

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

Estonia

30 August 2020

European Environment Agency



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

Contents

Conclusions from the 2020 comprehensive review	3
National totals for the purpose of Article 3 of Decision No 406/2009/EC (ESD)	5
National totals for the purpose of Article 4(3) of Regulation (EU) No 2018/842 (ESR)	6
Statement from Estonia on the conclusions presented by the TERT	7
Greenhouse gas emissions covered by Decision 406/2009/EC (ESD)	8
Greenhouse gas emissions covered by Regulation (EU) No 2018/842 (ESR)	9
Recommendations from the TERT, considering revised estimates and technical corrections deemed necessary by the TERT	10
Revised estimates provided by Estonia and accepted by the TERT	11
Annex I: Legal background and procedures of the 2020 comprehensive review	13
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	16

List of tables

Table 1: Overview of issues raised with Estonia 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: National totals for the purpose of Article 4(3) of Regulation (EU) No 2018/842	6
Table 4: Greenhouse gas emissions for the purpose of Article 3 of Decision No 406/2009/EC	8
Table 5: Greenhouse gas emissions for the purpose of Article 4(3) of Regulation (EU) No 2018/842 (ESR)....	9
Table 6: Recommendations from TERT (RE = Revised estimate; TC = Technical correction)	10

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 Estonia, pursuant to:

- Article 4(3) of Regulation (EU) No 2018/842 (the 'Effort Sharing Regulation', ESR), for the purpose of setting out Estonia's annual emission allocations (AEAs) for the years from 2021 to 2030 in terms of tonnes of CO₂ equivalent, and
- Article 3 of Decision No 406/2009/EC (the 'Effort Sharing Decision', ESD), for the purpose of verifying Estonia'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 Estonia 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.

Estonia did not provide a resubmission to the Commission.

Step 1 and 2 conclusions

1. The reviewers raised 32 issues with Estonia 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. Estonia provided 2 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 Estonia (see Table 6).
6. The TERT considers that it received a response from Estonia that was sufficient in order to undertake the comprehensive review appropriately.

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

	Issues raised step 1 ¹	Issues raised step 2	Recommendations	Revised estimates ²	Technical corrections ³
Total	19	13	3	2	-
Energy	9	4	2	1	-
IPPU	7	2	-	-	-
Agriculture	2	1	-	-	-
Waste	1	6	1	1	-
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 Estonia pursuant to Article 7(4) of Regulation (EU) No 525/2013, taking into account any resubmission to the Commission	EST_2020_1_09042020	19 974.140
Difference between original estimates and revised estimates provided by Estonia and accepted by the TERT²		
1A3c Railways, CO ₂ , CH ₄ , N ₂ O	EE-1A3c-2020-0001	22.972
5A Solid Waste Disposal, CH ₄	EE-5A-2020-0003	-17.953
Total greenhouse gas emissions including revised estimates		19 979.160
CO ₂ emissions from 1A3a Domestic Aviation ³	EST_2020_1_09042020	4.042
NF ₃ emissions ³	EST_2020_1_09042020	-

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. NF₃ 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 Estonia pursuant to Article 7(4) of Regulation (EU) No 525/2013, taking into account any resubmission to the Commission	EST_2020_1_09042020	19 012.236	19 640.422	20 923.490	19 974.140
Difference between original estimates and revised estimates provided by Estonia and accepted by the TERT²					
1A3c Railways, CO ₂ , CH ₄ , N ₂ O	EE-1A3c-2020-0001	-	-	-	22.972
5A Solid Waste Disposal, CH ₄	EE-5A-2020-0003	-	-19.302	-18.995	-17.953
Total greenhouse gas emissions including revised estimates		19 012.236	19 621.120	20 904.495	19 979.160
CO ₂ emissions from 1A3a Domestic Aviation ³	EST_2020_1_09042020	4.673	3.359	3.550	4.042

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 Estonia on the conclusions presented by the TERT

Estonia 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 Estonia and any technical corrections deemed necessary by the TERT	See Table 2 above	19 979.160
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	13 853.417
CO ₂ emissions from 1A3a Domestic Aviation	See Table 2 above	4.042
NF ₃ emissions	See Table 2 above	-
Total ESD emissions		6 121.701

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 Estonia and any technical corrections deemed necessary by the TERT	See Table 3 above	19 012.236	19 621.120	20 904.495	19 979.160
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	12 621.824	13 447.175	14 670.571	13 853.417
CO ₂ emissions from 1A3a Domestic Aviation	See Table 3 above	4.673	3.359	3.550	4.042
Total ESR emissions		-	6 170.586	6 230.374	6 121.701

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 'CO₂ 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
EE-1A3c-2020-0001	Yes	1A3c Railways, CO ₂ , 2018	For 1A3c Railways, liquid fuels, all gases and for the year 2018, the TERT noted that the fuel consumption provided in the CRF table1.A(a)s3 was 338 TJ whereas Eurostat quotes 619 TJ. In response to a question raised during the review, Estonia explained that there was in fact an error and that the Eurostat data was correct. Estonia therefore provided a revised estimate for 2018 and stated that it will be included in the next submission. The TERT agreed with the revised estimate provided by Estonia. The TERT recommends that Estonia include the revised estimate in its next submission.	RE
EE-5A-2020-0003	Yes	5A Solid Waste Disposal, CH ₄ , 1990-2018	For CH ₄ emissions from 5A Solid Waste Disposal for all years, the TERT noted that in Estonia's inventory, the Oxidation Factor value OX is 0 for managed landfills (see table 7.7 page 362 of the 2020 Estonian NIR) whereas the OX value should be 0.1 for managed landfills covered with CH ₄ oxidising material as recommended in Table 3.2 of Volume 5, Chapter 3 of the 2006 IPCC Guidelines. In response to a question raised during the review, Estonia provided a revised estimate for years 2016, 2017 and 2018 and stated that they will be included in the next submission. For 2005, Estonia justified that the use of OX=0 is appropriate. The TERT agreed with the revised estimate provided by Estonia. The TERT recommends that Estonia include the revised estimate in its next submission.	RE
EE-1AB-2020-0002	No	1AB Reference Approach, CO ₂ , 2018	The TERT noted that there are large differences between the reference approach and sectoral approach for total CO ₂ as visible in CRF Table 1A(c); 27.8% for 2018, with large variation between years e.g. -6.5% for 2017. The TERT notes that this issue does not relate to an over- or under-estimate of emissions. In response to a question raised during the review, Estonia explained that the differences arise due to the variable conversion of primary solid fuels (oil shale) into secondary liquid fuels (shale oil) with lower emission factors (the amount of which varies each year), along with the different approaches in applying weight average calorific values versus annual average calorific values, and the NCV of oil shale changing year on year. The TERT recommends that Estonia improve the transparency of its NIR, including explanations regarding the difference between reference and sectoral approaches varying so much over the years, and regarding a justification that these differences do not relate to an over- or under-estimate of emissions in the sectoral approach.	No

Revised estimates provided by Estonia and accepted by the TERT

1	ESD Review Tool ID:	EE-1A3c-2020-0001								
	ESD Review Tool URL:	https://emrt-esd.eionet.europa.eu/2020/EE-1A3c-2020-0001								
	Country:	Estonia								
	Sector:	1A3c Railways								
	Gases:	CO ₂ , CH ₄ and N ₂ O								
	Fuel	Liquid fuels								
	Completed by Sector Expert:	Melanie Hobson								
	Reviewed by Counterpart:	Jean-Marc Andre								
1	Reviewed by Lead Reviewer:	Suvi Monni								
	Reviewed by Quality Controller:	Justin Goodwin								
The underlying problem:		The activity data provided in the CRF table1.A(a)s3 is 338 TJ for 2018, whereas Eurostat provides a figure of 619 TJ. In addition, there was a significant drop in fuel consumption estimates between 2017 and 2018 which also indicated a potential problem. Estonia have confirmed that the Eurostat figure is correct.								
Summarise the methodology used:		The same methods and emission factors were used as in Estonia's original estimate, only AD was revised to that of Eurostat.								
2	Original estimate (Gg CO ₂ e)									Notes
	Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	NF ₃	Mixed GHG	
	2005									
	2016									
	2017									
	2018	24.716	0.035	2.881						Only 2018 needs a revised estimate
	Revised Estimate received from country (Gg CO ₂ e)									Notes
	Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	NF ₃	Mixed GHG	
	2005									
	2016									
	2017									
	2018	45.264	0.064	5.276						
	Difference between RE and OE (Gg CO ₂ e)									
	Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	NF ₃	Mixed GHG	
	2005									
	2016									
	2017									
	2018	20.548	0.029	2.395						

ESD Review Tool ID:		EE-5A-2020-0003						
ESD Review Tool URL:		https://emrt-esd.eionet.europa.eu/2020/EE-5A-2020-0003						
Country:		Estonia						
Sector:		5A Solid Waste Disposal						
Gases:		CH ₄						
Fuel		N/A						
Completed by Sector Expert:		Celine Gueguen						
Reviewed by Counterpart:		Elisabeth Kampel						
Reviewed by Lead Reviewer:		Suvi Monni						
Reviewed by Quality Controller:		Justin Goodwin						

1

The underlying problem:

For CH₄ emissions from 5A1 Solid Waste Disposal - Managed Waste Disposal Sites there is an over-estimate of emissions above the threshold of significance because of the Oxidation Factor value (OX) used by Estonia for managed landfills (OX) is 0 (see table 7.7 page 362 of the 2020 Estonian NIR), whereas the OX value should be 0.1 for managed landfills covered with CH₄ oxidising material as recommended in Table 3.2 of Volume 5, Chapter 3 of the 2006 IPCC Guidelines. The TERT also notes that in the introduction of the paragraph on OX in the 2006 IPCC Guidelines it is explained that “covered with CH₄-oxidising material” refers to soil or other materials covering the waste. Therefore, the TERT concludes that managed landfills, covered with soil should have an OX=0.1.

Summarise the methodology used:

Estonia estimates the CH₄ emissions from unmanaged and managed landfills in the same IPCC Waste Model. Therefore, an averaged OX (representative of all landfills) has been defined. For the purposes of the revised estimate, a linear interpolation between 2009 and 2015 is applied considering that before 2009 there were no managed landfills (Estonia entered the EU in 2004 and EU directives did not apply) and that since 2015 almost all waste is disposed in managed landfills.

Calculations: The amount of CH₄ emitted (as reported in the CRF tables) is multiplied by (1-OX), where OX=0.09 for 2016-2018. The OX applied takes into consideration that for some landfills, OX lower than 0.1 is still applicable.

2

Original estimate (Gg CO ₂ e)									Notes
Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	NF ₃	Mixed GHG	
2005									
2016		214.465							
2017		211.054							
2018		199.474							

Revised Estimate received from country (Gg CO ₂ e)									Notes
Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	NF ₃	Mixed GHG	
2005									
2016		195.163							
2017		192.059							
2018		181.522							

Difference between RE and OE (Gg CO ₂ e)								
Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	NF ₃	Mixed GHG
2005								
2016		-19.302						
2017		-18.995						
2018		-17.953						

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 CO₂ 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 CO₂ 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 CO₂ 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 Gyldenkerne 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 ₂ O, 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.