

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

United Kingdom

30 August 2020

Disclaimer (January 2021): Regulation (EU) No 2018/842 does not apply to the UK since the end of the transition period according to the Withdrawal Agreement. All references to that Regulation in this final review report are without effect since that date.



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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 the United Kingdom, pursuant to:

- Article 4(3) of Regulation (EU) No 2018/842 (the 'Effort Sharing Regulation', ESR), for the purpose of setting out the United Kingdom'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 the United Kingdom'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 the United Kingdom 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.

The United Kingdom did not provide a resubmission to the Commission.

Step 1 and 2 conclusions

1. The reviewers raised 31 issues with the United Kingdom during the first and the second step of the 2020 comprehensive ESD review (see Table 1). The TERT provided recommendations for 4 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 an under- or over-estimate exceeding the threshold of significance pursuant to Article 31 of Commission Implementing Regulation (EU) No 749/2014.
3. The United Kingdom provided 1 revised estimate that was accepted by the TERT. Table 2 and Table 3 below summarise the revised estimate and further information is provided in the respective chapter of this report. The TERT agreed to the revised estimate.
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 the United Kingdom (see Table 6).
6. The TERT considers that it received a response from the United Kingdom that was sufficient in order to undertake the comprehensive review appropriately.

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

	Issues raised step 1 ¹	Issues raised step 2	Recommendations	Revised estimates ²	Technical corrections ³
Total	20	11	4	1	-
Energy	3	2	-	-	-
IPPU	8	2	-	-	-
Agriculture	7	4	1	-	-
Waste	2	3	3	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 the United Kingdom pursuant to Article 7(4) of Regulation (EU) No 525/2013, taking into account any resubmission to the Commission	GBE_2020_1_13032020	462 102.320
Difference between original estimates and revised estimates provided by the United Kingdom and accepted by the TERT²		
5D2 Industrial Wastewater Handling, CH ₄	GB-5D-2020-0002	-1 823.133
Total greenhouse gas emissions including revised estimates		460 279.188
CO ₂ emissions from 1A3a Domestic Aviation ³	GBE_2020_1_13032020	1 539.645
NF ₃ emissions ³	GBE_2020_1_13032020	0.584

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 the United Kingdom pursuant to Article 7(4) of Regulation (EU) No 525/2013, taking into account any resubmission to the Commission	GBE_2020_1_13032020	691 482.688	482 674.840	471 479.326	462 102.320
Difference between original estimates and revised estimates provided by the United Kingdom and accepted by the TERT²					
5D2 Industrial Wastewater Handling, CH ₄	GB-5D-2020-0002	-1 676.976	-1 806.637	-1 766.272	-1 823.133
Total greenhouse gas emissions including revised estimates		689 805.712	480 868.203	469 713.054	460 279.188
CO ₂ emissions from 1A3a Domestic Aviation ³	GBE_2020_1_13032020	2 691.211	1 556.323	1 658.179	1 539.645

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 the United Kingdom on the conclusions presented by the TERT

The United Kingdom cautiously agrees with the aggregated GHG emission inventory estimates presented in Table 2 and Table 3. While the estimates used are still draft estimates, the United Kingdom accepts that it is likely that these estimates more accurately reflect true emissions occurring than the existing estimate.

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 the United Kingdom and any technical corrections deemed necessary by the TERT	See Table 2 above	460 279.188
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	128 858.553
CO ₂ emissions from 1A3a Domestic Aviation	See Table 2 above	1 539.645
NF ₃ emissions	See Table 2 above	0.584
Total ESD emissions		329 880.406

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 the United Kingdom and any technical corrections deemed necessary by the TERT	See Table 3 above	689 805.712	480 868.203	469 713.054	460 279.188
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	242 513.426	147 161.700	136 882.286	128 858.553
CO ₂ emissions from 1A3a Domestic Aviation	See Table 3 above	2 691.211	1 556.323	1 658.179	1 539.645
Total ESR emissions		-	332 150.180	331 172.589	329 880.989

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
GB-5D-2020-0002	Yes	5D2 Industrial Wastewater Handling, CH ₄ , 1990-2018	For category 5D2 Industrial Wastewater Handling, CH ₄ , and the years 1990-2018, the TERT noted that a methane correction factor (MCF) of 0.7 was applied to all industrial wastewater, meaning that all wastewater is treated anaerobically. Additionally, energy recovery had not been taken into account. The United Kingdom made this 'worst case' assumption due to a lack of data, which results in a significant over-estimate. In response to a question raised during the review, the United Kingdom explained that efforts are being made to collect information on the treatment paths and on energy recovery to improve the emission estimates for this category. The United Kingdom provided revised estimates for years 2005, 2016, 2017 and 2018, which are based on a draft Tier 1 approach. The United Kingdom stated that it is expected to be included in the next submission subject to finalisation and approval, and efforts will be made to further refine this estimate. The TERT agreed with the revised estimate provided by the United Kingdom. The TERT recommends that the United Kingdom includes the revised estimate in its next submission and provides a transparent description of the data (activity data, COD per industry type, MCF applied per treatment path) and methodology used.	RE

EMRT-ID	Key category	Category, gas, year	Recommendation	Revised estimate or technical correction in 2020
GB-3-2020-0003	Yes	3A Enteric Fermentation, CH ₄ , 1990-2018	<p>For category 3A Enteric Fermentation, CH₄, and for all years, the TERT noted that the methane emission factor for non-dairy cattle is very high (Ym=8.0% approximately) and is above the range given in the 2006 IPCC Guidelines (Ym=6.5% +/- 1.0%). At the same time, the reported Gross Energy (GE) intake by non-dairy cattle is low (104.71 MJ/hd/day in 2018) compared to other countries with a similar herd distribution (share of dairy cattle in relation of the total cattle population). In response to a question raised during the review, the United Kingdom explained that they "are currently reviewing more recent data which suggest a revision to the maintenance energy requirement of the AFRC 1993 equations, with a view to implementing this in the next submission. We are in the process of assessing the implications of this revision on enteric methane estimates and consequently the implied Ym value. We will be in a position to report on this in the next few months." The TERT accepted the explanation provided by the United Kingdom. Mainly because the resulting average emission estimate for non-dairy cattle (55.1 kg CH₄/hd/year in 2018) is in line with other countries with similar herd distribution and is lower than the default in the 2006 IPCC Guidelines for growing cattle (73 kg CH₄/hd/year for Western Europe). The TERT recommends that the United Kingdom include updated GE intake and Ym values in its next submission, so the values reported are comparable with other countries. Furthermore, the TERT recommends that the United Kingdom verify the current model used for estimating the CH₄ emission from enteric fermentation. The current model has high intercepts with the y-axis, which means that animals with low daily dry matter intake (DMI) are estimated to have high CH₄ emissions, and animals with high DMI are going to be under-estimated in their CH₄ emission. The total emissions from a country using the United Kingdom's model, is thus heavily dependent on whether the sub-distribution of animal categories in the inventory (in groups with different daily DMI) is the same as that used for estimating the equation for CH₄ emissions. The model should therefore not be used uncritically under other conditions. The model for non-dairy cattle has a slope, which on plots shows an over-estimation of the CH₄ emissions for especially low DMI. The United Kingdom has explained that this is mainly due to a correction of the model for "Location" of where the different measurements were taken. This correction is normal procedure in statistical analyses. The model for estimating the CH₄ emissions is not published and peer reviewed, which should be normal procedure for inclusion in a national inventory. The TERT recommends the United Kingdom publish the model as soon as possible and include information on its limitations in the next submission.</p>	No

EMRT-ID	Key category	Category, gas, year	Recommendation	Revised estimate or technical correction in 2020
GB-5A-2020-0001	Yes	5A Solid Waste Disposal, CH ₄ , 1990-2018	For category 5A Solid Waste Disposal, CH ₄ and years 1990-2018, the TERT noted that the United Kingdom is using a country specific model (MELmod). In the NIR, Figure 7.3, the United Kingdom presents a comparison of CH ₄ emissions calculated with their model and with the 2006 IPCC Guidelines default method. During the review, the TERT noted that this figure is not in line with emissions reported. In response to a question raised during the review, the United Kingdom provided the IPCC default calculation, which provides results within the range of the MELmod model. It was noticed that the MELmod model takes into account lower DOC values and higher k-values (shorter half-life times) compared to default values. The United Kingdom explained that a more detailed breakdown of categories is used, which are not explicitly the same as in the IPCC model. Further, the MELmod model allocates different waste types to a range of rapidly, moderately and slowly decaying wastes, which also makes a direct comparison of k-values difficult. The TERT notes that this issue does not relate to an over- or under-estimate of emissions. The TERT recommends that the United Kingdom update Figure 7.3 to serve the purpose of verifying the MELmod model and increase transparency and to justify that MELmod results in a better prediction for methane generation at United Kingdom landfills than the IPCC-waste model with IPCC defaults.	No

EMRT-ID	Key category	Category, gas, year	Recommendation	Revised estimate or technical correction in 2020
GB-5D-2020-0001	Yes	5D1 Domestic Wastewater Handling, CH ₄ , 1990-2018	For category 5D1 Domestic Wastewater Handling, CH ₄ , and for all years 1990-2018, the TERT noted that emissions are reported from municipal and private wastewater treatment. The emissions from private wastewater treatment can be reproduced, but the emissions from municipal wastewater cannot. The United Kingdom applies a country-specific method, based on activity data provided as total dissolvable solids, and country-specific emission factors derived from information from the United Kingdom's water industry. There is a lack of transparency in NIR chapter 7.5.2 how emission factors have been derived for each treatment path. It was noted, that CH ₄ used for energy recovery is calculated with the country specific method, as the applied emission factors already take into account the methane capture. The recovered CH ₄ has been calculated as the difference of unabated emission estimates and the emissions calculated with the country-specific approach, which is not in line with the 2006 IPCC Guidelines, but does not affect the current CH ₄ emission estimates. 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, the United Kingdom provided further information on how the co-discharge of industrial water was taken into account, activity data (dry solids, total dissolvable solids), and the emission factor (2.7 kg CH ₄ /t dry solids). The TERT recommends that the United Kingdom includes in its next submission a justification that the activity data 'total dissolved solids' are an equivalent to BOD and an explanation for how emission factors (as included in Table 7.7, NIR page 419) have been derived.	No

Revised estimates provided by the United Kingdom and accepted by the TERT

1	ESD Review Tool ID:	GB-5D-2020-0002							
	ESD Review Tool URL:	https://emrt-esd.eionet.europa.eu/2020/GB-5D-2020-0002#tab-qa							
	Country:	United Kingdom							
	Sector:	5D2 Industrial Wastewater Handling							
	Gases:	CH ₄							
	Fuel:	N/A							
	Completed by Sector Expert:	Elisabeth Kampel							
	Reviewed by Counterpart:	Hans Oonk							
	Reviewed by Lead Reviewer:	Ole-Kenneth Nielsen							
	Reviewed by Quality Controller:	Bernd Guegle							
2	The underlying problem:	For CH ₄ emissions from 5D2, the TERT noted a significant over-estimate due to the application of an MCF to all industrial wastewater. The United Kingdom replied that this 'worst case' assumption is made due to a lack of data. During the review, the TERT recommended to estimate the share of industrial wastewater treated anaerobically and apply the corresponding MCF.							
	Summarise the methodology used:	The United Kingdom provided a revised estimate following a Tier 1 approach, taking into account activity data from Discharge Consents Register published by the Environment Agency and production data (Prodcom database), multiplied with COD values (from the 2006 IPCC Guidelines), average MCFs and B0. Based on information from the Discharge Consents Register the coverage of different industries and treatment technologies deployed have been estimated. Although the revised estimate provided does not allow to the TERT to check the calculations undertaken, the TERT accepts the revised estimate as it seems more reliable and accurate than the reported estimate. The United Kingdom plans to further improve the methodology and also take into account the energy recovered.							
2	Original estimate (Gg CO ₂ e)								Notes
	Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	NF ₃	
	2005		2 626.743						
	2016		2 611.895						
	2017		2 690.046						
	2018		2 685.872						
	Revised Estimate received from country (Gg CO ₂ e)								Notes
	Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	NF ₃	
	2005		949.767						
	2016		805.259						
	2017		923.774						
	2018		862.740						
	Difference between RE and OE (Gg CO ₂ e)								
	Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	NF ₃	
	2005		-1 676.976						
	2016		-1 806.637						
	2017		-1 766.272						
	2018		-1 823.133						

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.