

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

Portugal

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 Portugal, pursuant to:

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

Portugal did not provide a resubmission to the Commission.

Step 1 and 2 conclusions

1. The reviewers raised 34 issues with Portugal during the first and the second step of the 2020 comprehensive ESD review (see Table 1). The TERT provided recommendations for 5 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. Portugal provided 4 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 also deemed necessary a technical correction in the meaning of Article 19(3)(c) of Regulation (EU) No 525/2013 and calculated the technical correction taking into account the consultation with Portugal on this issue. The technical correction is presented in Table 2 and Table 3 of the present review report and is accompanied by evidence-based justification. In its response to the draft technical correction, Portugal stated that it agrees with the technical correction.
5. The TERT identified non-binding recommendations in order to improve the national inventory data of Portugal (see Table 6).

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

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

	Issues raised step 1 ¹	Issues raised step 2	Recommendations	Revised estimates ²	Technical corrections ³
Total	16	18	5	4	1
Energy	5	8	1	1	-
IPPU	5	3	2	1	1
Agriculture	3	4	2	2	-
Waste	3	3	-	-	-
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 Portugal pursuant to Article 7(4) of Regulation (EU) No 525/2013, taking into account any resubmission to the Commission	PRT_2020_1_12032020	67 416.792
Difference between original estimates and revised estimates provided by Portugal and accepted by the TERT²		
2F1e Mobile Air-Conditioning, HFCs	PT-2F1-2020-0001	-48.056
3D1 Direct N ₂ O Emissions from Managed Soils, N ₂ O	PT-3D1-2020-0001	-12.026
3I Other Carbon-Containing Fertilizers, CO ₂	PT-3I-2020-0001	2.088
Total greenhouse gas emissions including revised estimates and technical corrections		67 358.799
CO ₂ emissions from 1A3a Domestic Aviation ³	PRT_2020_1_12032020	498.122
NF ₃ emissions ³	PRT_2020_1_12032020	-

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 Portugal pursuant to Article 7(4) of Regulation (EU) No 525/2013, taking into account any resubmission to the Commission	PRT_2020_1_12032020	85 714.653	66 022.580	70 638.912	67 416.792
Difference between original estimates and revised estimates provided by Portugal and accepted by the TERT²					
1A1 Energy Industries, CO ₂	PT-1A1a-2020-0001	-	-	503.427	-
2F1e Mobile Air-Conditioning, HFCs	PT-2F1-2020-0001	-	-	-42.539	-48.056
3D1 Direct N ₂ O Emissions from Managed Soils, N ₂ O	PT-3D1-2020-0001	-10.229	-11.944	-11.860	-12.026
3I Other Carbon-Containing Fertilizers, CO ₂	PT-3I-2020-0001	2.617	2.298	1.744	2.088
Difference between original estimates and technical corrections deemed necessary by the TERT²					
2B1 Ammonia Production, CO ₂	PT-2B1-2020-0001	212.964	-	-	-
Total greenhouse gas emissions including revised estimates and technical corrections		85 920.005	66 012.934	71 089.685	67 358.799
CO ₂ emissions from 1A3a Domestic Aviation ³	PRT_2020_1_12032020	389.143	447.130	501.753	498.122

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 Portugal on the conclusions presented by the TERT

Portugal 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 Portugal and any technical corrections deemed necessary by the TERT	See Table 2 above	67 358.799
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	26 288.813
CO ₂ emissions from 1A3a Domestic Aviation	See Table 2 above	498.122
NF ₃ emissions	See Table 2 above	-
Total ESD emissions		40 571.864

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 Portugal and any technical corrections deemed necessary by the TERT	See Table 3 above	85 920.005	66 012.934	71 089.685	67 358.799
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	36 425.933	25 755.477	30 076.001	26 288.813
CO ₂ emissions from 1A3a Domestic Aviation	See Table 3 above	389.143	447.130	501.753	498.122
Total ESR emissions		-	39 810.326	40 511.931	40 571.864

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
PT-1A1a-2020-0001	Yes	1A1a Public Electricity and Heat Production, CO ₂ , 2017	For category 1A1a Public Electricity and Heat Production, CO ₂ emissions, and the year 2017, the TERT noted that emissions reported in the GHG inventory are higher (100.5%) than emissions from EU-ETS as reported in MMR Annex: Implementing Regulation Article 10: "Reporting on consistency of reported emissions with data from the emissions trading system" which is not the case in 2016 and 2018. In response to a question raised during the review, Portugal explained that an error was identified in an oxidation factor in one of the main power generation plants. Portugal provided a revised estimate for the year 2017 and stated that it will be included in the next submission. The TERT agreed with the revised estimate provided by Portugal. The TERT recommends Portugal to include the revised estimate in its next submission.	RE
PT-2B1-2020-0001	Yes	2B1 Ammonia Production, CO ₂ , 2005	For category 2B1 Ammonia Production, CO ₂ emissions, and the year 2005 the TERT noted that in response to a question raised during the review, Portugal provided a revised estimate that the TERT disagreed with. The TERT decided to calculate a technical correction for the year 2005 which was accepted by Portugal. The estimates demonstrate that the issue is above the threshold of significance. The TERT notes that its technical correction is based on a Tier 1 approach despite CO ₂ emissions from 2B1 Ammonia Production being a key category in 2005. The TERT recommends that Portugal include a revised estimate in its next submission.	TC

EMRT-ID	Key category	Category, gas, year	Recommendation	Revised estimate or technical correction in 2020
PT-2F1-2020-0001	Yes	2F1 Refrigeration and Air Conditioning, HFCs, 2017, 2018	For category 2F1e Mobile Air-Conditioning, the TERT noted that the R-134a emission calculation did not take into account the share of R-1234yf, which implied an over-estimate above the threshold of significance for years 2017 and 2018. In response, Portugal explained that it did indeed over-estimate the R-134a emissions and provided revised estimates for the years 2017 and 2018 which are consistent with the proposed Potential Technical Correction. Portugal also intends to apply the revised assumptions for the whole time series and include the new estimates in the next NIR submission. The TERT agreed with the revised estimate provided by Portugal and agreed that revised assumptions could be included on the whole time series. However, the TERT would like to point out that the proposed share of R-134a usage on Air Conditioning for 2011-2015 looks low as the R-1234yf share only started to be significant in Europe from 2014 onwards. The TERT recommends Portugal to include the revised estimate in its next submission.	RE
PT-3D1-2020-0001	Yes	3D1 Direct N ₂ O Emissions from Managed Soils, N ₂ O, 2005, 2016, 2017, 2018	For 3D1 Direct N ₂ O Emissions from Managed Soils, N ₂ O and years 2005, 2016, 2017 and 2018, the TERT noted that the value of 0.01 kg N ₂ O-N/kg N is used as default IPCC emission factor for inorganic nitrogen inputs while the default emission factor from the 2006 IPCC Guidelines for nitrogen applied to rice cultivation areas is 0.003 kg N ₂ O-N/kg N. In response to a question raised during the review, Portugal explained that the annual consumption of inorganic N fertilizers in Portugal is provided by the National Statistics Authority (INE) and the data are not disaggregated by crop. In addition, the rice cultivated area in Portugal is relatively small compared to the total cultivated areas and that the impact of applying the specific EF for inorganic nitrogen input to rice areas is below the threshold of significance. Portugal provided a revised estimate for years 2005, 2016, 2017 and 2018. The TERT agreed with the revised estimate provided by Portugal. The TERT recommends that Portugal include the revised estimate in its next submission and justify the amount of inorganic nitrogen input to rice areas (in the revised estimates assumed to be 125 kg N/ha rice).	RE

EMRT-ID	Key category	Category, gas, year	Recommendation	Revised estimate or technical correction in 2020
PT-3I-2020-0001	No	3I Other Carbon-Containing Fertilizers, CO ₂ , 2005, 2016, 2017, 2018	For 3I Other Carbon-Containing Fertilizers, CO ₂ emissions and years 2005, 2016, 2017 and 2018, the TERT noted that Portugal reports 'NO'. The TERT acknowledges that this is a non-mandatory category, but that emissions could be estimated similarly as can be done for liming (i.e. use of fertilizer as activity data, and use of an emission factor based on carbon content). In response to a question raised during the review, Portugal provided a revised estimate for years 2005, 2016, 2017 and 2018. The TERT agreed with the revised estimate provided by Portugal but noted that the assumed content of limestone in calcium ammonium nitrate (CAN) (5.5%) is small compared to the usual content (23%). The TERT recommends that Portugal include the revised estimate in its next submission, and justify the limestone amount content in CAN.	RE

Revised estimates provided by Portugal and accepted by the TERT

1

ESD Review Tool ID:	PT-1A1a-2020-0001
ESD Review Tool URL:	https://emrt-esd.eionet.europa.eu/2020/PT-1A1a-2020-0001
Country:	Portugal
Sector:	1A1 Energy Industries
Gases:	CO ₂
Fuel	N/A
Completed by Sector Expert:	Julien Vincent
Reviewed by Counterpart:	Katrina Young
Reviewed by Lead Reviewer:	Ole-Kenneth Nielsen
Reviewed by Quality Controller:	Bernd Gugele
The underlying problem:	The TERT noted with reference to the comparison between EU-ETS data and GHG inventory, for category 1A1a, CO ₂ , 2017 that there might be an under-estimate of emissions. This under-estimate might be above the threshold of significance. The TERT noted that this under-estimate might be because for 2017, EU-ETS emissions from 1A1a (18,231 kt CO ₂) were higher than emissions reported in the GHG inventory (18,141 kt CO ₂) for the same category (100.5%). For 2016 and 2018, EU-ETS emissions represent 96.2% and 97.4% of GHG inventory respectively.
Summarise the methodology used:	Portugal answered that an error was identified in an oxidation factor in one of the main power generation plants. Thus, the value of GHG inventory will be 18,644 kt in 2017 for category 1A1a, which means that EU-ETS values represent 97.8% in relation to GHG Inventory data, in line with the representativeness verified in 2016 and 2018. Therefore, the TERT accepted this Revised Estimate as emissions are consistent after revision for the year 2017.

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	18 140.573								1A1a Public Electricity and Heat Production
2018									
	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	18 644.000								1A1a Public Electricity and Heat Production
2018									
	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	503.427								
2018									

1

ESD Review Tool ID:	PT-2F1-2020-0001
ESD Review Tool URL:	https://emrt-esd.eionet.europa.eu/2020/PT-2F1-2020-0001#tab-qa
Country:	Portugal
Sector:	2F1e Mobile Air-Conditioning
Gases:	HFC-134a
Fuel	N/A
Completed by Sector Expert:	Stephanie Barrault
Reviewed by Counterpart:	Barbara Gschrey
Reviewed by Lead Reviewer:	Ole-Kenneth Nielsen
Reviewed by Quality Controller:	Bernd Guegle

1

The underlying problem:	The TERT identified a potential under-estimate exceeding the threshold of significance for R-134a in 2017 and 2018. Portugal did not yet consider the introduction of the new low-GWP refrigerant R1234yf in new vehicles.
Summarise the methodology used:	The TERT proposed a revised estimate. Portugal reviewed this proposal including more accurate data. Both estimates were consistent. Revised estimates for this category are based on a bottom-up approach Tier 2a including new data regarding the number of vehicles placed on the market with R-1234yf. The methodology applied for the assembly phase takes into account the MAC Directive, as well as the number of new vehicles assembled in Portugal in 2017 and 2018 by type of vehicle. MAC's initial charge by type of vehicle values proposed are based on national manufacturers and suppliers. Assembly emission factors correspond to values within the ranges proposed in Table 7.9 of chapter 7 of the 2006 IPCC Guidelines for "Mobile AC". The methodology applied for the operation phase takes into account the national vehicle fleet in 2017 and 2018, as well as the share of vehicles with Air Conditioning which was obtained from the COPERT V Software.

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				813.367					HFC-134a only
2018				848.473					HFC-134a only
	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				770.828					
2018				800.417					
	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				-42.539					
2018				-48.056					

ESD Review Tool ID:

PT-3D1-2020-0001

ESD Review Tool URL:

https://emrt-esd.eionet.europa.eu/2020/PT-3D1-2020-0001

Country:

Portugal

Sector:

3D1 Direct N₂O Emissions from Managed Soils

Gases:

N₂O

Fuel

N/A

Completed by Sector Expert:

Beatriz Sanchez

Reviewed by Counterpart:

Katalin Lovas

Reviewed by Lead Reviewer:

Ole-Kenneth Nielsen

Reviewed by Quality Controller:

Bernd Guegle

The underlying problem:

For 3D11 Inorganic N Fertilizers and N₂O for all years, the TERT noted that Portugal uses the default EF of 0.01 kg N₂O-N/kg N for all inorganic nitrogen inputs, while the default EF for inorganic nitrogen applied to rice cultivations is 0.003 kg N₂O-N/kg N. Figure 5-15 of 2020 NIR (p. 5-41) shows that mineral fertilizer are applied to rice cultivation right before flooding and at tilling stage. The TERT noted that there may be an over-estimate of emissions.

Summarise the methodology used:

Portugal provided a revised estimate assuming that 125 kg N are applied per hectare of rice cultivated and applying the default emission factor of 0.003 kg N₂O-N/kg N applied.

Year

CO₂

CH₄

N₂O

HFCs

PFCs

SF₆

NF₃

Mixed GHG

Notes

2005

480.757

3D11 Inorganic N Fertilizers

2016

507.811

3D11 Inorganic N Fertilizers

2017

494.902

3D11 Inorganic N Fertilizers

2018

470.393

3D11 Inorganic N Fertilizers

Year

CO₂

CH₄

N₂O

HFCs

PFCs

SF₆

NF₃

Mixed GHG

Notes

2005

470.528

3D11 Inorganic N Fertilizers

2016

495.867

3D11 Inorganic N Fertilizers

2017

483.042

3D11 Inorganic N Fertilizers

2018

458.367

3D11 Inorganic N Fertilizers

Year

CO₂

CH₄

N₂O

HFCs

PFCs

SF₆

NF₃

Mixed GHG

2005

-10.229

2016

-11.944

2017

-11.860

2018

-12.026

1	ESD Review Tool ID:	PT-3I-2020-0001								
	ESD Review Tool URL:	https://emrt-esd.eionet.europa.eu/2020/PT-3I-2020-0001								
	Country:	Portugal								
	Sector:	3I Other Carbon-Containing Fertilizers								
	Gases:	CO ₂								
	Fuel	N/A								
	Completed by Sector Expert:	Beatriz Sanchez								
	Reviewed by Counterpart:	Katalin Lovas								
1	Reviewed by Lead Reviewer:	Ole-Kenneth Nielsen								
	Reviewed by Quality Controller:	Bernd Guegle								
The underlying problem:		The TERT noted that Portugal reports 3I Other Carbon-Containing Fertilizers CO ₂ emissions as 'NO', while Portugal reports consumption of CAN (Calcium ammonium nitrate) that can contain carbon.								
Summarise the methodology used:		Although the 2006 IPCC Guidelines do not provide a methodology, emissions are estimated with a similar methodology to liming (i.e. use of fertilizer as AD, EF based on carbon content). Portugal provided a revised estimate based on the amount of CAN fertiliser used and the limestone content in CAN. The TERT noted that Portugal assumes a 5.5% of limestone content in CAN, while the content is usually around 23%.								
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	NO								
	2016	NO								
	2017	NO								
	2018	NO								
	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	2.617								Assumed 5.5% Limestone content in CAN
	2016	2.298								Assumed 5.5% Limestone content in CAN
	2017	1.744								Assumed 5.5% Limestone content in CAN
	2018	2.088								Assumed 5.5% Limestone content in CAN
	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	2.617								
	2016	2.298								
	2017	1.744								
	2018	2.088								

Technical corrections deemed necessary by the TERT

1

ESD Review Tool ID:	PT-2B1-2020-0001
ESD Review Tool URL:	https://emrt-esd.eionet.europa.eu/2020/PT-2B1-2020-0001
Country:	Portugal
Sector:	2B1 Ammonia Production
Gases:	CO ₂
Fuel	n/a
Completed by Sector Expert:	Wolfram Jörß
Reviewed by Counterpart:	Emma Salisbury
Reviewed by Lead Reviewer:	Ole-Kenneth Nielsen
Reviewed by Quality Controller:	Bernd Gugele
The underlying problem:	
The Tier 2 methodology applied by Portugal in its original submission had been questioned by a UNFCCC review and then confirmed as an error by Portugal. An initial revised estimate using Tier 1 had been rejected by the TERT as 2B1 is a key category. The subsequent revised estimate by Portugal using a Tier 2 methodology was also rejected by the TERT due to implausible fuel requirement assumptions.	
Summarise the methodology used:	The TERT calculated a technical correction drawing on the Tier 1 revised estimate submitted by Portugal on 20 May 2020.

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	582.626								
2016	NO								
2017	NO								
2018	NO								
Technical Correction calculated by TERT (Gg CO ₂ e)									Notes
Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	NF ₃	Mixed GHG	
2005	795.590								This TC takes up the initial RE submitted by Portugal on 20 May 2020 and rejects the updated RE submitted on 28 May 2020.
2016									
2017									
2018									
Difference between TC and OE (Gg CO ₂ e)									
Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	NF ₃	Mixed GHG	
2005	212.964								
2016									
2017									
2018									

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.