

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

Austria

30 August 2020



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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 Austria, pursuant to:

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

Austria did not provide a resubmission to the Commission.

Step 1 and 2 conclusions

1. The reviewers raised 42 issues with Austria during the first and the second step of the 2020 comprehensive ESD review (see Table 1). The TERT provided recommendations for 7 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. Austria provided 5 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 Austria (see Table 6).
6. The TERT considers that it received a response from Austria that was sufficient in order to undertake the comprehensive review appropriately.

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

	Issues raised step 1 ¹	Issues raised step 2	Recommendations	Revised estimates ²	Technical corrections ³
Total	22	20	7	5	-
Energy	5	5	-	-	-
IPPU	10	8	3	3	-
Agriculture	1	4	2	1	-
Waste	6	3	2	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 Austria pursuant to Article 7(4) of Regulation (EU) No 525/2013, taking into account any resubmission to the Commission	AUT_2020_2_14042020	78 950.336
Difference between original estimates and revised estimates provided by Austria and accepted by the TERT²		
2F3 Fire Protection, HFCs	AT-2F3-2020-0002	12.344
2G Other Product Manufacture and Use, N ₂ O	AT-2G-2020-0002	-87.165
2G1 Electrical Equipment, SF ₆	AT-2G-2020-0003	4.169
3I Other Carbon-Containing Fertilizers, CO ₂	AT-3I-2020-0001	26.297
5A Solid Waste Disposal, CH ₄	AT-5A-2020-0003	-104.894
Total greenhouse gas emissions including revised estimates		78 801.087
CO ₂ emissions from 1A3a Domestic Aviation ³	AUT_2020_2_14042020	45.980
NF ₃ emissions ³	AUT_2020_2_14042020	16.512

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 Austria pursuant to Article 7(4) of Regulation (EU) No 525/2013, taking into account any resubmission to the Commission	AUT_2020_2_14042020	92 427.269	79 467.291	82 023.358	78 950.336
Difference between original estimates and revised estimates provided by Austria and accepted by the TERT²					
2F3 Fire Protection, HFCs	AT-2F3-2020-0002	-	0.431	1.495	12.344
2G Other Product Manufacture and Use, N ₂ O	AT-2G-2020-0002	-87.165	-87.165	-87.165	-87.165
2G1 Electrical Equipment, SF ₆	AT-2G-2020-0003	-	-	-	4.169
3I Other Carbon-Containing Fertilizers, CO ₂	AT-3I-2020-0001	20.027	28.551	26.376	26.297
5A Solid Waste Disposal, CH ₄	AT-5A-2020-0003	-	-95.801	-100.729	-104.894
Total greenhouse gas emissions including revised estimates		92 360.131	79 313.307	81 863.334	78 801.087
CO ₂ emissions from 1A3a Domestic Aviation ³	AUT_2020_2_14042020	66.647	47.477	42.468	45.980

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 Austria on the conclusions presented by the TERT

Austria 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 Austria and any technical corrections deemed necessary by the TERT	See Table 2 above	78 801.087
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	28 402.029
CO ₂ emissions from 1A3a Domestic Aviation	See Table 2 above	45.980
NF ₃ emissions	See Table 2 above	16.512
Total ESD emissions		50 336.566

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 Austria and any technical corrections deemed necessary by the TERT	See Table 3 above	92 360.131	79 313.307	81 863.334	78 801.087
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	33 373.155	29 000.120	30 555.226	28 402.029
CO ₂ emissions from 1A3a Domestic Aviation	See Table 3 above	66.647	47.477	42.468	45.980
Total ESR emissions		-	50 265.710	51 265.641	50 353.078

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
AT-2F3-2020-0002	No	2F3 Fire Protection, HFCs, 1990-2018	For 2F3 Fire Protection HFC-227ea emissions the TERT noted that emissions were reported as 'NO' for several years, including 2016-18 although the NIR stated that detailed data from fire protection companies are provided every year. In response to a question raised during the review, Austria explained that HFC-227ea emissions were not occurring for 2008 and 2013, because in these years there was no case of flooding reported. Due to a mistake the notation key was also reported for the subsequent years, although except for 2008 and 2013 for all years since 2002 flooding occurred. Austria provided a revised estimate for years 2016-2018. The TERT agreed with the revised estimate provided by Austria. The TERT recommends that Austria include the revised estimate in its next submission.	RE
AT-2G-2020-0002	No	2G Other Product Manufacture and Use, N ₂ O, 2005, 2016, 2017, 2018	For N ₂ O in category 2G3b Propellant for Pressure and Aerosol Products the TERT noted that emissions are calculated using the same value (0.4 kt of N ₂ O) across the time series. The NIR (page 288), explains that "the numbers used in this sector... includes N ₂ O in capsules for export. Investigations on production and sales data are ongoing, results are expected within the next 2 years." In response to a question raised during the review, Austria explained that activity data are now available to update these estimates. Austria provided a revised estimate for years 2005, 2016, 2017 and 2018 and stated that it will be included in the next submission. The TERT agreed with the revised estimate provided by Austria. The TERT recommends that Austria include the revised estimate in its next submission.	RE
AT-2G-2020-0003	Yes	2G1 Electrical Equipment, SF ₆ , 2018	For SF ₆ emissions in 2G1 Electrical Equipment in 2018, the TERT noted that manufacturing and disposal emissions as well as recovery were reported as 'NO'. In response to a question raised during the review, Austria explained that information on SF ₆ filled into equipment and SF ₆ recovered is provided by the association of energy providers in Austria. However, due to a transcription error, for 2018, emissions of SF ₆ for newly filled in equipment, as well as the amount of recovered SF ₆ , were set to 0. Austria provided a revised estimate for 2018. The TERT agreed with the revised estimate provided by Austria. The TERT recommends that Austria include the revised estimate in its next submission.	RE

EMRT-ID	Key category	Category, gas, year	Recommendation	Revised estimate or technical correction in 2020
AT-3I-2020-0001	No	3I Other Carbon-Containing Fertilizers, CO ₂ , 1990-2018	The TERT noted that Austria did not report CO ₂ emissions from CRF Category 3I Other Carbon-Containing Fertilizers. The TERT acknowledged, that this is a non-mandatory category, but the CO ₂ emissions from calcium ammonium nitrate (CAN) fertilisers could be significant in Austria, because in accordance with the data provided on the website of the Agrarmarkt Austria Marketing (https://www.ama.at), 50% of the total inorganic fertilizer use was CAN fertilizer in 2018. The TERT noted that emissions could be estimated similarly as can be done for urea (e.g. use of fertilizer as AD, EF based on carbon content). In response to a question raised during the review, Austria provided a voluntary revised estimate for years 2005, 2016, 2017, 2018 and stated that it will be included in the next submission. The TERT agreed with the revised estimate provided by Austria. The TERT recommends Austria include the revised estimate in its next submission.	RE
AT-5A-2020-0003	Yes	5A Solid Waste Disposal, CH ₄ , 2005-2018	For CH ₄ in 5A Solid Waste Disposal in the years 2016-2018, the TERT noted that that there was a potential overestimate of emissions, because of the Country Specific value of F (fraction of CH ₄ in generated landfill gas) used. The value of F seems to be based on the composition of collected landfill gas, as cited in various literature. According to the 2006 IPCC Guidelines (Volume 5, chapter 3, page 3.15), the fraction of CH ₄ in generated landfill gas (F) should not be confused with measured CH ₄ in gas emitted from the solid waste disposal sites (SWDS), because CO ₂ is absorbed in seepage water and the composition of the gas is shifted towards higher concentration of CH ₄ . It is good practice to adjust for CO ₂ -absorption in seepage water if F is based on measured concentrations of CH ₄ in landfill gas, emitted from the SWDS. During the review, Austria provided a revised estimate for the years 2016, 2017 and 2018 and stated that it will be included in the next submission. The TERT agreed with the revised estimate provided by Austria. The TERT recommends that Austria include the revised estimate in its next submission.	RE

EMRT-ID	Key category	Category, gas, year	Recommendation	Revised estimate or technical correction in 2020
AT-3B-2020-0002	Yes	3B Manure Management, N ₂ O, 1990-2018	For category 3B Manure Management - dairy cows and gas N ₂ O for all years 1990-2018 the TERT noted that there is a lack of transparency with regard to the milk yield and nitrogen excretion values presented in Table 190 of the NIR and that the excretion values were calculated on the basis of the guidelines of the European Commission according to the requirements of the European Nitrates Directive. In response to a question raised during the review Austria explained that the nitrogen excretion values were derived from a field study at 6 different grassland sites reflecting agricultural practices in Austria. Furthermore, Austria clarified that the values used are gross nitrogen values (prior to gaseous losses) and that in Austria a high proportion of dairy farms are low input organic farms (both certified and uncertified) where a high proportion of the diet consists of non-intensively farmed alpine pastures and meadows. These pastures have a lower crude protein content than conventional grasslands which as a consequence effects the quantity of nitrogen excreted. The TERT agreed with the explanation provided by Austria. The TERT recommends that Austria provide further information in the NIR of its next submission with respect to the specific circumstances which exist in Austria with regard to low input organically farmed alpine meadows including information on the differences in crude protein content between these pastures and those on conventional farms in order to justify the N excretion rates used.	No
AT-5A-2020-0002	Yes	5A Solid Waste Disposal, CH ₄ , 2005-2018	For category 5A Solid Waste Disposal, CH ₄ , for years 2005-2018 the TERT noted that there was a lack of transparency regarding the justification of DOC _f (fraction of degradable organic carbon which decomposes) in the Austrian NIR (Table 280, page 489). In response to questions raised during the review, Austria explained that the assumptions are based on a report from the year 2005. Austria explained that they consider that the DOC _f , which accommodates different degrees of biodegradability of substrates, is still justifiable and that the guidance in 2019 Refinement to the 2006 IPCC Guidelines supports the approach used, because application of the Refinement results in an average DOC _f , similar to the Austrian value. The TERT partially agreed with the explanation provided by Austria. The TERT agrees that the DOC _f s used by Austria are reasonable assumptions and introduce more detail in the calculation, than the DOC _f in the 2006 IPCC Guidelines. However, the TERT considers that more detail does not necessarily result in better estimates and that use of country-specific parameters is appropriate only when the country is able to justify that the use of such parameters improves accuracy. The TERT recommends that Austria improve the justification of DOC _f in its next submission. Justification could be supported by validation of the country-specific models, for example based on recovered methane at Austrian landfills.	No

Revised estimates provided by Austria and accepted by the TERT

ESD Review Tool ID:	AT-2F3-2020-0002								
ESD Review Tool URL:	https://emrt-esd.eionet.europa.eu/2020/AT-2F3-2020-0002								
Country:	Austria								
Sector:	2F3 Fire protection								
Gases:	HFC-227ea								
Fuel	N/A								
Completed by Sector Expert:	Barbara Gschrey								
Reviewed by Counterpart:	Jacek Soszkiewics								
1 Reviewed by Lead Reviewer:	Suvi Monni								
Reviewed by Quality Controller:	Justin Goodwin								

The underlying problem:	For 2F3, HFC-227ea emissions from stock were reported as 'NO' for the years 2014-2018 (CRF table 2(II)B-Hs2) but it is stated in the NIR that detailed information on this extinguishing agent is provided by the fire protection companies annually. During the review, Austria explained that due to a mistake the notation key 'NO' (which was correctly reported for 2013 when no emissions occurred) was reported for the years 2014-2018 although emission estimates had been made.								
Summarise the methodology used:	In the revised estimate, Austria included the missing data in its calculations. Values below include emissions from stocks under 2F3.								

	Original estimate (Gg CO₂e)								Notes
Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	NF ₃	Mixed GHG	
2005									
2016				12.698					HFC-23 reported
2017				12.698					HFC-23 reported
2018				12.698					HFC-23 reported

	Revised Estimate received from country (Gg CO₂e)								Notes
Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	NF ₃	Mixed GHG	
2005									
2016				13.129					
2017				14.193					
2018				25.042					

	Difference between RE and OE (Gg CO₂e)							
Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	NF ₃	Mixed GHG
2005								
2016				0.431				
2017				1.495				
2018				12.344				

1	ESD Review Tool ID:	AT-2G-2020-0002								
	ESD Review Tool URL:	https://emrt-esd.eionet.europa.eu/2020/AT-2G-2020-0002								
	Country:	Austria								
	Sector:	2G Other Product Manufacture and Use								
	Gases:	N ₂ O								
	Fuel	N/A								
	Completed by Sector Expert:	Emma Salisbury								
	Reviewed by Counterpart:	Kristina Kaar								
Reviewed by Lead Reviewer:	Suvi Monni									
Reviewed by Quality Controller:	Justin Goodwin									
The underlying problem:		The TERT noted that Austria's N ₂ O emissions in 2018 from the category 2G3b Propellant for Pressure and Aerosol Products are the highest of all countries. N ₂ O in capsules produced in Austria but then exported were also included in emission estimates, thus leading to an overestimate of emissions.								
Summarise the methodology used:		Investigations were conducted to estimate the amount of N ₂ O in capsules sold in Austria (59.5 t N ₂ O); ready to use whipped cream can sales data were obtained from three supermarket chains, which was scaled by market share (24 t N ₂ O); ready to use whipped cream can sales data for wholesalers were estimated to be the same as supermarkets (24 t N ₂ O). According to information from companies selling N ₂ O capsules, the market is saturated and stable, so the value is applied across the time series.								
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			119.200						
	2016			119.200						
	2017			119.200						
	2018			119.200						
	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			32.035						
	2016			32.035						
	2017			32.035						
	2018			32.035						
	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			-87.165						
	2016			-87.165						
	2017			-87.165						
	2018			-87.165						

1	ESD Review Tool ID:	AT-2G-2020-0003								
	ESD Review Tool URL:	https://emrt-esd.eionet.europa.eu/2020/AT-2G-2020-0003								
	Country:	Austria								
	Sector:	2G1 Electrical Equipment								
	Gases:	SF ₆								
	Fuel	N/A								
	Completed by Sector Expert:	Barbara Gschrey								
	Reviewed by Counterpart:	Jacek Soszkiewicz								
Reviewed by Lead Reviewer:	Suvi Monni									
Reviewed by Quality Controller:	Justin Goodwin									
The underlying problem:		For 2G1 Electrical Equipment, SF ₆ emissions from manufacturing and disposal as well as recovery were reported as 'NO' in 2018, only emissions from stock were reported. During the review, Austria explained that the data were excluded by mistake.								
Summarise the methodology used:		In the revised estimate, Austria included the missing data in its calculations.								
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						37.091			
	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						41.261			
	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						4.169			

1	ESD Review Tool ID:	AT-3I-2020-0001								
	ESD Review Tool URL:	https://emrt-esd.eionet.europa.eu/2020/AT-3I-2020-0001								
	Country:	Austria								
	Sector:	3I Other Carbon-Containing Fertilizers								
	Gases:	CO ₂								
	Fuel	N/A								
	Completed by Sector Expert:	Katalin Lovas								
	Reviewed by Counterpart:	Etienne Mathias								
	Reviewed by Lead Reviewer:	Suvi Monni								
Reviewed by Quality Controller:	Justin Goodwin									
<p>The underlying problem:</p> <p>Austria did not report CO₂ emissions from CRF Category 3I Other Carbon-Containing Fertilizers. The TERT acknowledged, that this is a non-mandatory category, but the CO₂ emissions from calcium ammonium nitrate (CAN) fertilisers could be significant in Austria, because in accordance with the data provided on the website of the Agrarmarkt Austria Marketing (https://www.ama.at), 50% of the total inorganic fertilizer use was CAN fertilizer in 2018. The TERT notes that emissions could be estimated similarly as can be done for urea (e.g. use of fertilizer as AD, EF based on carbon content).</p>										
<p>Summarise the methodology used:</p> <p>Austria calculated a revised estimate based on the official fertilizer consumption data of CAN. In consistency to N₂O estimations within source category 3Da1 the arithmetic average of each two years has been used as AD. Applied CAN data is fully consistent to the fertilizer type specific AD used in the Tier 2 calculations in Austria's ammonia inventory under the NEC directive. For the revised estimate, the arithmetic average of limestone and dolomite has been used as first approach.</p>										
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	0								
	2016	0								
	2017	0								
	2018	0								
	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	20.027								
	2016	28.551								
	2017	26.376								
	2018	26.297								
	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	20.027								
	2016	28.551								
	2017	26.376								
	2018	26.297								

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

1

The underlying problem:

The TERT noted with reference to 5A, CH₄ and years 2005-2018 and the NIR, table 280 (page 489), that there may be an overestimate of emissions, because of the country-specific value of F (fraction of CH₄ in generated landfill gas). The value of F seems to be based on the composition of collected landfill gas, as cited in various literature. According to the 2006 IPCC Guidelines (Volume 5, chapter 3, page 3.15), the fraction of CH₄ in generated landfill gas (F) should not be confused with measured CH₄ in gas emitted from the solid waste disposal sites (SWDS), because CO₂ is absorbed in seepage water and the composition of the gas is shifted towards higher concentration of CH₄. It is good practice to adjust for CO₂-absorption in seepage water if F is based on measured concentrations of CH₄ in landfill gas, emitted from the SWDS.

Summarise the methodology used:

Emissions are calculated by Austria, assuming F=55% until 2009, gradually declining to 50% in 2018. The reduction in F is justified by available literature on concentrations of F, as measured in landfill gas and theoretical considerations, that predict a gradual decrease in F, once the more rapidly degradable organic material is degraded.

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		1 186.260								
2017		1 114.106								
2018		1 045.271								

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		1 090.459								
2017		1 013.377								
2018		940.377								

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		-95.801							
2017		-100.729							
2018		-104.894							

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.