

Final Review Report

2017 annual review of national greenhouse gas inventory data

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

Bulgaria

30 June 2017

European Environment Agency



Reference: 34.0201/2016/743206/SER/CLIMA.C2
Umweltbundesamt GmbH
Spittelauer Lande 5
1090 Vienna Austria

Contents

Conclusions from the 2017 annual ESD review	3
Step 1 conclusions	3
Step 2 conclusions	3
National totals	5
Greenhouse gas emissions covered by Decision 406/2009/EC.....	6
Statement from Bulgaria on the conclusions presented by the TERT.....	7
Revised estimates provided the MS and accepted by TERT.....	8
Recommendations from the TERT, considering revised estimates and technical corrections deemed necessary by the TERT	10
Annex I: Legal background and procedures of the 2017 annual ESD review	14
Annex II: Checks carried out during the 2017 annual ESD review in line with Art.29 and 32 of the Commission Implementing Regulation (EU) No 749/2014	16

List of tables

Table 1: Issues raised with Bulgaria during the first and the second step	4
Table 2: National totals	5
Table 3: Greenhouse gas emissions covered by Decision 406/2009/EC.....	6
Table 4: Recommendations from the TERT	10

Conclusions from the 2017 annual ESD review

This Final Review Report presents the findings from the 2017 annual review of the GHG emission inventory of Bulgaria, pursuant to Article 19(2) of Regulation (EU) No 525/2013, with a view to monitoring Bulgaria's achievement of its greenhouse gas emission reduction or limitation target pursuant to Article 3 of Decision No 406/2009/EC (the 'Effort Sharing Decision', ESD) in 2015.

The reviewers carried out checks to verify the transparency, accuracy, consistency, comparability and completeness of the national greenhouse gas inventory for the year 2015 submitted in 2017 by Bulgaria pursuant to Article 7(3) of Regulation (EU) No 525/2013.

The review consisted in two steps:

1. The EU inventory team (European Environment Agency (EEA), European Topic Centre on Air Pollution and Climate Change Mitigation (ETC/ACM), Joint Research Centre (JRC) and Eurostat) performed the initial checks under Step 1.
2. A Technical Expert Review Team (TERT) performed Step 2 of the 2017 annual ESD review.

More information on the Effort Sharing Decision and the procedures for the 2017 annual ESD review is presented in the annexes to this review report.

Step 1 conclusions

The EU inventory team identified, through the checks performed in Step 1, two significant issues. Therefore Bulgaria was subject to a second step of the 2017 annual ESD review. It should be noted that Bulgaria volunteered to be subject to a second step of the 2017 annual ESD review in accordance with Article 32(2) of Commission Implementation Regulation (EU) No 749/2014. Therefore the second step review checks went beyond the significant issues identified in the first step.

Step 2 conclusions

1. The reviewers raised 60 issues with Bulgaria during the first and the second step of the review 2017 (see Table 1). The TERT provided recommendations for nine of these issues. Other issues raised during the annual review were clarified and are considered resolved.
2. The TERT identified cases where inventory data were prepared in a manner which is inconsistent with UNFCCC guidance documentation or Union rules. In particular, the TERT identified an underestimate or overestimate exceeding the threshold of significance pursuant to Article 31 of Commission Implementing Regulation (EU) No 749/2014.
3. Bulgaria provided two revised estimates. The TERT agreed to both revised estimates. Table 2 below summarises the revised estimates and further information is provided at the end of this report.
4. On that basis, the TERT did not deem necessary any technical corrections in the meaning of Article 19(3)(c) of Regulation (EU) No 525/2013 in consultation with Bulgaria.
5. The TERT identified non-binding recommendations in order to improve the national inventory data of Bulgaria (see Table 4).
6. The TERT considers that it received a response from Bulgaria that was sufficient in order to undertake the annual review appropriately.

Table 1: Issues raised with Bulgaria during the first and the second step

	Issues raised	Recommendations	Revised estimates ¹	Technical corrections ²
Total	60	9	2	-
Energy	14	3	-	-
IPPU	21	1	-	-
Agriculture	18	4	2	-
Waste	7	1	-	-
Cross-cutting	-	-	-	-

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

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

National totals

Table 2: National totals

Data / Source category	Reference	Emission estimates (kt CO ₂ equivalent) ¹
		2015
Total greenhouse gas emissions, including indirect CO ₂ , without land use, land-use change and forestry as reported by Bulgaria pursuant to Article 7(3) of Regulation (EU) No 525/2013.	BGR_2017_13032017	61 500.664
Difference between original estimates and revised estimates provided by Bulgaria and accepted by the TERT²		
3.D.1 Direct N ₂ O emissions from managed soils, N ₂ O	BG-3D1-2017-0001	154.599
3.D.1 Direct N ₂ O emissions from managed soils, N ₂ O	BG-3D1-2017-0005	0.575
Total greenhouse gas emissions including any accepted revised estimates provided by Bulgaria		61 655.837
CO ₂ emissions from 1.A.3.a Domestic aviation	BGR_2017_13032017	40.110
NF ₃ emissions	BGR_2017_13032017	-

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 would be taken into account.

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

Greenhouse gas emissions covered by Decision 406/2009/EC

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

Data	Reference	Emissions (kt CO ₂ equivalent) ¹
		2015
Total greenhouse gas emissions including accepted revised estimates provided by Bulgaria	<i>See Table 2 above</i>	61 655.837
Total verified emissions from stationary installations under Directive 2003/87/EC	Extracted by the European Commission from EUTL on 8 March 2017 (as agreed at the Working Group I of the Climate Change Committee on 18 May 2015) ²	36 260.861
CO ₂ emissions from 1.A.3.a Domestic aviation	<i>See Table 2 above</i>	40.110
NF ₃ emissions	<i>See Table 2 above</i>	-
Total ESD emissions		25 354.866

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 would be 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.

Statement from Bulgaria on the conclusions presented by the TERT

Bulgaria agrees with the aggregated GHG emission inventory estimates presented in Table 2.

Bulgaria would like to express her gratefulness to the TERT during the ESD review 2017 to their efforts to support us for better implementation of the 2006 IPCC Guidelines.

Revised estimates provided the MS and accepted by TERT

1	ESD Review Tool ID:	BG-3D1-2017-0001
	ESD Review Tool URL:	https://emrt.eea.europa.eu/2017/BG-3D1-2017-0001
	Member State:	Bulgaria
	Sector:	3.D.1 Direct N ₂ O emissions from managed soils
	Gases:	N ₂ O
	Fuel	n/a
	Completed by (SE):	Chris Dore
	Reviewed by (Counterpart):	Rocio Condor
	Reviewed by (LR):	Suvi Monni
	The underlying problem:	For category 3.D.a.6 Cultivation of organic soils, for all years, Bulgaria reports "NO" (not occurring). In response to a question raised during the review, Bulgaria explained that there were cultivated organic soils in the country.
	The rationale for the corrected estimate:	Bulgaria explained that all the organic soils are in the protected area, but that in the FAO database, there is information for territory of organic soils used in agriculture. Bulgaria provided emission estimates of N ₂ O for the entire time series, using the default methodology presented in the 2006 IPCC Guidelines. The TERT agreed with the emission estimates presented by Bulgaria, and noted that the emission estimates were above the threshold of significance.
	Summarise the methodology used:	The default methodology presented in the 2006 IPCC Guidelines was used. Activity data are taken from FAO, emission factor is from 2006 IPCC Guidelines.
	References to other workbooks:	Bulgaria provided a file "Organic_soils_Agriculture", which included the revised estimates.

2

Details of the corrected estimate								
		Original estimate (Gg CO ₂ eq)						Notes
	Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	
BG-3D1-2017-0001-OE	2015			0				
Was a Revised Estimate received from the MS?		yes						
		Revised Estimate received from MS (Gg CO ₂ eq)						Notes
	Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	
BG-3D1-2017-0001-RE	2015			154.599				
Was the Revised Estimate accepted by the TERT?		yes						
		Technical Correction calculated by TERT (Gg CO ₂ eq)						Notes
	Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	
BG-3D1-2017-0001-TC	2015							
Was the Technical Correction accepted by the MS?		-						

1	ESD Review Tool ID:	BG-3D1-2017-0005
	ESD Review Tool URL:	https://emrt.eea.europa.eu/2017/BG-3D1-2017-0005
	Member State:	Bulgaria
	Sector:	3.D.1 Direct N ₂ O emissions from managed soils
	Gases:	N ₂ O
	Fuel	n/a
	Completed by (SE):	Chris Dore
	Reviewed by (Counterpart):	Rocio Condor
	Reviewed by (LR):	Suvi Monni
	The underlying problem:	3.D.a.3 (Urine and Dung Deposited by Grazing Animals): A check of the IEFs across the time series (including 2015) showed disagreement with the default IPCC EFs.
The rationale for the corrected estimate:	Bulgaria identified a technical error in its calculation based on the following check from step 1: "Compare the IEF in 3.D.a.3 (N ₂ O emissions from Urine and Dung Deposited by Grazing Animals) with default EFs from the 2006 IPCC Guidelines using the shares of N excreted in pasture range and paddock by different animal types." In the revised estimate by Bulgaria, total livestock N was conserved but was reallocated between different livestock classes.	
Summarise the methodology used:	The methodology is taken from the 2006 IPCC Guidelines, default EFs have been used.	
References to other workbooks:	Bulgaria provided a revised estimate in the file "Agriculture_corrected".	

2	Details of the corrected estimate								
			Original estimate (Gg CO₂eq)						Notes
		Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	
	BG-3D1-2017-0005-OE	2015			133.431				
	Was a Revised Estimate received from the MS?		yes						
			Revised Estimate received from MS (Gg CO₂eq)						Notes
		Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	
	BG-3D1-2017-0005-RE	2015			134.005				
	Was the Revised Estimate accepted by the TERT?		yes						
			Technical Correction calculated by TERT (Gg CO₂eq)						Notes
	Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆		
BG-3D1-2017-0005-TC	2015								
Was the Technical Correction accepted by the MS?		-							

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

Table 4: Recommendations from the TERT

EMRT - ID	Key category	Category, gas, year	Conclusion step 2 note	Revised estimate	Technical correction
BG-1A1b-2017-0002	Yes	1.A.1.b Petroleum refining, CO ₂ , 2015	<p>In following up on an issue raised during the ESD Review 2016 (BG-1A1b-2016-0001), the TERT noted that there is still a noticeable difference between CO₂ emissions in CRF category 1.A.1.b as reported under the GHG inventory and under the EU ETS in 2015 (inventory: 1 351.98 kt CO₂, ETS: 1 246.48 kt CO₂). In addition, the TERT noted that it was recommended previously that Bulgaria investigate the possibility to use the country-specific data from EU ETS for the estimation of emissions in the inventory, while in the current submission a default emission factor for refinery gas is still used.</p> <p>In response to a question raised, Bulgaria provided a detailed overview of differences and explained that energy balance data were used in the inventory since they also include consumption which is not allocated to installations in the ETS. The explanation was accepted by the TERT. Furthermore, Bulgaria explained that it plans to further investigate with the National Statistics Institute and a relevant refinery about the reasons for the discrepancies. After clarification, Bulgaria may consider using data generated under the ETS for the inventory submission for refinery gas and for natural gas used for hydrogen production. The TERT acknowledges the efforts by Bulgaria for improving accuracy without compromising on completeness and recommends that Bulgaria report on information obtained and progress made on this matter in the next annual submission.</p>	No	No
BG-1A2f-2017-0002	No	1.A.2.f Non-metallic minerals, CH ₄ , CO ₂ , N ₂ O, 2015	<p>In following up on an issue raised during the ESD Review 2016 (BG-1A2f-2016-0001), the TERT noted that emissions from "other fossil fuels" under category 1.A.2.f are still reported as not occurring ("NO").</p> <p>In response to a question raised, Bulgaria confirmed that the emissions from other fossil fuels reported under CRF 1.A.2.g.viii continue to include the emissions from 1.A.2.f (non-metallic minerals) and informed that currently the calculation files for other fossil fuels do not disaggregate emissions estimates by subcategory, for which reason all the emissions were reported under CRF 1.A.2.g.viii as an aggregated value. Bulgaria further explained that it is planning to provide a separate estimate for non-metallic mineral plants and all other plants in the next annual submission. The TERT notes that this issue does not relate to an over or underestimate and recommends that Bulgaria provide corresponding separate estimates in the next submission.</p>	No	No
BG-1B1-2017-0002	Yes	1.B.1 Fugitive emissions from solid fuels, CH ₄ , 2015	<p>In following up on an issue raised during the ESD Review 2016 (BG-1B1-2016-0001) recommending that CH₄ emissions from abandoned coal mines be estimated in line with a methodology included in the 2006 IPCC Guidelines, the TERT noted that Bulgaria, due to absence of additional information on closed mines, applied the same approach as in the technical correction applied in the ESD Review 2016. Accordingly, CH₄ emissions from Hungary were directly applied to the Bulgarian case. The TERT noted that the 2015 emissions in the inventory of Bulgaria slightly deviate from the value</p>	No	No

			<p>included in the Hungarian inventory and noted that this difference is below the threshold of significance.</p> <p>In response to a question raised, Bulgaria informed that the 2014 value of Hungary was used and that a national survey for collection of data on the state of abandoned underground mines has been initiated. The results of the survey are expected to be included in the next annual submission. The TERT accepted this explanation and recommends that Bulgaria update the 2015 value and report on progress made regarding the results of the survey in the next annual submission.</p>		
BG-2G-2017-0001	No	2.G Other product manufacture and use, N ₂ O, 2012-2015	<p>For category 2.G.3.b and N₂O for whole time series, the TERT noted from the NIR that the approach used by Bulgaria to estimate N₂O emissions from propellant for pressure and aerosol is based on population as proxy variable and considers an emission factor of 10 g per person of N₂O from the Swiss inventory. In response to a question raised during the review, Bulgaria explained that the choice of the Swiss approach was recommended within a Twinning Project with the Austrian Environmental Agency. The TERT noted that the described approach, applying 10 g of N₂O per person, is not applied correctly in Bulgaria's inventory, leading to an error of three orders of magnitude. However, the quantitative impact of a revision of the current Bulgarian estimates in order to correct the identified unit error is below the threshold of significance.</p> <p>The TERT also noted that the approach used by Bulgaria is not in line with the 2006 IPCC Guidelines, according to which total quantity of N₂O supplied by application type should be obtained from manufacturers and distributors of N₂O products. The TERT further noted, considering per capita emissions of some other member states, that the use of a country-specific data by Bulgaria could lead to a change above the threshold of significance. However, since no country-specific AD are available to the TERT to provide a technical correction which would follow the 2006 IPCC Guidelines, the TERT decides to recommend that Bulgaria carry out appropriate data collection for N₂O used in propellant for pressure and aerosol products in order to be able to apply the 2006 IPCC Guidelines methodology, and include revised estimates in its next submission. The TERT also recommends that when revising emission estimates Bulgaria pay particular attention to the units conversion.</p>	No	No
BG-3D1-2017-0001	Yes	3.D.1 Direct N ₂ O emissions from managed soils, N ₂ O, 2015	<p>For category 3.D.a.6 Cultivation of organic soils, for all years, Bulgaria reports "NO" (not occurring). In response to a question raised during the review, Bulgaria explained that there were cultivated organic soils in the country, and provided revised estimates of N₂O for the entire time series, using the default methodology presented in the 2006 IPCC Guidelines.</p> <p>The TERT agreed with the revised estimates provided by Bulgaria (presented above), and noted that the emission estimates were above the threshold of significance. The TERT recommends that Bulgaria include the revised estimate in its next submission.</p>	Yes	No
BG-3D1-2017-0005	Yes	3.D.1 Direct N ₂ O emissions from managed soils, N ₂ O, 1990-2015	<p>For category 3.D.a.3 Urine and Dung Deposited by Grazing Animals, N₂O for all years, the TERT noted that the implied emission factors check for cattle, sheep and other livestock did not give a match with the 2006 IPCC Guidelines default values (0.02 and 0.01 kg N₂O-N/kg N).</p> <p>In response to a question raised during the review, Bulgaria provided, for 1988-2015, revised data for N deposited during grazing, accompanied with calculations to show revised N₂O emission estimates. The impact of the revision was below the threshold of significance, but Bulgaria confirmed that the data provided were to be used as revised estimates.</p> <p>The TERT agreed with the revised estimate provided by Bulgaria, which is presented above.</p>	Yes	No

			The TERT recommends that Bulgaria include the revised estimate in its next submission.		
BG-3D1-2017-0006	Yes	3.D.1 Direct N ₂ O emissions from managed soils, N ₂ O, 1990-2015	<p>During Step 1 of the ESD review, a test was run to compare the amount of manure N being output from 3.B Manure Management against the amount of manure N being input into 3.D.a.2.a Animal manure applied to soils. Bulgaria were asked to explain whether the values were comparable, and whether any differences were caused by the addition of N in bedding material. During the review, Bulgaria explained that they do not have data to estimate the amount of bedding being added. The TERT have undertaken a detailed review of the N flow in the inventory and have drawn several conclusions:</p> <ul style="list-style-type: none"> - The emission estimates for N₂O from 3.B Manure Management can be considered a Tier 2 methodology for direct emissions from manure management. This is because some country specific parameters are used (e.g. N excretion) - The 2006 IPCC Guidelines indicate that it is only appropriate to include emission estimates from leaching and run-off in 3.B when country-specific data are available (p. 10.56 states: "Equation 10.28 should only be used where there is country-specific information on the fraction of nitrogen loss due to leaching and runoff from manure management systems available"). - Bulgaria have determined the N losses to leaching and run-off by using data calculated from the differences between information presented in Tables 10.22 and 10.23 of the 2006 IPCC Guidelines. This approach is high in uncertainty, and will incorrectly also include the losses of N to air as N₂ in the N going to leaching and run-off (as the values in Table 10.23 also include N₂). This results in an overestimate of the N₂O emissions from leaching and run-off, the impact of which the TERT note is below the threshold of significance - Bulgaria calculates the amount of N from 3.B Manure Management that is available as input to 3.D.a.2.a as the N in manure management systems minus all the calculated N loss terms (and have indicated that it is not currently possible to estimate N additions from bedding). This approach follows <i>good practice</i>. <p>Given these findings, the TERT recommends that Bulgaria follow the 2006 IPCC Guidelines more directly. More specifically, the TERT recommends that (unless Bulgaria are able to source country specific information), Bulgaria use the information in Table 10.22 (2006 IPCC Guidelines) to determine the volatilisation losses of NH₃ and NO_x, and separately use the information in Table 10.23 (2006 IPCC Guidelines) to determine the total losses of N from 3.B Manure Management and hence the amount of N that is available for application to 3.D.</p> <p>The TERT also recommends that Bulgaria investigate the possibility of estimating the N additions to manure applied to soils that arise from bedding material.</p> <p>The TERT note that the approach described above would mean that no emission estimate was reported for leaching and run-off (unless country specific information was available). But the TERT also note that the use of the information available in the EMEP/EEA Emissions Inventory Guidebook (2016 edition) may help Bulgaria to improve the quantification of individual N loss terms from 3.B Manure Management, and hence improve the overall accuracy of the emission estimates.</p>	No	No
BG-3D1-2017-0007	Yes	3.D.1 Direct N ₂ O emissions from	For category 3.D.a.1 Inorganic N Fertilisers, the TERT noted that the activity data reported in the CRF were substantially lower than information from FAOSTAT and the International Fertiliser Association	No	No

		managed soils, N ₂ O, 2015	<p>(IFA) for years before 2015 (2015 data is not yet available from FAOSTAT and the IFA). For example, data in 2014 (consumption of synthetic fertiliser expressed as N) is as follows:</p> <ul style="list-style-type: none"> - FAOSTAT: 373,045 tonnes of N (http://www.fao.org/faostat/en/#data/RF) - IFA: 385,000 tonnes of N (http://ifadata.fertilizer.org/ucResult.aspx?temp=20170428095009) - Bulgaria NIR: 174,002 tonnes of N (Table 212, page 320). <p>Discrepancies are also noted for years before 2014.</p> <p>In response to a question raised during the review, Bulgaria explained that the values used in the inventory are the official national data. The TERT noted that this information is in agreement with the information provided on page 319 of the NIR, which states that the synthetic fertilizers quantities are provided by Bulgarian Food Safety Agency/ National Service for Plant Protection and that the data are cross-checked with the “National State of the Environment”.</p> <p>The TERT noted that if the emissions were calculated using FAOSTAT data, then the impact of this issue would be above the threshold of significance. However, the TERT are not able to conclude that the FAOSTAT data are more accurate than the current national data used by Bulgaria in its inventory. Therefore, the TERT decided not to make a technical correction.</p> <p>The TERT recommends that Bulgaria review the data that are available from both FAOSTAT and the IFA, and compare this with the data from the Bulgarian Food Safety Agency, and that any genuine differences are fully explained in the NIR.</p>		
BG-5D-2017-0005	No	5.D Wastewater treatment and discharge, N ₂ O, 1990-2015	<p>For category 5.D.1 Domestic Wastewater and gas N₂O for 2015 the TERT noted that for estimating N₂O emissions from domestic wastewater, Bulgaria is using 1.4 as the factor for non-consumed protein added to the wastewater ($F_{\text{NON-CON}} = 1.4$, CRF table 5.D). This default value of 1.4 from the 2006 IPCC Guidelines, table 6.11, assumes that kitchen garbage disposal units are used at households. By using 1.4 for all domestic wastewater, Bulgaria assumes that all households are using garbage disposal units. In response to a question raised during the review, Bulgaria explained that during the last 5 years, new residential buildings in the large cities are widely equipped with kitchen garbage disposal units as a method for handling food waste. Thus, the use of these appliances is limited but exists in the country. So, to avoid underestimations in N₂O emissions from wastewater treatment, Bulgaria used the proposed default value of 1.4 for $F_{\text{NON-CON}}$. The TERT noted that this assumption could be considered to be in line with the 2006 IPCC Guidelines which do not provide explicit guidance for a situation where garbage disposal units are used only in parts of the residential buildings. The TERT recommends that Bulgaria reconsider its assumption to use $F_{\text{NON-CON}}=1.4$ for all domestic wastewater. In case Bulgaria would like to make the emission estimates more accurate by using a country-specific $F_{\text{NON-CON}}$ factor, the TERT recommends that Bulgaria estimate the fraction of the population that is using garbage disposal units and calculate a weighted average $F_{\text{NON-CON}}$ factor with this information. Furthermore, the TERT notes that the impact of such a change would be below the threshold of significance.</p>	No	No

Annex I: Legal background and procedures of the 2017 annual ESD review

The Effort Sharing Decision No 406/2009/EC (ESD) sets national emission limits for greenhouse gas (GHG) emissions in the sectors outside the EU's Emission Trading System (ETS) for the period 2013-2020. The ESD and the Monitoring Mechanism Regulation (EU) 525/2013 (MMR) lay down annual reporting obligations, compliance checks and a Union review process to ensure that the compliance with annual GHG emission limits is assessed in a credible, consistent, transparent and timely manner. The requirements for the Union review of the national inventory data submitted by Member States are set out in Article 19 of the MMR.

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

The objectives of the 2017 annual ESD review of Member States' GHG emission inventories are:

- a) to support the European Commission by ensuring it has accurate, reliable and verified information on annual GHG emissions for determining compliance with ESD targets for the year 2015 in a credible, consistent, transparent and timely manner, according to Article 19 (2) of the MMR;
- b) to assist Member States in improving the quality of their GHG inventories.

The 2017 annual ESD review of national greenhouse gas (GHG) inventory data was carried out for the compliance year 2015 pursuant to Article 19 of the MMR. The EEA review secretariat (consisting of Melanie Sporer, John van Aardenne and Emma Salisbury) coordinated the 2017 annual ESD review as foreseen in Article 28 of the Commission Implementing Regulation (EU) No 749/2014.

The scope of the 2017 annual ESD review is presented in Table A.1.1. The checks carried out during the 2017 annual ESD review are presented in Annex II.

The review consisted of 2 steps. Step 1 was combined with the 'EU QA/QC procedures' (i.e. initial checks) and was carried out by the EU inventory team (ETC/ACM, JRC, Eurostat). All findings from the initial checks that were relevant for the ESD and that were not resolved within the initial check phase were followed up in the second step of the annual review.

Step 2 of the 2017 annual ESD review was performed by a Technical Expert Review Team (TERT) under service contract 34.0201/2016/743206/SER/CLIMA.C2 of the Directorate General for Climate Action of the European Commission. The TERT consisted of the following experts:

- Lead Reviewers: Anke Herold, Suvi Monni, Klaus Radunsky
- Energy: Julien Vincent, Ralph Harthan, Graham Anderson
- IPPU F-gases: Barbara Gschrey, Domenico Gaudioso
- IPPU excluding F-gases: Daniela Romano, Eva Krtkova
- Agriculture: Steen Gyldenkaerne, Rocio Condor, Chris Dore, Katalin Lovas
- Waste: Hans Oonk, Kaat Jespers, Juraj Farkas
- Quality controller: Justin Goodwin
- Co-ordinator: Bernd Guegle

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

Step 2 of the review was performed on the basis of GHG emission data and the national inventory report (NIR) officially reported by Member States by 15 March 2017 under the MMR. Where relevant, the TERT calculated technical corrections for over- or underestimates identified in a mandatory category in the Member States' GHG inventories that exceed the threshold of significance. Technical corrections were calculated for the year 2015.

Table A.1.1: Scope of the 2017 annual ESD review

Element	Scope	Further information
Member States	EU geographical coverage of the Member States	
Years	2015	
Gases	CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆	NF ₃ is not covered by the ESD
Sectors	All emission source sectors excluding LULUCF	National totals exclude emissions from LULUCF and emissions reported under memo items
Indirect CO ₂ emissions	Included in national total	
Inventory Submission	Submissions received by 15 March, 2017	

Annex II: Checks carried out during the 2017 annual ESD review in line with Art.29 and 32 of the Commission Implementing Regulation (EU) No 749/2014

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

First step review checks:

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

Second step review checks:

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