findings related to Land use, land use change and forestry (LULUCF) and Kyoto Protocol (KP) LULUCF.

<sup>2</sup> The total number of recommendations includes revised estimates and technical corrections.

<sup>3</sup> Revised estimates: changes in inventory estimates triggered by the review and provided by the Member State.

<sup>4</sup> Technical corrections: changes in inventory estimates triggered by the review and provided by the TERT.

## National totals for the purpose of Article 3 of Decision No 406/2009/EC (ESD)

**Table 2: National totals for the purpose of Article 3 of Decision No 406/2009/EC**

Data / Source category	Reference	Emission estimates (kt CO <sub>2</sub> equivalent) <sup>1</sup> 2020
Total greenhouse gas emissions, including indirect CO <sub>2</sub> , without land use, land-use change and forestry as reported by Romania pursuant to Article 7(4) of Regulation (EU) No 525/2013, taking into account any resubmission to the Commission	ROU_2022_4_23022022	113 628.430
<b>Difference between original estimates and revised estimates provided by Romania and accepted by the TERT<sup>2</sup></b>		
1A Fuel Combustion, CO <sub>2</sub>	RO-1-2022-0003	-2 736.166
1A1b Petroleum Refining, CO <sub>2</sub>	RO-1A1b-2022-0001, RO-1A1b-2022-0003	-196.640
1A2f Non-Metallic Minerals, CO <sub>2</sub>	RO-1A2-2022-0001	-469.897
2F1 Refrigeration and Air Conditioning, HFCs	RO-2F1-2022-0002	-320.553
<b>Total greenhouse gas emissions including revised estimates</b>		<b>109 905.174</b>
CO <sub>2</sub> emissions from 1A3a Domestic aviation <sup>3</sup>	ROU_2022_4_23022022	115.641
NF <sub>3</sub> emissions <sup>3</sup>	ROU_2022_4_23022022	-

<sup>1</sup> The tables presented in this report show numbers rounded to three decimal places, although most numbers are available with greater precision. For all calculations (in particular of total GHG emissions and total ESD emissions), all available decimal places were used. Therefore, the totals shown may slightly differ from calculation results where only three decimals would be taken into account.

<sup>2</sup> A positive difference indicates an increase compared to reported emissions. A negative difference indicates a decrease compared to reported emissions.

<sup>3</sup> CO<sub>2</sub> emissions from 1A3a Domestic aviation and NF<sub>3</sub> emissions have been deducted from the national total as they are not included within the scope of total ESD emissions.

## Greenhouse gas emissions covered by Decision 406/2009/EC

**Table 3: Greenhouse gas emissions covered by Decision 406/2009/EC**

Data	Reference	Emissions (kt CO <sub>2</sub> equivalent) <sup>1</sup> 2020
Total greenhouse gas emissions including accepted revised estimates provided by Romania	<i>See Table 2 above</i>	109 905.174
Total verified emissions from stationary installations under Directive 2003/87/EC	Extracted by the European Commission from EUTL on 8 March 2022 (as agreed at the Working Group I of the Climate Change Committee on 18 May 2015) <sup>2</sup>	32 665.999
CO <sub>2</sub> emissions from 1A3a Domestic aviation <sup>3</sup>	<i>See Table 2 above</i>	115.641
NF <sub>3</sub> emissions <sup>3</sup>	<i>See Table 2 above</i>	-
<b>Total ESD emissions</b>		<b>77 123.535</b>

<sup>1</sup> The tables presented in this report show numbers rounded to three decimal places, although most numbers are available with greater precision. For all calculations (in particular of total GHG emissions and total ESD emissions), all available decimal places were used. Therefore, the totals shown may slightly differ from calculation results where only three decimals would be taken into account.

<sup>2</sup> The emissions of ETS stationary installations were independently verified and recorded in the EU Transaction Log (EUTL). These emissions do not derive from the national greenhouse gas emission inventory data and therefore the TERT was not tasked to review them. Emissions of ETS stationary installations have been deducted from the national total as they are not included within the scope of total ESD emissions.

<sup>3</sup> CO<sub>2</sub> emissions from 1A3a Domestic aviation and NF<sub>3</sub> emissions have been deducted from the national total as they are not included within the scope of total ESD emissions.

## Statement from Romania on the conclusions presented by the TERT

Romania agrees with the aggregated GHG emission inventory estimates presented in Table 3.

## Recommendations from the TERT including revised estimates

**Table 4: Recommendations from the TERT (RE = Revised estimate<sup>1</sup>; TC = Technical correction<sup>2</sup>)**

EMRT - ID	Key category	Category, gas, year	Recommendation	RE or TC in 2022
RO-1-2022-0003	Yes	1A Fuel Combustion, 2020, CO <sub>2</sub>	The TERT noted large differences between CO <sub>2</sub> emissions in the reference and sectoral approaches reported in CRF Table1.A(c), namely -6.48% for liquid fuels and -16.21% for gaseous fuels for the year 2020. During the review, Romania acknowledged that the CO <sub>2</sub> emissions associated with the combustion of gaseous and liquid fuels in 1A1a Public Electricity and Heat Production and 1A2 Manufacturing Industries and Construction, as reported in CRF Table1.A(a)s1 and Table1.A(a)s2, were over-estimated. The over-estimation was due to errors in the activity data. Romania provided a revised estimate for the year 2020. The TERT agreed with the revised estimate provided by Romania and attached it to the annex of the review report. The TERT recommends that Romania include the revised estimate in its next submission.	RE
RO-1A1b-2022-0001, RO-1A1b-2022-0003	Yes	1A1b Petroleum Refining, 2020, CO <sub>2</sub>	This issue combines the findings raised under issues RO-1A1b-2022-0001 and RO-1A1b-2022-0003. For category 1A1b Petroleum Refining, liquid fuels, CO <sub>2</sub> , year 2020 the TERT noted that Romania estimated CO <sub>2</sub> emissions associated with petcoke consumption by using the activity data and emissions from EU ETS reports and adding to them the difference between activity data and the associated CO <sub>2</sub> emissions reported in the national energy balance and EU ETS data. This resulted in an additional quantity of 65.85 kt petcoke and 196.64 kt of associated CO <sub>2</sub> emissions. The TERT considers that any combustion and / or processing of petcoke in refineries (category 1A1b Petroleum Refining) has to be included in the EU ETS reports because the activity exceeds any combustion or other process thresholds for reporting under the EU ETS. For that reason, the TERT is of the view that the consumption of petcoke in refineries from EU ETS reports is more accurate than the data from the national energy balance and should be included in the inventory (CRF Table1.A(a)s1), and any difference with the data from national energy balance should not be included. In response to a question raised during the review, Romania provided a revised estimate of CO <sub>2</sub> emissions from petroleum refining for the year 2020 by taking into account, for petcoke, only the CO <sub>2</sub> emissions as reported in EU ETS reports. The TERT agreed with the revised estimate provided by Romania and attached it to the annex of the review report. The TERT recommends that Romania include the revised estimate in its next submission.	RE



EMRT - ID	Key category	Category, gas, year	Recommendation	RE or TC in 2022
RO-1A2-2022-0001	Yes	1A2f Non-Metallic Minerals, 2020, CO <sub>2</sub>	For category 1A2f Non-Metallic Minerals, other fossil fuels, CO <sub>2</sub> in the year 2020, the TERT noted that Romania used as activity data the sum of the amount of industrial waste that was reported under the 1A2f category at the national energy balance and the amount of industrial waste that was reported in the EU ETS reports related to 1A2f category. The TERT is of the view that since the value from the national energy balance is greater than the EU ETS one, the EU ETS consumption is included in the data from the national energy balance. This means that the CO <sub>2</sub> emissions of the EU ETS plants are double-counted. In response to a question raised during the review, Romania provided a revised estimate of CO <sub>2</sub> emissions associated with the combustion of other fossil fuels in the 1A2f category for the year 2020 by using solely the activity data of the 1A2f category from the national energy balance. The TERT agreed with the revised estimate provided by Romania and attached it to the annex of the review report. The TERT recommends that Romania include the revised estimate in its next submission.	RE
RO-2F1-2022-0002	Yes	2F1 Refrigeration and Air Conditioning, 2015-2020, HFCs	For category 2F1f Stationary Air-Conditioning and HFCs for year 2020 the TERT noted that Romania reported a disposal loss factor of 100%, while 15% was applied for 2F1a Commercial refrigeration and 2F1c Industrial refrigeration. The TERT noted that it is unusual that there would be no recovery for stationary air-conditioning units while recovery efficiency for refrigeration systems would be relatively high. In response to a question raised during the review, Romania explained that the factor of 15% can also be considered applicable for stationary air-conditioning. Romania provided a revised estimate for years 2015-2020. In the context of this review, the revised estimate was taken into consideration only regarding the year 2020. The TERT agreed with the revised estimate provided by Romania for 2020 and attached to the annex of the review report. The TERT recommends that Romania include the revised estimate in its next submission and include the justification provided during the review for applying disposal loss factors of 15% in its NIR.	RE

<sup>1</sup> Revised estimates: changes in inventory estimates triggered by the review and provided by the Member State.

<sup>2</sup> Technical corrections: changes in inventory estimates triggered by the review and provided by the TERT.

## Revised estimates provided by Romania and accepted by the TERT

1

ESD Review Tool ID:	RO-1-2022-0003
ESD Review Tool URL:	https://emrt-esd.eionet.europa.eu/2022/RO-1-2022-0003#tab-qa
Country:	Romania
Sector:	1A Fuel Combustion
Gases:	CO <sub>2</sub>
Fuel	Gaseous and liquid fuels
Completed by Sector Expert:	Ioannis Sempas
Reviewed by Counterpart:	Marlene Plejdrup
Reviewed by Lead Reviewer:	Suvi Monni
Reviewed by Quality Controller:	Bernd Gugele
The underlying problem:	The TERT noted large differences between CO <sub>2</sub> emissions in the reference and sectoral approaches reported in CRF Table1.A(c), namely -6.48% for liquid fuels and -16.21% for gaseous fuels for the year 2020. During the review, Romania acknowledged that the CO <sub>2</sub> emissions associated with the combustion of gaseous and liquid fuels in 1A1 and 1A2, as reported in CRF Table1.A(a)s1 and Table1.A(a)s2, were over-estimated. The over-estimation was due to errors in the AD.
Summarise the methodology used:	The AD was corrected and CO <sub>2</sub> emission estimates were revised accordingly.

2

	Original estimate (Gg CO <sub>2</sub> e)							Notes
Year	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	SF <sub>6</sub>	Mixed GHG	
2020	53 764.285							Liquid and gaseous fuels for 1A
	Revised Estimate received from country (Gg CO <sub>2</sub> e)							Notes
Year	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	SF <sub>6</sub>	Mixed GHG	
2020	51 028.119							Liquid and gaseous fuels for 1A
	Difference between RE and original estimate (Gg CO <sub>2</sub> e)							
Year	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	SF <sub>6</sub>	Mixed GHG	
2020	-2736.166							

ESD Review Tool ID:		RO-1A1b-2022-0001, RO-1A1b-2022-0003						
ESD Review Tool URL:		<a href="https://emrt-esd.eionet.europa.eu/2022/RO-1A1b-2022-0003#tab-qa">https://emrt-esd.eionet.europa.eu/2022/RO-1A1b-2022-0003#tab-qa</a>						
Country:		Romania						
Sector:		1A1b Petroleum Refining						
Gases:		CO <sub>2</sub>						
Fuel		Liquid fuels						
Completed by Sector Expert:		Ioannis Sempas						
Reviewed by Counterpart:		Marlene Plejdrup						
Reviewed by Lead Reviewer:		Suvi Monni						
Reviewed by Quality Controller:		Bernd Guegle						

  

1

The underlying problem:

Romania estimated CO<sub>2</sub> emissions associated with petcoke consumption in refineries (category 1A1b) by using the AD and emissions from EU ETS reports and adding to them the difference between AD and the associated CO<sub>2</sub> emissions of petcoke consumption reported in the national energy balance and EU ETS data. This resulted in an additional quantity of 65.85 kt petcoke and 196.64 kt of associated CO<sub>2</sub> emissions. The TERT considers that any combustion and / or processing of petcoke in refineries is included in the EU ETS reports because the activity exceeds any combustion or other process thresholds for reporting under EU ETS. The TERT further noted that even the CO<sub>2</sub> emissions of petcoke use as a byproduct in catalytic cracking and reforming (e.g. in FCC units) is included in EU ETS reports. For that reason, the TERT is of the view that the consumption of petcoke in refineries reported in the EU ETS reports is more accurate compared to the data from national energy balance and should be included in the inventory (CRF Table1.A(a)s1), and any difference with the data from national energy balance should not be included.

Summarise the methodology used:

The CO<sub>2</sub> emissions associated with the consumption of petcoke in 1A1b category were estimated by using solely the AD and CO<sub>2</sub> emissions of EU ETS reports.

  

2

Original estimate (Gg CO <sub>2</sub> e)								Notes
Year	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	SF <sub>6</sub>	Mixed GHG	
2020	1 774.549							

  

Revised Estimate received from country (Gg CO <sub>2</sub> e)								Notes
Year	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	SF <sub>6</sub>	Mixed GHG	
2020	1 577.910							

  

Difference between RE and original estimate (Gg CO <sub>2</sub> e)							
Year	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	SF <sub>6</sub>	Mixed GHG
2020	-196.640						

1	ESD Review Tool ID:	RO-1A2-2022-0001							
	ESD Review Tool URL:	<a href="https://emrt-esd.eionet.europa.eu/2022/RO-1A2-2022-0001#tab-qa">https://emrt-esd.eionet.europa.eu/2022/RO-1A2-2022-0001#tab-qa</a>							
	Country:	Romania							
	Sector:	1A2f Non-Metallic Minerals							
	Gases:	CO <sub>2</sub>							
	Fuel	Other fuels							
	Completed by Sector Expert:	Ioannis Sempos							
	Reviewed by Counterpart:	Marlene Plejdrup							
	Reviewed by Lead Reviewer:	Suvi Monni							
Reviewed by Quality Controller:	Bernd Guele								
1	The underlying problem:	To estimate CO <sub>2</sub> emissions associated with the consumption of other fossil fuels (i.e. industrial waste) in 1A2f category, Romania used as AD the sum of the amount of industrial waste that was reported under 1A2f category at the national energy balance and the amount of industrial waste that was reported in the EU ETS reports related to 1A2f category. The TERT is of the view that since the data from the national energy balance are greater than the EU ETS data, the EU ETS consumption is included in the data from the national energy balance. Therefore, the CO <sub>2</sub> emissions of EU ETS plants are double counted. An additional argument about the above reasoning is that the biggest plants of category 1A2f fall under EU ETS. It is not likely that the AD of small plants would be included in the national energy balance and the AD of bigger plants (such as cement plants) would not be included in the national energy balance.							
	Summarise the methodology used:	The CO <sub>2</sub> emissions associated with the consumption of other fossil fuels (i.e. industrial waste) of 1A2f category were estimated by using solely the AD of 1A2f category from the national energy balance multiplied by the CO <sub>2</sub> IEF for 1A2f category.							
2	<b>Original estimate (Gg CO<sub>2</sub>e)</b>								
	Year	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	SF <sub>6</sub>	Mixed GHG	Notes
	2020	1 448.144							
	<b>Revised Estimate received from country (Gg CO<sub>2</sub>e)</b>								
	Year	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	SF <sub>6</sub>	Mixed GHG	Notes
	2020	978.247							
	<b>Difference between RE and original estimate (Gg CO<sub>2</sub>e)</b>								
	Year	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	SF <sub>6</sub>	Mixed GHG	
	2020	-469.897							

ESD Review Tool ID:

RO-2F1-2022-0002

ESD Review Tool URL:

https://emrt-esd.eionet.europa.eu/2022/RO-2F1-2022-0002

Country:

Romania

Sector:

2F1 Refrigeration and Air Conditioning

Gases:

HFCs

Fuel

N/A

Completed by Sector Expert:

Kristina Kaar

Reviewed by Counterpart:

Maria Purzner

Reviewed by Lead Reviewer:

Suvi Monni

Reviewed by Quality Controller:

Bernd Guegle

1

The underlying problem:

For 2F1f Stationary Air-Conditioning and HFCs, the TERT noted that Romania reported a disposal loss factor of 100%, while 15% was applied for 2F1a Commercial Refrigeration and 2F1c Industrial Refrigeration. The TERT noted that it is unusual that there would be no recovery for stationary air-conditioning units while recovery efficiency for refrigeration systems would be relatively high. In response to a question raised during the review, Romania explained that the recovery assumption of 85% (i.e. disposal loss factor of 15%) can also be adopted for 2F1f Stationary Air-Conditioning.

Summarise the methodology used:

The disposal loss factor for 2F1f was updated to 15% for year 2020. Romania explained that the information requested from the Waste Directorate of NEPA regarding the waste of electrical and electronic equipment (data received only for 2015) showed that from the total number of air conditioners collected for disposal about 83% are sent for treatment to economic operators holding an authorization to treat WEEE equipment (in-country treatment). About 2% of all air conditioning waste collected for decommissioning is sent for treatment to foreign countries. The remaining approximately 15% is decommissioned without recovery of the refrigerant. Taking into account the fact that waste air conditioning systems are treated at an aggregate level (no distinction is made between domestic and commercial / industrial air-conditioning systems) and assuming that the domestic air-conditioning equipment is maintained and dismantled by the same certified personnel who deal with the refrigeration units and commercial and industrial air-conditioning systems, the value of the 15% for disposal loss factor can be applied. It is the same value that is also used for the 2F1a Commercial Refrigeration category.

2

Original estimate (Gg CO<sub>2</sub>e)

Year

CO<sub>2</sub>

CH<sub>4</sub>

N<sub>2</sub>O

HFCs

PFCs

SF<sub>6</sub>

Mixed GHG

2020

807.525

Notes

2F1f Stationary Air-Conditioning

Revised Estimate received from country (Gg CO<sub>2</sub>e)

Year

CO<sub>2</sub>

CH<sub>4</sub>

N<sub>2</sub>O

HFCs

PFCs

SF<sub>6</sub>

Mixed GHG

2020

486.972

Notes

2F1f Stationary Air-Conditioning

Difference between RE and original estimate (Gg CO<sub>2</sub>e)

Year

CO<sub>2</sub>

CH<sub>4</sub>

N<sub>2</sub>O

HFCs

PFCs

SF<sub>6</sub>

Mixed GHG

2020

-320.553

## Annex I: Legal background and procedures of the 2022 annual ESD review

The Effort Sharing Decision No 406/2009/EC (ESD) sets national emission limits for greenhouse gas (GHG) emissions in the sectors outside the EU's Emission Trading System (ETS) for the period 2013-2020.

Therefore, this is the last ESD review that will be performed. The ESD and the Monitoring Mechanism Regulation (EU) 525/2013 (MMR) lay down annual reporting obligations, compliance checks and a Union review process to ensure that the compliance with annual GHG emission limits is assessed in a credible, consistent, transparent and timely manner. The requirements for the Union review of the national inventory data submitted by Member States are set out in Article 19 of the MMR.

The details concerning the review process, such as the timing and steps of conducting the annual and comprehensive reviews are set out in Chapter III and Annex XVI of the Commission Implementing Regulation (EU) No 749/2014.

The objectives of the 2022 annual ESD review of Member States' GHG emission inventories are:

- a) to support the European Commission by ensuring it has accurate, reliable and verified information on annual GHG emissions for determining compliance with ESD targets for the year 2020 in a credible, consistent, transparent and timely manner, according to Article 19 (2) of the MMR;
- b) to assist Member States in improving the quality of their GHG inventories.

The 2022 annual ESD review of national GHG inventory data was carried out for the compliance year 2020 pursuant to Article 19 of the MMR. The EEA review secretariat (consisting of Melanie Sporer, Claire Qoul and Justine Raoult) coordinated the 2022 annual ESD review as foreseen in Article 28 of the Commission Implementing Regulation (EU) No 749/2014.

The scope of the 2022 annual ESD review is presented in Table A.1.1. The checks carried out during the 2022 annual ESD review are presented in Annex II.

The review consisted of 2 steps. Step 1 was combined with the 'EU QA/QC procedures' (i.e. initial checks) and was carried out by the EU inventory team (EEA, ETC/CM, JRC, Eurostat). The EU inventory team consisted of the following experts:

- ETC/CME task manager: Nicole Mandl, Marion Pinterits (ETC/CM)
- Energy: Julien Vincent, Coralie Jeannot, Marion Pinterits, Zuzana Roskova, Bernd Gugele, Markéta Klusackova, Maria Georgakaki (ETC/CM), Michael Goll (Eurostat)
- IPPU: Barbara Gschrey, Kristina Kaar, Lorenz Moosmann, Lukas Emele, Julien Vincent, Coralie Jeannot (ETC/CM)
- Agriculture: Frank Dentener, Simona Bosco, Efisio Solazzo (JRC)
- Waste: Céline Gueguen (ETC/CM)
- LULUCF: Peter Iversen (EEA), Raúl Abad-Viñas (JRC)
- Quality experts: Frank Dentener, Giacomo Grassi (JRC), Nicole Mandl, Marion Pinterits, Markéta Klusackova, Risto Saarikivi, Maria Purzner, Julien Vincent, Giorgos Mellios, Ils Moorkens, Zuzana Roskova (ETC/CM)
- Cross-cutting: Nicole Mandl (ETC/CM)

All findings from the initial checks that were relevant for the ESD and that were not resolved within the initial check phase were followed up in the second step of the annual review.

Step 2 of the 2022 annual ESD review was performed by a Technical Expert Review Team (TERT) under service contract 340201/2018/790329/SER/CLIMA.C of the Directorate General for Climate Action of the European Commission. The TERT consisted of the following experts:

- Lead Reviewers: Suvi Monni, Ralph Harthan
- Energy: Marlene Plejdrup, Ioannis Sempas
- IPPU: Kristina Kaar, Maria Purzner
- Agriculture: Etienne Mathias, Steen Gyldenkaerne
- Waste: Richard Claxton, Hans Oonk
- Quality controller: Emma Salisbury, Justin Goodwin
- Co-ordinator: Bernd Guegle

The TERT did not review emission inventories of Member States where these individuals have themselves contributed to the compilation of that inventory, or presently are or have been any part of the decision-making process related to the compilation of that inventory. Reviewers who are nationals of the Member State whose inventory is concerned, did not take part in the review of that inventory.

Step 2 of the review was performed on the basis of GHG emission data and the national inventory report (NIR) officially reported by Member States by 15 March 2022 under the MMR. Where relevant, the TERT calculated technical corrections for under- or over-estimates identified in a mandatory category in the Member States' GHG inventories that exceed the threshold of significance. Technical corrections were calculated for the year 2020.

**Table A.1.1: Scope of the 2022 annual ESD review**

Element	Scope	Further information
Countries	EU geographical coverage of the 27 Member States and the United Kingdom	
Years	2020	
Gases	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFCs, PFCs, SF <sub>6</sub>	NF <sub>3</sub> is not covered by the ESD
Sectors	All emission source sectors excluding LULUCF	National totals exclude emissions from LULUCF and emissions reported under memo items
Indirect CO <sub>2</sub> emissions	Included in national total	
Inventory Submission	Submissions received by 15 March 2022	

## Annex II: Checks carried out during the 2022 annual ESD review in line with Art. 29 and 32 of the Commission Implementing Regulation (EU) No 749/2014

**As part of the EU's effort to assist Member States in improving the quality of the GHG inventories, the checks to verify the transparency, consistency, comparability and completeness of the greenhouse gas inventory included:**

### **First step review checks:**

1. Assessment whether all emission source categories and gases required under Regulation (EU) No 525/2013 are reported;
2. Assessment whether emissions data time series are consistent;
3. Assessment whether implied emission factors across Member States are comparable taking the IPCC default emission factors for different national circumstances into account;
4. Assessment of the use of 'Not Estimated' notation keys where IPCC Tier 1 methodologies exist and where the use of the notation key is not justified in accordance with paragraph 37 of the UNFCCC reporting guidelines on annual greenhouse gas inventories as included in Annex I to Decision 24/CP.19;
5. Analysis of recalculations performed for the inventory submission, in particular if the recalculations are based on methodological changes;
6. Comparison of the verified emissions reported under the Union's Emissions Trading System with the greenhouse gas emissions reported pursuant to Article 7 of Regulation (EU) No 525/2013 with a view of identifying areas where the emission data and trends as submitted by the Member State under review deviate considerably from those of other Member States;
7. Comparison of the results of Eurostat's reference approach with the Member States' reference approach;
8. Comparison of the results of Eurostat's sectoral approach with the Member States' sectoral approach;
9. Assessment whether recommendations from earlier Union or UNFCCC reviews, not implemented by the Member State could lead to a technical correction;
10. Assessment whether there are potential under- or over-estimations relating to a key category in a Member State's inventory.

### **Second step review checks:**

1. Detailed examination of the inventory estimates including methodologies used by the Member State in the preparation of inventories;
2. Detailed analysis of the Member State's implementation of recommendations related to improving inventory estimates as listed in its most recent UNFCCC annual review report made available to that Member State before the submission under review or in the final review report pursuant to Article 35(2) of this Regulation; where recommendations have not been implemented a detailed analysis of the justification provided by the Member State for not implementing them;
3. Detailed assessment of the time series consistency of the greenhouse gas emissions estimates;
4. Detailed assessment whether the recalculations made by a Member State in the given inventory submission as compared to the previous one are transparently reported and made in accordance with the 2006 IPCC Guidelines for National Greenhouse Gas Inventories;
5. Follow-up on the results of the checks referred to in Article 29 of the Commission Implementing Regulation (EU) No 749/2014 and on any additional information submitted by the Member State under review in response to questions from the technical experts review team and other relevant checks.