Final Review Report

2020 Comprehensive Review of National Greenhouse Gas Inventory Data

pursuant to Article 4(3) of Regulation (EU) No 2018/842 and to Article 3 of Decision No 406/2009/EC

Lithuania

30 August 2020

European Environment Agency

Reference: 340201/2019/814628/SER/CLIMA.C.2

Contents

List of tables

Conclusions from the 2020 comprehensive review

This Final Review Report presents the findings from the 2020 review of the greenhouse gas (GHG) emission inventory of Lithuania, pursuant to:

- Article 4(3) of Regulation (EU) No 2018/842 (the 'Effort Sharing Regulation', ESR), for the purpose of setting out Lithuania's annual emission allocations (AEAs) for the years from 2021 to 2030 in terms of tonnes of CO_2 equivalent, and
- Article 3 of Decision No 406/2009/EC (the 'Effort Sharing Decision', ESD), for the purpose of verifying Lithuania's GHG emissions and achievement of its GHG emission limitation target in the year 2018

The review was carried out as a comprehensive review in line with Article 19(1) of Regulation (EU) No 525/2013 (the 'Monitoring Mechanism Regulation', MMR). The global warming potentials applied are those from the IPCC Assessment Report 4.

The reviewers carried out checks to verify the transparency, accuracy, consistency, comparability and completeness of the national GHG inventory for the years 2005, 2016, 2017 and 2018 submitted in 2020 by Lithuania pursuant to Article 7 of the MMR.

The review consisted of two steps. The initial checks in step 1 were performed by 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). Step 2 was performed by a Technical Expert Review Team (TERT).

More information on the Effort Sharing legislation and the procedures for the 2020 comprehensive review is presented in the annexes of this review report.

Lithuania provided a resubmission to the Commission on 24/04/2020. The TERT considered this resubmission as the basis for the comprehensive review.

Step 1 and 2 conclusions

1. The reviewers raised 26 issues with Lithuania during the first and the second step of the 2020 comprehensive ESD review (see Table 1). The TERT provided recommendations for 3 of these issues. Other issues raised during the comprehensive review were clarified and are considered non-issues for the ESD review 2020.

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. Lithuania provided 3 revised estimates that were accepted by the TERT. Table 2 and Table 3 below summarise the revised estimates and further information is provided in the respective chapter of this report.

4. The TERT did not deem necessary any technical corrections in the meaning of Article 19(3)(c) of Regulation (EU) No 525/2013.

5. The TERT identified non-binding recommendations in order to improve the national inventory data of Lithuania (see Table 6).

6. The TERT considers that it received a response from Lithuania that was sufficient in order to undertake the comprehensive review appropriately.

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

	Issues raised step 1[1]	Issues raised step 2	Recommendations	Revised estimates[2]	Technical corrections[3]
Total	**14**	**12**	**3**	**3**	**-**
Energy	4	3	-	-	-
IPPU	7	2	1	1	-
Agriculture	-	4	-	-	-
Waste	3	3	2	2	-
Cross-cutting	-	-	-	-	-

[1] Excluding findings related to Land Use, Land Use Change and Forestry (LULUCF) and Kyoto Protocol (KP) LULUCF.
[2] Revised estimates: changes in inventory estimates triggered by the review, which were provided by the country and accepted by the TERT.
[3] 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

Emission source category	**Reference**	**Emission estimates (kt CO_2 equivalent)[1] 2018**
Total greenhouse gas emissions, including indirect CO_2, without Land Use, Land Use Change and Forestry, without international aviation, as reported by Lithuania pursuant to Article 7(4) of Regulation (EU) No 525/2013, taking into account any resubmission to the Commission	LTU_2020_1_15042020	20 266.829
Difference between original estimates and revised estimates provided by Lithuania and accepted by the TERT[2]		
2D Non-Energy Products from Fuels and Solvent Use, CO_2	LT-2D-2020-0001	26.736
5A Solid Waste Disposal, CH_4	LT-5A-2020-0003	-51.638
5D Wastewater Treatment and Discharge, CH_4	LT-5D-2020-0001	-3.899
Total greenhouse gas emissions including revised estimates		20 238.028
CO_2 emissions from 1A3a Domestic Aviation[3]	LTU_2020_1_15042020	1.988
NF_3 emissions[3]	LTU_2020_1_15042020	0.027

[1] 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 are taken into account.

[2] A positive difference indicates an increase compared to reported emissions. A negative difference indicates a decrease compared to reported emissions.

[3] Included in the totals. NF_3 was included in the comprehensive review (see Table A-1) for the purpose of the ESR, but has to be deducted for the purpose of ESD.

National totals for the purpose of Article 4(3) of Regulation (EU) No 2018/842 (ESR)

Table 3: National totals for the purpose of Article 4(3) of Regulation (EU) No 2018/842

Emission source category	Reference	Emission estimates (kt CO_2 equivalent)[1]			
		2005	2016	2017	2018
Total greenhouse gas emissions, including indirect CO_2, without Land Use, Land Use Change and Forestry, without international aviation, as reported by Lithuania pursuant to Article 7(4) of Regulation (EU) No 525/2013, taking into account any resubmission to the Commission	LTU_2020_1_15042020	22 801.833	20 420.348	20 617.614	20 266.829
Difference between original estimates and revised estimates provided by Lithuania and accepted by the TERT[2]					
2D Non-Energy Products from Fuels and Solvent Use, CO_2	LT-2D-2020-0001	26.336	23.663	25.987	26.736
5A Solid Waste Disposal, CH_4	LT-5A-2020-0003	0	-62.492	-64.190	-51.638
5D Wastewater Treatment and Discharge, CH_4	LT-5D-2020-0001	-15.546	-3.489	-4.151	-3.899
Total greenhouse gas emissions including revised estimates		22 812.623	20 378.030	20 575.259	20 238.028
CO_2 emissions from 1A3a Domestic Aviation[3]	LTU_2020_1_15042020	3.947	1.420	1.489	1.988

[1] 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 ESR emissions), all available decimal places were used. Therefore, the totals shown may slightly differ from calculation results where only three decimals are taken into account.

[2] A positive difference indicates an increase compared to reported emissions. A negative difference indicates a decrease compared to reported emissions.

[3] Included in the totals

Statement from Lithuania on the conclusions presented by the TERT

Lithuania agrees with the aggregated GHG emission inventory estimates presented in Table 2 and Table 3.

Greenhouse gas emissions covered by Decision 406/2009/EC (ESD)

Table 4: Greenhouse gas emissions for the purpose of Article 3 of Decision No 406/2009/EC

Emission source category	**Reference**	**Emission estimates (kt CO_2 equivalent)[1] 2018**
Total greenhouse gas emissions including any accepted revised estimates provided by Lithuania and any technical corrections deemed necessary by the TERT	See Table 2 above	20 238.028
Total verified emissions from stationary installations under Directive 2003/87/EC	Extracted by the European Commission from EUTL on 9 March 2020 (as agreed at the Working Group I of the Climate Change Committee on 18 May 2015)[2]	5 952.939
CO_2 emissions from 1A3a Domestic Aviation	See Table 2 above	1.988
NF_3 emissions	See Table 2 above	0.027
Total ESD emissions		**14 283.074**

[1] 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 are taken into account.

[2] 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.

Greenhouse gas emissions covered by Regulation (EU) No 2018/842 (ESR)

Table 5: Greenhouse gas emissions for the purpose of Article 4(3) of Regulation (EU) No 2018/842 (ESR)

Emission source category	Reference	Emission estimates (kt CO_2 equivalent)[1]			
		2005[3]	2016	2017	2018
Total greenhouse gas emissions including any accepted revised estimates provided by Lithuania and any technical corrections deemed necessary by the TERT	See Table 3 above	22 812.623	20 378.030	20 575.259	20 238.028
Total verified emissions from stationary installations under Directive 2003/87/EC	Extracted by the European Commission from EUTL on 9 March 2020 (as agreed at the Working Group I of the Climate Change Committee on 18 May 2015)[2]	6 603.869	6 159.573	6 283.336	5 952.939
CO_2 emissions from 1A3a Domestic Aviation	See Table 3 above	3.947	1.420	1.489	1.988
Total ESR emissions		-	**14 217.037**	**14 290.434**	**14 283.101**

[1] 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 ESR emissions), all available decimal places were used. Therefore, the totals shown may slightly differ from calculation results where only three decimals are taken into account.

[2] 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.

[3] Due to changes in ETS scope and country coverage between 2005 and 2013, 'Total ESR emissions' cannot be calculated for 2005 by deducting 'Total verified emissions from stationary installations under Directive 2003/87/EC' and 'CO_2 emissions from 1A3a Domestic Aviation' from 'Total GHG emissions including any revised estimates and any technical corrections'.

Recommendations from the TERT, considering revised estimates and technical corrections deemed necessary by the TERT

Table 6: Recommendations from TERT (RE = Revised estimate; TC = Technical correction)

EMRT-ID	Key category	Category, gas, year	Recommendation	Revised estimate or technical correction in 2020
LT-2D-2020-0001	No	2D Non-Energy Products from Fuels and Solvent Use, CO_2, 2005, 2016, 2017, 2018	For category 2D3 Solvent Use, CO_2 and the years 2005, 2016 and 2017, the TERT noted that Lithuania performed recalculations between the 2019 and 2020 submission, which resulted in a -0.11%/-0.12% change in total emissions (excluding LULUCF). Lithuania explains in its NIR (page 209) that CO_2 emissions were recalculated due to changes in NMVOC emission calculation methodology (Tier 2 method has been used for 2D3e Degreasing and 2D3f Dry Cleaning since 2002 and since 2005 for 2D3a Domestic Solvent Use, 2D3d Coating Application, 2D3g Chemical Products, 2D3h Printing and 2D3i Wool Production categories). 2D3 Solvent Use CO_2 emissions were reduced by about 69% in 2005, 66% in 2016 and 71% in 2017. The TERT noted that after the recalculation Lithuania reported the lowest per capita CO_2 emissions from solvents use among countries under review. The TERT asked for further clarification whether the activity data used to estimate emissions from solvent use is complete. In response to a question raised during the review, Lithuania explained that they have analyzed the NMVOC calculation file provided by their air pollutants inventory team and it was revealed that in most cases the recalculated NMVOC estimates are not reliable and not complete and require further revision and justification. In order to avoid under-estimation, Lithuania provided revised estimates for the years 2005, 2016-2018 based on the same NMVOC calculation method as in the 2019 submission. The TERT agreed with the revised estimate provided by Lithuania. The TERT recommends that Lithuania include the revised estimate in its next submission or improve its methodology and align emission estimates with the NECD and CLRTAP submissions.	RE
LT-5A-2020-0003	Yes	5A Solid Waste Disposal, CH_4, 2005-2018	For 5A Solid Waste Disposal, CH_4 and the years 2016-2018 the TERT noted that Lithuania calculated emissions from managed solid waste disposal sites (SWDS), assuming an oxidation factor (OX) of 0, despite the fact that they have been covered by sand since 2008. In response to a question raised during the review, Lithuania provided revised estimates, assuming OX for managed landfills is 0.1 for the years 2016, 2017 and 2018 and stated that it will be included in the next submission. The TERT agreed with the revised estimate provided by Lithuania. The TERT recommends that Lithuania include the revised estimate in its next submission.	RE

EMRT-ID	Key category	Category, gas, year	Recommendation	Revised estimate or technical correction in 2020
LT-5D-2020-0001	Yes	5D Wastewater Treatment and Discharge, CH_4, 2005-2018	For 5D Wastewater Treatment and Discharge, CH_4 and the years 2005-2018 the TERT noted that wastewater treatment plants (WWTP) with only primary treatment or chemical treatment were considered by Lithuania as aerobic, not well managed WWTP. WWTP with only primary treatment or chemical treatment are not included in the 2006 IPCC Guidelines and expert judgement can be used to estimate a methane correction factor (MCF). According to the judgement of the TERT, emissions from chemical treatment will be more in line with emissions from well-managed aerobic treatment and a similar MCF might be used. Emissions from only primary treatment can be estimated, assuming 40% removal efficiency of the total amount of organically degradable material in the wastewater (TOW), whereas the other 60% is discharged directly to open waters (producing indirect methane, assuming MCF=0.1). Lithuania provided revised estimates for the years 2005 and 2016, 2017 and 2018 and stated that it will be included in the next submission. For 2005 the impact of the recalculation is above the Threshold of Significance. The TERT agreed with the revised estimate provided by Lithuania. The TERT recommends that Lithuania include the revised estimate in its next submission.	RE

Revised estimates provided by Lithuania and accepted by the TERT

ESD Review Tool ID:	LT-2D-2020-0001
ESD Review Tool URL:	https://emrt-esd.eionet.europa.eu/2020/LT-2D-2020-0001#tab-qa
Country:	Lithuania
Sector:	2D Non-energy Products from Fuels and Solvent Use
Gases:	CO_2
Fuel	N/A
Completed by Sector Expert:	Kristina Kaar
Reviewed by Counterpart:	Wolfram Jörß
Reviewed by Lead Reviewer:	Ralph Harthan
Reviewed by Quality Controller:	Bernd Gugele

1

The underlying problem:	For category 2D3 Solvent Use, CO_2 and the years 2005, 2016 and 2017 the TERT noted that Lithuania performed recalculations between the 2019 and 2020 submission, which resulted in a -0.11%/-0.12% change in total emissions (excluding LULUCF). Lithuania explains in its NIR (page 209) that CO_2 emissions were recalculated due to changes in NMVOC emission calculation methodology (Tier 2 method has been used for 2D3e Degreasing and 2D3f Dry Cleaning since 2002 and since 2005 for 2D3a Domestic Solvent Use, 2D3d Coating Application, 2D3g Chemical Products, 2D3h Printing and 2D3i Wool Production categories). 2D3 Solvent Use CO_2 emissions were reduced by about 69% in 2005, 66% in 2016 and 71% in 2017. The TERT noted that after the recalculation Lithuania reported the lowest per capita CO_2 emissions from solvents use among countries under review. The TERT asked for further clarification whether the activity data used to estimate emissions from solvent use is complete. In response to a question raised during the review, Lithuania explained that they have analysed the NMVOC calculation file provided by their air pollutants inventory team and it was revealed that in most cases the recalculated NMVOC estimates are not reliable and not complete and require further revision and justification. In order to avoid under-estimation, Lithuania provided revised estimates for the years 2005, 2016-2018 based on the same NMVOC calculation method as in the 2019 submission.
Summarise the methodology used:	The revised CO_2 estimates are based on the same NMVOC calculation method as in the 2019 submission, mostly per capita based estimates (please see worksheet "Methodology").

2

	Original estimate (Gg CO_2e)								Notes
Year	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	NF_3	Mixed GHG	
2005	11.755								2D3 Solvent Use
2016	11.942								2D3 Solvent Use
2017	10.087								2D3 Solvent Use
2018	11.194								2D3 Solvent Use

	Revised Estimate received from country (Gg CO_2e)								Notes
Year	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	NF_3	Mixed GHG	
2005	38.091								2D3 Solvent Use
2016	35.605								2D3 Solvent Use
2017	36.074								2D3 Solvent Use
2018	37.929								2D3 Solvent Use

	Difference between RE and OE (Gg CO_2e)							
Year	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	NF_3	Mixed GHG
2005	26.336							
2016	23.663							

2017	25.987								
2018	26.736								

ESD Review Tool ID:	LT-5A-2020-0003
ESD Review Tool URL:	https://emrt-esd.eionet.europa.eu/2020/LT-5A-2020-0003/
Country:	Lithuania
Sector:	5A Solid Waste Disposal
Gases:	CH_4
Fuel	N/A
Completed by Sector Expert:	Hans Oonk
Reviewed by Counterpart:	Katja Pazdernik
Reviewed by Lead Reviewer:	Ralph Harthan
Reviewed by Quality Controller:	Bernd Gugele

1

The underlying problem:	The TERT noted with reference to 5A Solid Waste Disposal, CH_4 and the years 2005-2018 and the NIR (15 April 2020 submission), page 466, that methane oxidation at managed solid waste disposal sites (SWDS) was assumed to be 0. However, according to the introduction of the paragraph on oxidation (2006 IPCC Guidelines, Vol 5, Chapter 3, page 3.15), managed landfills, covered with soil, can assume an oxidation factor (OX) of 0.1. In Lithuania since 2007 legislation is in place, that landfills need to cover their waste with a daily cover and a temporary cover. In the period before 2007, there was no requirement to cover disposed wastes in old landfills and hence they were not covered. This was also valid for managed landfills operated before 2007. After 2008 all the older generation managed landfills were remediated and covered with a layer of sand, so from 2008 onward, emissions from these older landfills are calculated, assuming OX=0.1. New landfills operated after 2008 operate with daily covering of waste and can therefore assume OX=0.1. Lithuania agreed with the TERT and provided a revised estimate.
Summarise the methodology used:	Emissions are calculated by Lithuania and checked by the TERT, starting from the information in the CRF Tables. From 2008 onwards, emissions from managed landfills are calculated, assuming OX=0.1, by multiplying the reported emissions for managed landfills by 0.9. Emissions from unmanaged landfills remain unchanged.

2

	Original estimate (Gg CO_2e)								Notes
Year	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	NF_3	Mixed GHG	
2005		1 152.344							5A Solid Waste Disposal
2016		795.964							5A Solid Waste Disposal
2017		800.254							5A Solid Waste Disposal
2018		661.742							5A Solid Waste Disposal

	Revised Estimate received from country (Gg CO_2e)								Notes
Year	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	NF_3	Mixed GHG	
2005		1 152.344							5A Solid Waste Disposal
2016		733.472							5A Solid Waste Disposal
2017		736.063							5A Solid Waste Disposal
2018		610.104							5A Solid Waste Disposal

	Difference between RE and OE (Gg CO_2e)							
Year	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	NF_3	Mixed GHG
2005		0						
2016		-62.492						
2017		-64.190						
2018		-51.638						

ESD Review Tool ID:	LT-5D-2020-0001
ESD Review Tool URL:	https://emrt-esd.eionet.europa.eu/2020/LT-5D-2020-0001
Country:	Lithuania
Sector:	5D Wastewater Treatment and Discharge
Gases:	CH_4
Fuel	N/A
Completed by Sector Expert:	Hans Oonk
Reviewed by Counterpart:	Céline Gueguen
Reviewed by Lead Reviewer:	Ralph Harthan
Reviewed by Quality Controller:	Justin Goodwin

1

The underlying problem:	The TERT noted with reference to 5D Wastewater Treatment and Discharge, CH_4 and the years 2005-2018 and the NIR, table 7-47 (page 483), that wastewater treatment plants (WWTP) with only primary treatment or chemical treatment were considered by Lithuania as aerobic, not well managed WWTP. WWTP with only primary treatment or chemical treatment are not included in the 2006 IPCC Guidelines and expert judgement can be used to estimate a methane correction factor (MCF). According to the judgement of the TERT, emissions from chemical treatment will be more in line with emissions from well-managed aerobic treatment and a similar MCF might be used. Emissions from only primary treatment can be estimated, assuming 40% removal efficiency of the total amount of organically degradable material in the wastewater (TOW), whereas the other 60% is discharged directly to open waters (producing indirect methane, assuming MCF = 0.1). Lithuania agreed with this expert judgement and provided a revised estimate.
Summarise the methodology used:	Emissions are calculated by Lithuania, assuming MCF=0 for chemical treatment, 40% removal efficiency of TOW upon primary treatment and an MCF of 0.1 after discharge of remaining TOW in the effluent after primary treatment.

2

	Original estimate (Gg CO_2e)								Notes
Year	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	NF_3	Mixed GHG	
2005		263.553							
2016		142.197							
2017		140.003							
2018		128.578							

	Revised Estimate received from country (Gg CO_2e)								Notes
Year	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	NF_3	Mixed GHG	
2005		248.007							
2016		138.708							
2017		135.852							
2018		124.679							

	Difference between RE and OE (Gg CO_2e)							
Year	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	NF_3	Mixed GHG
2005		-15.546						
2016		-3.489						
2017		-4.151						
2018		-3.899						

Annex I: Legal background and procedures of the 2020 comprehensive 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 countries 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 Effort Sharing Regulation (EU) 2018/842 (ESR) sets national emission limits for greenhouse gas emissions in the sectors outside the EU's ETS for the period 2021-2030. In Article 4(3) of the ESR, the Commission is required to adopt implementing acts setting out annual emission allocations (AEAs) for the period 2021-2030 in terms of CO_2 equivalents, for which it shall carry out a comprehensive review.

The 2020 Union review was thus held as a comprehensive review in line with MMR Article 19 (1) in concert with the Union review required by the ESR.

Objectives

The objectives of the comprehensive review of countries' GHG emission inventories in 2020 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 years 2018 in a credible, consistent, transparent and timely manner, and for
   - setting out countries' annual emission allocations (AEAs) for the years from 2021 to 2030 in terms of tonnes of CO_2 equivalent, according to Article 4(3) of the ESR.

b) to assist countries in improving the quality of their GHG inventories.

Procedures

The scope of the 2020 comprehensive review is presented in Table A-1. The checks carried out during the 2020 comprehensive review are presented in Annex II. The review consisted of two steps.

The Step 1 was combined with the 'EU QA/QC procedures' (i.e. initial checks) and was carried out by the EU inventory team (ETC/CME, JRC, Eurostat). All findings from the initial checks that were partly resolved or not resolved within the initial check phase were followed up in the second step of the review.

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 Krtková, Marion Pinterits, Matina Kastori, Giorgos Mellios, Markéta Müllerová, Bernd Gugele (ETC/CME), Michael Goll (Eurostat)
- IPPU: Barbara Gschrey, Lorenz Moosmann, Kristina Kaar, Lukas Emele, Maria Purzner, Ils Moorkens (ETC/CME)
- Agriculture: Adrian Leip, Janka Szemesová, Alexander De-Meij (JRC)
- Waste: Céline Gueguen (ETC/CME)
- LULUCF: Raúl Abad-Viñas (JRC)

- Quality coordinators: Adrian Leip, Giacomo Grassi (JRC), Bernd Gugele, Nicole Mandl, Marion Pinterits, Maria Purzner, Julien Vincent, Giorgos Mellios, Ils Moorkens, Kaat Jespers (ETC/CME)
- Cross-cutting: Nicole Mandl (ETC/CME)

Step 2 of the comprehensive review 2020 was performed by a Technical Expert Review Team (TERT) under service contract **340201/2019/814628/SER/CLIMA.C.2** of the Directorate General for Climate Action of the European Commission. The lead reviewers and sector review experts did not review emission inventories of countries 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 country whose inventory is concerned, did not take part in the review of that inventory.

The TERT consisted of the following experts:

- CRF categories 1A1, 1A2, 1A4, 1A5 (Stationary Combustion) + Reference Approach: Katrina Young, Julien Vincent and Stephan Poupa;
- CRF categories 1A3 Transport + 1D International Bunkers: Melanie Hobson, Jean-Marc André and Matina Kastori;
- CRF categories 1B Fugitive + 1C CO_2 Transport and Storage: Ioannis Sempos, Marlene Plejdrup and Marion Pinterits;
- CRF categories IPPU Fluorinated Gases: Barbara Gschrey, Jacek Skoskiewicz and Stephanie Barrault;
- CRF categories IPPU Other Gases than Fluorinated Gases: Emma Salisbury, Kristina Kaar and Wolfram Jörß;
- CRF categories 3A Enteric Fermentation and 3B Manure Management: Chris Dore, Steen Gyldenkærne and Bernard Hyde;
- CRF categories 3C-3J: Katalin Lovas, Etienne Mathias and Michael Anderl;
- CRF sector 5 Waste: Céline Gueguen, Elisabeth Kampel and Hans Oonk;
- Lead reviewers: Karin Kindbom, Suvi Monni, Ole-Kenneth Nielsen and Ralph Harthan.
- The following experts supported the team on request of the TERT: Tomas Gustafson (IPPU), Maria Purzner (F-gases), Beatriz Sanchez (Agriculture), Katja Pazdernik (Waste).

The second step of the review was coordinated by Bernd Gugele and Justin Goodwin.

The EEA review secretariat consisting of Melanie Sporer, Claire Qoul, Kirsten May, Justine Raoult and Henry Irvine prepared and coordinated the Union comprehensive review as foreseen in Article 28 of Commission Implementing regulations (EU) No 749/2014 and Article 42 of the Governance Regulation (EU) 2018/1999.

The step 2 of the review was performed on the basis of the 15 April submissions of GHG emission data and the national inventory report (NIR) under the Monitoring Mechanism. Resubmissions reported by countries were taken into account until 8 May 2020.

Where relevant, the TERT calculated technical corrections for over- or under-estimates identified in a mandatory category in the countries' GHG inventories that exceed the threshold of significance. Technical corrections have been calculated only for the years 2005 and 2016-2018. If the technical correction exceeds the threshold of significance for at least one year of the inventory under review (2005, and 2016-2018) but not for all the years the technical correction was calculated for all years under review in order to ensure time series consistency.

Table A-1: Scope of the comprehensive review 2020

Element	Scope	Further information
Countries	EU geographical coverage of the Member States, the United Kingdom, Norway and Iceland	
Years	2005, 2016, 2017, 2018	According to MMR Article 27(2); According to MMR Article 19(1); According to ESR Article 4(3)
Gases	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3	
Sectors	All emission source sectors excluding LULUCF	National totals exclude emissions from LULUCF and emissions reported under memo items
Indirect CO_2 emissions	Included in national total	

Annex II: Checks carried out during the 2020 comprehensive review in line with Art. 29, 32 and 33 of the Commission Implementing Regulation (EU) No 749/2014

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 over-estimations or under-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.