

Final report of the 2012 technical
review of the greenhouse gas emission
inventory of Portugal
to support the determination of annual emission
allocations under Decision 406/2009/EC

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Introduction

Pursuant to Article 3.2 of Decision 406/2009/EC⁽¹⁾ (the 'Effort Sharing Decision' – ESD), the European Commission shall determine the annual emission allocations (maximum allowed greenhouse gas emissions) of Member States for the period from 2013 to 2020 in tonnes of carbon dioxide equivalent (CO₂ eq.), using reviewed and verified emission data.

Complete sets of greenhouse gas (GHG) emission estimates for the reference years (2005, 2008, 2009 and 2010) were submitted by each Member State by the 15th of May, 2012 as part of the 2012 national inventory submission under Decision 280/2004/EC (the 'Monitoring Mechanism Decision' – MMD). These estimates must have been reviewed to allow the determination in 2012 of the annual emission allocations for the period from 2013 to 2020.

The 'Guidelines for the 2012 technical review of greenhouse gas emission inventories to support the determination of Member States' annual emission allocations under Decision 406/2009/EC' were endorsed by the Climate Change Committee on 19 May 2011 and published as a European Commission Staff Working Document on 26 April 2012⁽²⁾. The 2012 greenhouse gas emission inventory of Portugal was reviewed in accordance with these guidelines.

This report presents the findings of the 2012 technical review of the greenhouse gas emission inventory of Portugal to support the determination of annual emission allocations under Decision 406/2009/EC.

Review Objectives

The purpose of the technical review of Member States' GHG inventories is to support the determination of the annual emission allocations by:

- a) ensuring that the European Commission has accurate, reliable and verified information on annual GHG emissions for the years 2005, 2008, 2009 and 2010 to determine the annual emission allocations under Decision 280/2004/EC;
- b) providing the European Commission and its Member States with a consistent, transparent, thorough and comprehensive technical assessment of GHG emissions, with a focus on data for the years 2005, 2008, 2009 and 2010 reported in 2012;
- c) examining, in a facilitative and open manner, the reported inventory information for consistency with the 'Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories', with the 2000 'Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories', and with the requirements of Decision 280/2004/EC (the 'Greenhouse Gas Monitoring Mechanism' Decision)⁽³⁾;

⁽¹⁾ Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020. OJ L 140, 5.06.2009, p. 136.

⁽²⁾ Commission Staff Working Document of 26 April 2012: Guidelines for the 2012 technical review of greenhouse gas emission inventories to support the determination of Member States' annual emission allocations under Decision 406/2009/EC. SWD(2012) 107 final.

⁽³⁾ Decision No 280/2004/EC of the European Parliament and of the Council of 11 February 2004 concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto protocol. OJ L 140, 5.06.2009, p. 136.

- d) assisting Member States in improving the quality of their GHG inventories.

Review approach and scope

The technical review of the 2012 GHG inventory estimates of Portugal for the years 2005, 2008, 2009 and 2010 was performed by a Technical Expert Review Team (TERT) under service contract 2011/S 234-378130 to the Directorate General for Climate Action of the European Commission. The review was conducted by the following experts: Kristien Aernouts & Tomas Gustafson for Stationary combustion (CRF categories 1.A.1, 1.A.2, 1.A.4, 1.A.5) + Reference approach; Maria Liden & Tinus Pulles for CRF categories 1.A.3 Transport + 1.C International bunkers; Ralph Harthan & John Watterson for CRF category 1.B Fugitive; Anke Herold & IIs Moorkens for CRF categories 2.A Mineral products + 2.B Chemical industry + CRF sector 3 Solvents; Kristina Saarinen & Dusan Vacha for CRF categories 2.C Metal production + 2.D Other production + 2.G Other; Maria Jose Lopez & Karin Kindbom for CRF categories 2.E Production of Halocarbons and SF₆ + 2.F Consumption of Halocarbons and SF₆; Michael Anderl & Steen Gyldenkaerne for CRF categories 4.A Enteric fermentation + 4.B Manure management; Sorin Deaconu & Etienne Mathias for CRF categories 4.C Rice cultivation + 4.D Agricultural soils, 4.E Prescribed burning of savannas, 4.F Field burning of agricultural residues; Juraj Farkas & Celine Gueguen for CRF sector 6 Waste. Ole-Kenneth Nielsen, Suvi Monni, Klaus Radunsky and Tatiana Tugui acted as lead reviewers. The review was coordinated by Bernd Gugele and Justin Goodwin. The TERT acknowledges the support of the EEA review secretariat Martin Adams, Francois Dejean and Melanie Sporer.

This technical review was performed on the basis of GHG emission data and the national inventory report (NIR) officially reported by Member States by the 15th of April, 2012 under the MMD. Resubmissions reported by Member States were taken into account until the 15th of May, consistent with the reporting practice for resubmissions under Decision 280/2004/EC. Emissions from international transport and land use, land-use change and forestry (LULUCF) were not reviewed. The review was performed with a focus on data for the years 2005, 2008, 2009 and 2010, reported in 2012.

The technical review process for GHG inventories comprised three stages, each of which considered different aspects of the inventories in such a way that the purposes described above were achieved by the end of the process. The three stages were:

- Stage 1, completed by 15 April 2012 – initial completeness checks of each Member State GHG inventory (submitted by 15 January and by 15 March);
- Stage 2, completed by 15 April 2012 – initial consistency and comparability checks of each Member State GHG inventory (submitted by 15 January and by 15 March);
- Stage 3, to be completed by the end of August 2012 – detailed *technical review* of each Member State GHG inventory (submitted by 15 May).

The detailed timeline of the review, including a summary of the correspondence with Portugal, is presented in Annex 3.

ESD 2012 technical review conclusions

Table 1. Main conclusions from the TERT

Findings
1. The TERT considers that the GHG emission inventory estimates of Portugal for the years 2005, 2008, 2009 and 2010 submitted in 2012 under the MMD included emission overestimates .
2. The TERT identified inconsistency issues between the reported GHG emission inventory estimates and verified emission data under the EU ETS (see Table 3 in Annex 1).
3. During the course of the technical review, the TERT received revised GHG emission inventory estimates from Portugal in response to its initial findings (see Table 2).
4. The TERT considers that the aggregated revised GHG emission inventory estimates from Portugal for the years 2005, 2008, 2009 and 2010 do not include emission overestimates .
5. The TERT suggests that it is not necessary to implement any technical correction to the GHG emission inventory estimates and to amend the reported GHG total.
6. As stated beneath Table 1, Portugal accepts the aggregated GHG emission inventory estimates presented in Table 2 including any revised estimate received from Portugal and accepted by the TERT.
7. The TERT identified non-binding recommendations for improvements of Portugal's GHG inventory (see Table 3 in Annex 1).
8. The TERT considers that it received a response from Portugal that was sufficient in order to undertake the review appropriately.

Statement from Portugal on the conclusions of the TERT

Portugal agrees with the TERT's conclusions and accepts the aggregated GHG emission inventory estimates presented in Table 2 including any revised estimates received from Portugal and accepted by the TERT.

Table 2. Summary of national totals, including any revised estimates or technical corrections identified during the review

Data / Category	Reference	Status of GHG emission revision or correction	2005 Gg CO ₂ eq.	2008 Gg CO ₂ eq.	2009 Gg CO ₂ eq.	2010 Gg CO ₂ eq.
Total GHG emissions as reported in the 2012 submission under the MMD	14 May 2012, PRT-2012-v1.3		86 540.429	77 824.631	74 371.586	70 599.091
Revised estimates provided by Portugal ⁽⁴⁾						
1.A.2.a Iron and steel + 2.C.1 Iron and steel production, CO ₂ , CH ₄ , N ₂ O	06/07/2012 Steel_PT_20120706.xlsx	Accepted by the TERT	31.173	18.457	9.554	-36.777
1.A.3.b Road transportation, gaseous fuels, CO ₂	Corrected values provided by Portugal 2012-06-08 (file Road Recalculation_20120608 PT.xls), PT-1A3+1C-10	Accepted by the TERT	-3.643	-2.309	-4.162	-4.362
2.A.7 Glass production, CO ₂	10/08/2012 Glass_PT_20120809.xlsx	Accepted by the TERT	-29.222	-54.111	-68.322	-82.900
2.B.5 Other chemical industry, CO ₂	2012-06-08, revised outlier correction, PT_CarbonBlack.xlsx	Accepted by the TERT		-23.777		
2.F(a).1. Mobile Air-Conditioning, AD, HFC-134a	2012-06-08, Q_attachment for PT 20120605-reply 20120608.xlsx, PT-2E+F-2	Accepted by the TERT	76.463	183.395	231.438	283.157
Total GHG emissions including any accepted revised estimate received from Portugal and/or technical correction as proposed by the TERT			86 615.200	77 946.286	74 540.095	70 758.208

⁴ Difference: revised estimates – original estimates. A positive difference indicates an increase compared to reported emissions. A negative difference indicates a decrease compared to reported emissions. For more information on revised estimates, see Annex 1.

CO₂ emissions from 1.A.3.a Civil aviation	14 May 2012, PRT-2012-v1.3		384.274	347.273	395.548	398.200
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Note: National totals exclude emissions from LULUCF and emissions reported under memo items (e.g. international aviation and maritime transport).

Annex 1 – Recommendations, revised estimates and technical corrections

Table 3. Recommendations of the TERT

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ⁽⁵⁾	Technical correction ⁽⁶⁾
Yes	1.A.1.b. Petroleum refining CO ₂ 2005–2010	There are systematic differences between data reported under the EU ETS for mineral oil refineries and in the CRF for petroleum refining activities, EU ETS data being higher for all years. In the NIR it is stated that data from the EU ETS is used as activity data but that CO ₂ EFs are derived from various international references (IPCC, EMEP/CORINAIR, US EPA). During the technical review, Portugal acknowledged that there are differences in the CO ₂ EFs for refinery gas and fuel oil used and derived EU ETS values, but that further analysis of the differences is needed.	The TERT recommends that Portugal continues analysing the information on CO ₂ EF in the EU ETS and if found justifiable and applicable starts introducing them in the GHG inventory.	No	No
No	1.A.2.a Iron and steel + 2.C.1 Iron and steel production CO ₂ , CH ₄ , N ₂ O	The TERT identified that Portugal’s emission estimates from 2.C.1 Iron and steel production were not based on the best available data for 2005, 2009 and 2010. In response to a question raised by the TERT during the review, Portugal provided revised estimates from iron	The TERT recommends that Portugal reflects the revised estimates in future submissions	Yes	No

⁵ The GHG emission estimate for this category was revised by Portugal during the technical review.

⁶ The GHG emission estimate for this category is subject to a technical correction proposal by the TERT.

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ⁽⁵⁾	Technical correction ⁽⁶⁾
	2005-2010	and steel production for 1.A.2.a and 2.C.1. The TERT agreed with the revised estimates.			
Yes	1.A.3.b. Road transportation Gaseous fuels CO ₂ All years	The EF used for CO ₂ emissions from gaseous fuels is inaccurate; the correct EF should be 55.8 t CO ₂ /TJ. Emissions in the inventory are overestimated. This has been confirmed by Portugal and Portugal has provided corrected estimates.	The TERT recommends that Portugal includes the revised estimates on CO ₂ from gaseous fuels used for road transport in future inventory submissions.	Yes	No
Yes	1.A.4. Other sectors CO ₂ 2005–2009	CO ₂ emissions from 1.A.4. have been recalculated for 2005–2009 (decrease of about 200 Gg in 2005). The NIR indicates the reason for the recalculation but information on the magnitude of each revision is not provided. The TERT could therefore not judge whether the recalculations are in line with the 2000 IPCC Good Practice Guidance (GPG).	The TERT recommends that Portugal includes in the NIR descriptive information and the magnitude of all significant recalculations for key categories.	No	No
Yes	2.A.2. Lime production CO ₂ 2005–2010	The NIR states on page 4–9: ‘There is still some possibility that the inventory is doubling the estimate of CO ₂ emissions, if part of the quick-lime that is produced in an industrial unit is sold and used again to produce slacked lime or hydraulic lime in a different industrial plant. To correct this effect, emissions estimated from lime production should be cross checked with emission estimates from limestone and dolomite consumption. Another contribution factor to over-estimation of emissions is the possible use of calcium materials to other used than lime production in the paper pulp industry.’ During the review, Portugal confirmed that additional checks showed that	The TERT recommends that Portugal describes additional checks and their results related to double-counting between lime production and limestone and dolomite use in the NIR.	No	No

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ⁽⁵⁾	Technical correction ⁽⁶⁾
		no double-counting occurs.			
No	2.A.7.a. Glass production CO ₂ 2005–2010	From the description in the NIR it is not clear whether the methodology used for CO ₂ emissions from glass production took into account that glass makers usually use a certain amount of recycled scrap glass (cullet) which should be subtracted in the emission estimation independent of the methodological tier as this fraction does not cause CO ₂ emissions. During the review, Portugal provided detailed revised estimates for CO ₂ emissions from glass production taking into account the fraction of cullet. The revised CO ₂ estimates are also based on revised AD resulting in lower CO ₂ emissions. The cullet fraction is taken into account in the AD estimates (amounts of molten glass). The TERT accepted the revised estimates provided by Portugal.	The TERT recommends that Portugal includes the revised CO ₂ emission estimates for glass production in its next inventory submission and report transparently how the fraction of cullet was taken into account in the estimation and how EFs were derived.	Yes	No
Yes	2.B.5. Other (chemical industry) CO ₂ 2008	Activity data for carbon black for the year 2008 was corrected by Portugal after the TERT identified an outlier for the year 2008. Corrected data and revised estimates were submitted to the TERT during the review.	The TERT recommends that Portugal uses corrected activity data and CO ₂ emissions for carbon black for 2008 in the GHG inventory.	Yes	No
Yes	2.F(a).1. Refrigeration and air conditioning equipment HFC-134a 2005-2010	The TERT noted that the product life factor in Portugal's CRF background data table 2(II) Fs1 for 2010 for HFC-134a from MAC is high, 47%/year, and for 2009 51%. During the review week, Portugal provided revised estimates for HFC-134a from MAC. The TERT agreed with the revised estimates.	The TERT recommends that Portugal reflects the revised estimates in future submissions	Yes	No
Yes	6.A.1. Managed	The k value applied is 0.07 although there is no	The TERT recommends that Portugal develops more	No	No

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ⁽⁵⁾	Technical correction ⁽⁶⁾
	waste disposal on land k value All years	national study to determine this parameter. The default value proposed in the 2000 IPCC Good Practice Guidance (GPG) is 0.05. Portugal indicated that there is no national data concerning this value and that the value was chosen on the basis of the EPA emission model. Even though this justification does not appear to be sufficient in case a default value is proposed in the 2000 GPG, the TERT considers this value to be acceptable taking into account that the IPCC 2006 GLs provide an interval of 0.05–0.08 for countries with dry climate.	specific k values that are adapted to its national characteristics.		
Yes	6.A.1. Managed waste disposal on land Recovery All years	The CH ₄ recovery values were collected through questionnaires to operators. The value increased from 0 Gg in 2003 (0 % of generated CH ₄) to 30 Gg in 2010 (20 % of generated CH ₄). There is no precise description of CH ₄ recovery estimation in the NIR. During the review Portugal provided more detailed information. The TERT was satisfied with the response.	The TERT recommends that Portugal improves the transparency of the NIR concerning the estimation of CH ₄ recovered on landfills. When direct data from landfills are used, the completeness of the reporting should be presented and recalculations made for undocumented sites (closed landfills, not reporting) should be explained in the NIR. The type of monitored parameters used for this estimation should be indicated (amount of CH ₄ /biogas recovered, flared or used for energy purpose (in mass or energy units), energy generation, etc.). If monitored data is not available in terms of amounts of CH ₄ or biogas, but only in energy units (e.g. TJ, electricity/heat generation), the parameters used for the conversion of energy data to CH ₄ amounts (e.g. efficiency of the energy plants, NCV, on-site energy use) should be well	No	No

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ⁽⁵⁾	Technical correction ⁽⁶⁾
			documented.		
Yes	6.B. Wastewater handling MCF All years	The TERT noted that Portugal applies a detailed methodology to estimate emissions from domestic and commercial wastewater handling. This approach is compliant with the one proposed in the Revised 1996 IPCC Guidelines. Some MCF values were estimated on the basis of expert judgment. In Table 8.6 of the NIR, it seems that there is an inversion concerning notes a) and b).	The TERT encourages Portugal to check the notes in Table 8.6 of the NIR.	No	No
Yes	6.B.1. Industrial wastewater MCF All years	The TERT noted that the fraction of wastewater treated by each wastewater handling system (fraction of wastewater type i treated using wastewater handling system x - WSix - in the Revised 1996 IPCC Guidelines) is documented for only 50–60 % of the organic load in industrial wastewater.	The TERT recommends that Portugal implements the Methodological Development Plans concerning the improvement of the description of the fraction of industrial wastewater treated using each wastewater handling system.	No	No
Yes	6.B.1.b. Sludge recovery All years	The TERT noted that combusted biogas concerning 'agriculture' is included in the estimation of CH ₄ recovered in sludge treatment of industrial wastewater treatment plants. In its response to a question raised by the TERT, Portugal indicated that this refers to CH ₄ recovered in pig farms and that this amount should be considered in the CRF sector 4.	The TERT recommends that Portugal does not include the amount of CH ₄ recovered in pig farms in CH ₄ recovered in industrial wastewater treatment plants. The CH ₄ recovery should be considered in the CRF sector 4. and – if the CH ₄ is used for energy production – in the CRF sector 1.	No	No
Yes	6.B.1.b. Sludge recovery All years	Parameters used to estimate emissions from industrial wastewater and sludge treatment are based on an old study (1985). Even though the validity of this study was checked, more recent data could be useful for the accuracy of the inventory.	The TERT recommends that Portugal investigates further the parameters used to estimate emissions from industrial wastewater and sludge treatment in order to update this study with more recent data.	No	No

Annex 2 – Detailed technical corrections

There are no technical corrections applied to the Portugal's estimates of emissions.

Annex 3 – Checks and tests completed

The initial checks (stage 1 and 2 checks), which cover the national inventory submissions, informed the stage 3 technical review with a view to:

- a) assess whether all emission source categories and gases are reported as required under Decision 280/2004/EC;
- b) assess whether sub-category sums are consistent with sectoral and national totals;
- c) assess whether emission data time series are consistent;
- d) assess whether implied emission factors across Member States are comparable;
- e) assess the use of 'Not Estimated' notation keys where IPCC Tier 1 methodologies exist;
- f) compare with the previous year's inventory submission of the Member State;
- g) limited sector-specific checks performed by ETC/ACM sector experts.

The EU initial checks were extended in 2012 to address additional elements needed for the 2012 technical review. The extended checks included:

- a) a detailed analysis of recalculations performed for the 2012 inventory submissions, in particular if recalculations are based on methodological changes.
- b) a comparison of the verified emissions reported under the EU ETS with the greenhouse gas emissions reported in GHG inventories. The verified emissions under the EU ETS are not fully comparable with the emissions reported in the GHG inventories. This comparison may only highlight areas where some Member States' data and trends deviate considerably from those of other Member States.
- c) a comparison of the results from Eurostat's reference and sectoral approach, based on energy data reported under Regulation (EC) No 1099/2008, with the Member States' reference and sectoral approach.

The specific activities of the 2012 technical review included:

- a) an analysis of the Member States' implementation of recommendations related to improving inventory estimates in accordance with the Revised 1996 IPCC Guidelines and the 2000 IPCC good practice guidance (GPG) as listed in the UNFCCC Annual Review Reports from the 2010 and 2011 UNFCCC review processes. Where UNFCCC recommendations have not been implemented, the analysis included an assessment as to whether the Member State provided adequate justification for this;
- b) an assessment of the time series consistency of the greenhouse gas emissions estimates, with a particular focus on the 2005 and 2008-2010 estimates;
- c) checking whether problems identified for one Member State in UNFCCC reviews might also have been a problem for other Member States (whether identified by the UNFCCC expert review team or not);
- d) an assessment of any recalculations made by a Member State in its inventory since the previous submission, and an assessment as to whether these were transparently reported and were in accordance with IPCC good practice guidance;
- e) a follow-up on any outstanding findings from existing and extended stage 1 and 2 checks;
- f) the inclusion of revised estimates as provided by Member States in response to the review, and as accepted by the TERT during the review;
- g) the provision of an estimate for any 'technical correction' to emission estimates reported by a Member State where it is believed that emissions reported by the Member State are

overestimated, and a statement of the significance of these 'technical corrections' in comparison to the overall reported inventory estimates;

- h) the provision of recommendations where problems have been identified that do not require technical corrections.

Material from previous UNFCCC inventory reviews was used to inform the technical review, including the previous years' Annual Review Reports, which provide an indication of the overall quality of the inventory.

The TERT used additional technical information in the review process, such as EU ETS data, information from Eurostat, and F-gas data from the 'Preparatory study for a review of Regulation (EC) No 842/2006 on certain fluorinated greenhouse gases (⁷), as well as data from other international organisations.

⁷ Service contract 070307/2009/548866/SER/C4 to the European Commission

Annex 4 – Correspondence references

Date	Reference
14 May 2012	Final CRF and NIR submission under the MMD, version PRT-2012-v1.3
21, 23 May 2012	Initial questions raised by the TERT during the desk review
7, 11, 13, 16 June 2012	Additional questions raised by the TERT during the centralised review
4, 8, 12, 19, 29 June 2012	Responses from Portugal to TERT questions
21 June 2012	Draft technical corrections from TERT to Portugal
6 July 2012	Response from Portugal to TERT draft technical corrections
13 July 2012	Draft review report from TERT to Portugal
31 July, 3, 9 August 2012	Response and additional information from Portugal to draft review report
13 August 2012	Draft final review report from TERT to Portugal
14 August 2012	Response and additional information from Portugal to final review report
17 August 2012	Final review report to European Commission