

# Final Review Report

## 2021 annual review of national greenhouse gas inventory data

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

### Romania

8 July 2021

European Environment Agency



Reference: 340201/ 2020/838280/SER/CLIMA.C  
Umweltbundesamt GmbH  
Spittelauer Lände 5  
1090 Vienna Austria

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## Conclusions from the 2021 annual ESD review

This Draft Review Report presents the findings from the 2021 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 2019.

The reviewers carried out checks to verify the transparency, accuracy, consistency, comparability and completeness of the national GHG inventory for the year 2019 submitted in 2021 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 and Energy (ETC/CME), 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 2021 annual ESD review.

More information on the ESD legislation and the procedures for the 2021 annual ESD review is presented in the annexes to this review report.

### Step 1 conclusions

The EU inventory team identified 5 significant issues through the checks performed in Step 1. Therefore, Romania was subject to a second step of the 2021 annual ESD review. Only significant issues were subject to the second step review checks.

### Step 2 conclusions

1. The reviewers raised 35 issues with Romania during the first and the second step of the 2021 annual ESD review (see Table 1). The TERT provided a recommendation for 5 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 underestimates or overestimates 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>35</b>	<b>5</b>	<b>4</b>	<b>-</b>
Energy	18	3	3	-
IPPU	7	-	-	-
Agriculture	6	1	-	-
Waste	4	1	1	-
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> 2019
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	ROU_2021_3_15022021	112 664.587
<b>Difference between original estimates and revised estimates provided by Romania and accepted by the TERT<sup>2</sup></b>		
1A3b Road transportation, CO <sub>2</sub>	RO-1A3b-2021-0002	-31.014
1B2a6 Fugitive emissions from oil - other, CO <sub>2</sub>	RO-1B-2021-0001	270.346
1B2b6 Fugitive emissions from natural gas - other, CH <sub>4</sub>	RO-1B2b-2021-0001	-967.292
5A1 Managed waste disposal sites	RO-5A-2021-0001	13.752
<b>Total greenhouse gas emissions including revised estimates</b>		<b>111 950.379</b>
CO <sub>2</sub> emissions from 1A3a Domestic aviation <sup>3</sup>	ROU_2021_3_15022021	193.501
NF <sub>3</sub> emissions <sup>3</sup>	ROU_2021_3_15022021	-

<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> NF<sub>3</sub> emissions and emissions from 1A3a Domestic Aviation will be 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> 2019
Total greenhouse gas emissions including accepted revised estimates provided by Romania	<i>See Table 2 above</i>	111 950.379
Total verified emissions from stationary installations under Directive 2003/87/EC	Extracted by the European Commission from EUTL on 12 April 2021 <sup>2</sup>	36 545.538
CO <sub>2</sub> emissions from 1A3a Domestic aviation <sup>3</sup>	<i>See Table 2 above</i>	193.501
NF <sub>3</sub> emissions <sup>3</sup>	<i>See Table 2 above</i>	-
Total ESD emissions		75 211.340

<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.

<sup>3</sup> NF<sub>3</sub> emissions and emissions from 1A3a Domestic Aviation will be 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 2021
RO-1A3b-2021-0002	Yes	1A3b Road transportation, 2016-2017, CO <sub>2</sub>	For 1A3b Road transportation, diesel oil, CO <sub>2</sub> emissions and year 2019, the TERT noted that the implied emission factor is much higher (80.93 t CO <sub>2</sub> /TJ) than the default range (72.6 – 74.8 t/TJ) provided in the 2006 IPCC Guidelines - table 3.2.1. In response to a question raised during the review, Romania provided a revised estimate for 2019, using the default EF value available in Table 3.2.1 of 2006 IPCC Guidelines together with revised activity data, and stated that it makes efforts to allow for the inclusion of the revised estimates in the next submission. The TERT agreed with the revised estimate provided by Romania and attached to the annex of the review report. The TERT recommends that Romania include the revised estimate in its next submission.	RE
RO-1B-2021-0001	Yes	1B Fugitive emissions from fuels, 2019, CO <sub>2</sub>	For category 1B2a6 Other fugitive emissions from oil, CO <sub>2</sub> and year 2019, the TERT noted that CO <sub>2</sub> emissions from the EU ETS, as reported under Regulation (EU) No 749/2014, Article 10, ANNEX V (714.41 kt CO <sub>2</sub> ), are higher than emissions reported under 1B2a6 (388.40 kt CO <sub>2</sub> ). The TERT noted that according to the NIR (p. 130), category 1B2a6 includes emissions from 'petroleum coke' which was 'subtracted' from category 1A1b Petroleum Refining. The TERT noted that total ETS emissions (reported under ANNEX V) from refineries are: 1A1b Petroleum Refining + 1B = 1801.96 kt + 715.41 kt = 2517.37 kt CO <sub>2</sub> and that refinery emissions reported in the CRF are: 1A1b Petroleum Refining + 1B2a6 = 1801.96 kt + 388.4 kt = 2190.36 kt CO <sub>2</sub> which is 327.01 kt lower than ETS data. In response to a question raised during the review, Romania provided a revised estimate for category 1B2a6 and year 2019. The TERT agreed with the revised estimate provided by Romania and attached to the annex of the review report. The TERT recommends that Romania include the revised estimate in its next submission. The TERT further recommends that Romania check and improve time series consistency of category 1B2a6 – CO <sub>2</sub> emissions.	RE
RO-1B2b-2021-0001	Yes	1B2b Fugitive emissions from natural gas, 2019, CH <sub>4</sub>	For 1B2b6 Fugitive emissions from Natural Gas, CH <sub>4</sub> , and year 2019, which is a non-mandatory key category, the TERT noted that Romania reports CH <sub>4</sub> emissions from natural gas leakage at end consumers, using the default (average) emission factors from the Revised 1996 IPCC Guidelines, Table 1-58 for "Former USSR, Central & Eastern Europe". The TERT noted a potential overestimate and asked Romania to use a higher Tier method which reflects the actual technical aspects more accurately. In response to a question raised during the review, Romania provided a revised estimate for category 1B2b6 and year 2019, using the lower default (average) emission factors from the Revised 1996 IPCC Guidelines, Table 1-58 for "Rest of the World" and revised (lower) activity data. The TERT agreed with the revised estimate provided by Romania and attached 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 2021
RO-5A-2021-0001	Yes	5A Solid waste disposal, 2019, CH <sub>4</sub>	For category 5A1 Managed waste disposal sites, the TERT noted that CH <sub>4</sub> emissions in 2019 are 12 % higher than in 2018 based upon Romania's CRF submission (March 2021) and that it was not possible to determine the reasons for such a trend in the NIR. In response to a question raised during the review, Romania provided a revised estimate that amended the 2019 emissions total due to further clarifications that were received from three of its SWDS operators with regards to CH <sub>4</sub> recovery data. These clarifications adjusted the CH <sub>4</sub> recovery (and therefore the CH <sub>4</sub> emissions) that were originally reported by Romania in its CRF. The TERT noted that this revised estimate had the impact of further increasing the 2018-2019 trend (+ 13%). For one operator in particular, Romania highlighted that there is a change in methodology between the two years from estimates that are based on reported statistics to measured data. The TERT notes that the revised 2019 CH <sub>4</sub> recovery and emissions data is based on a higher proportion of measured data than the preceding timeseries. The TERT therefore agreed with the revised estimate provided by Romania and attached to the annex of the review report. The TERT recommends that Romania transparently justify its approach for estimating CH <sub>4</sub> flaring and recovery in its future NIR submission to ensure the consistency of its emissions time series for category 5A1 Managed waste disposal sites.	RE
RO-3A-2021-0001	Yes	3A Enteric fermentation, 1990-2019, CH <sub>4</sub>	For CH <sub>4</sub> emissions from category 3A1 Enteric Fermentation Dairy Cattle, the TERT noted that the milk yield increases across the time series, while the digestibility of feed remains constant across the time series. The TERT considers that these trends could be inconsistent but is not able to assess the extent to which this may result in an over or under-estimate of emissions. In response to a question raised during the review, Romania explained that they will make efforts to make improvements for the inventory submission in 2023. The TERT strongly recommends that Romania use year-specific values for the digestibility of feed in its emissions calculations for 3A1 Enteric Fermentation Dairy Cattle, or provide clear justification for the use of a constant value across the time series. Where this data is not currently available, the TERT strongly recommends that Romania undertake work that will deliver the required data, and that annual progress be reported on this improvement activity in the NIR until it is completed.	No

<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-1A3b-2021-0002						
ESD Review Tool URL:	<a href="https://emrt-esd.eionet.europa.eu/2021/RO-1A3b-2021-0002">https://emrt-esd.eionet.europa.eu/2021/RO-1A3b-2021-0002</a>						
Country:	Romania						
Sector:	1A3b Road transportation						
Gases:	CO <sub>2</sub>						
Fuel	Liquid fuels						
Completed by Sector Expert:	Stephan Poupa						
Reviewed by Counterpart:	Julien Vincent						
Reviewed by Lead Reviewer:	Ralph Harthan						
Reviewed by Quality Controller:	Justin Goodwin						
The underlying problem:	For 1A3b Road transportation, diesel oil, CO <sub>2</sub> emissions and year 2019, the implied emission factor is much higher (80.93 t CO <sub>2</sub> /TJ) than the default range (72.6 – 74.8 t/TJ) provided in the 2006 IPCC Guidelines - table 3.2.1.						
Summarise the methodology used:	Romania provided a revised estimate for 2019: revised activity data (correction of NCV) and revised CO <sub>2</sub> emissions. The revised IEF of 74.1 t CO <sub>2</sub> /TJ corresponds with the IPCC default value for diesel oil. Activity data is consistent with the Eurostat energy balance.						

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	
2019	13 712.644							
								Notes
	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	
2019	13 681.631							
	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	
2019	-31.014							

1

ESD Review Tool ID:	RO-1B-2021-0001
ESD Review Tool URL:	emrt-esd.eionet.europa.eu/2021/RO-1B-2021-0001
Country:	Romania
Sector:	1B2a6 Fugitive emissions from oil - other
Gases:	CO <sub>2</sub>
Fuel	N/A
Completed by Sector Expert:	Stephan Poupa
Reviewed by Counterpart:	Julien Vincent
Reviewed by Lead Reviewer:	Ralph Harthan
Reviewed by Quality Controller:	Justin Goodwin
The underlying problem:	In ANNEX V of the Regulation (EU) No 749/2014, Article 10, category 1B Fugitive emissions, CO <sub>2</sub> and year 2019, Romania reported higher CO <sub>2</sub> emissions (714.41 kt) from the EU ETS than in the inventory (591.79 kt) without appropriate explanation why ETS data is 123.62 kt higher. The TERT noted (NIR, p. 130) that CO <sub>2</sub> emissions of 714.41 kt from ETS should be compared with category 1B2a6 (not with total 1B), which is only 388.40 kt CO <sub>2</sub> . Therefore, CO <sub>2</sub> emissions from ETS would be even 327.01 kt higher than in the inventory.
Summarise the methodology used:	Romania provided a revised estimate for 1B2a6 and year 2019: 658.75 kt CO <sub>2</sub> from "catalytic cracking". The revised estimate is based on ETS data.

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	
2019	388.401							1.B.2.a.6: Calculated with petrol coke AD and CS-EF
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	
2019	658.747							1.B.2.a.6: ETS data. CO <sub>2</sub> emissions from "Catalytic Cracking"
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	
2019	270.346							

1

ESD Review Tool ID:	RO-1B2b-2021-0001
ESD Review Tool URL:	https://emrt-esd.eionet.europa.eu/2021/RO-1B2b-2021-0001
Country:	Romania
Sector:	1B2b Fugitive emissions from natural gas
Gases:	CH <sub>4</sub>
Fuel	N/A
Completed by Sector Expert:	Stephan Poupa
Reviewed by Counterpart:	Julien Vincent
Reviewed by Lead Reviewer:	Ralph Harthan
Reviewed by Quality Controller:	

The underlying problem:	For 1B2b6, which is not a mandatory category, Romania estimates CH <sub>4</sub> emissions from natural gas leakage at end consumers, using the default (average) emission factors from the Revised 1996 IPCC Guidelines, Table 1-58 for "Former USSR,Central & Eastern Europe", which does not reflect actual technical circumstances.
Summarise the methodology used:	Romania provided a revised estimate with revised activity data (natural gas consumption), using the default (average) emission factors from the Revised 1996 IPCC Guidelines, Table 1-58 for "Rest of the World", which are about 69 % lower than those for "of Former USSR,Central & Eastern Europe".

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	
2019		1 360.592						

	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	
2019		393.301						

	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
2019		-967.292					

1

ESD Review Tool ID:	RO-5A-2021-0001
ESD Review Tool URL:	https://emrt-esd.eionet.europa.eu/2021/RO-5A-2021-0001
Country:	Romania
Sector:	5A Solid waste disposal
Gases:	CH <sub>4</sub>
Fuel	N/A
Completed by Sector Expert:	Richard Claxton
Reviewed by Counterpart:	Céline Gueguen
Reviewed by Lead Reviewer:	Ralph Harthan
Reviewed by Quality Controller:	Justin Goodwin

The underlying problem:

For category 5A1 Managed waste disposal sites, the TERT noted that CH<sub>4</sub> emissions in 2019 are 12 % higher than in 2018 based upon Romania's CRF submission (March 2021) and that it was not possible to determine the reasons for such a trend in the NIR. In response to a question raised during the review, Romania provided a revised estimate that amended the 2019 emissions total due to further clarifications that were received from three of its SWDS operators with regards to CH<sub>4</sub> recovery data. These clarifications adjusted the CH<sub>4</sub> recovery (and therefore the CH<sub>4</sub> emissions) that were originally reported by Romania in its CRF. The TERT noted that this revised estimate had the impact of further increasing the 2018-2019 trend (+ 13%). For one operator in particular, Romania highlighted that there is a change in methodology between the two years from estimates that are based on reported statistics to measured data. The TERT notes that the revised 2019 CH<sub>4</sub> recovery and emissions data is based on a higher proportion of measured data than the preceding timeseries and the revised estimate provided by Romania for 2019 was therefore accepted by the TERT.

Summarise the methodology used:

Romania provided a revised estimate for 5A1 (81 kt CH<sub>4</sub>) based on updated SWDS operator data which contribute to its CH<sub>4</sub> recovery estimates in 2019. There are three operators in the dataset.

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	
2019		2 011.252						

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	
2019		2 025.004						

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
2019		13.752					

## Annex I: Legal background and procedures of the 2021 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. 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 regulations (EU) No 749/2014.

The objectives of the 2021 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 2019 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 2021 annual ESD review of national GHG inventory data was carried out for the compliance year 2019 pursuant to Article 19 of the MMR. The EEA review secretariat (consisting of Melanie Sporer, Claire Qoul and Justine Raoult) coordinated the 2021 annual ESD review as foreseen in Article 28 of the Commission Implementing Regulation (EU) No 749/2014.

The scope of the 2021 annual ESD review is presented in Table A.1.1. The checks carried out during the 2021 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/CME, JRC, Eurostat). The EU inventory team consisted of the following experts:

- ETC/CME task manager: Nicole Mandl, Marion Pinterits (ETC/CME)
- Energy: Julien Vincent, Coralie Jeannot, Eva Krtkova, Marion Pinterits, Matina Kastori, Bernd Gugele, Markéta Müllerová (ETC/CME), Michael Goll (Eurostat)
- IPPU: Barbara Gschrey, Kristina Kaar, Lorenz Moosmann, Lukas Emele, Julien Vincent, Coralie Jeannot (ETC/CME)
- Agriculture: Adrian Leip, Simona Bosco, Janka Szemesova, Efisio Solazzo (JRC)
- Waste: Céline Gueguen (ETC/CME)
- LULUCF: Raul Abdas-Vinas (JRC)
- Quality coordinators: Adrian Leip, Giacomo Grassi (JRC), Bernd Gugele, Nicole Mandl, Marion Pinterits, Eva Krtkova, Markéta Müllerová, Risto Saarikivi, Maria Purzner, Julien Vincent, Giorgos Mellios, Ils Moorkens, Kaat Jespers (ETC/CME)
- Cross-cutting: Nicole Mandl (ETC/CME)

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 2021 annual ESD review was performed by a Technical Expert Review Team (TERT) under service contract 340201/2020/838280/SER/CLIMA.C.2 of the Directorate General for Climate Action of the European Commission. The TERT consisted of the following experts:

- Lead Reviewers: Ioannis Sempas, Ralph Harthan
- Energy: Stephan Poupa, Julien Vincent

- IPPU: Emma Salisbury, Maria Purzner
- Agriculture: Chris Dore, Katalin Lovas
- Waste: Richard Claxton, Céline Gueguen
- Quality controller: Justin Goodwin
- Co-ordinator: Bernd Gugele

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 2021 under the MMR. Where relevant, the TERT calculated technical corrections for over- or underestimates identified in a mandatory category in the Member States' GHG inventories that exceed the threshold of significance. Technical corrections were calculated for the year 2019.

**Table A.1.1: Scope of the 2021 annual ESD review**

Element	Scope	Further information
Countries	EU geographical coverage of the 27 Member States and the United Kingdom	
Years	2019	
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 2021	

## Annex II: Checks carried out during the 2021 annual ESD review in line with Article 9 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 overestimations or underestimations 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.