Final report of the 2012 technical review of the greenhouse gas emission inventory of Italy

to support the determination of annual emission allocations under Decision 406/2009/EC

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Content

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 (CO_2 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 Italy was reviewed in accordance with these guidelines.

This report presents the findings of the 2012 technical review of the greenhouse gas emission inventory of Italy 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 Italy 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 & Ils 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 SF_6 + 2.F Consumption of Halocarbons and SF_6; 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 Italy, is presented in Annex 4.

ESD 2012 technical review conclusions

Table 1. Main conclusions from the TERT

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

Statement from Italy on the conclusions of the TERT

Italy accepts the aggregated GHG emission inventory estimates presented in Table 2 including the technical correction as proposed 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	13 April 2012, ITA-2012-v1.3		**574 749.009**	**541 589.393**	**491 528.493**	**501 317.659**
Technical correction proposed by the TERT ([4])						
2.C.2 Ferroalloys production, CO_2	IT-2C+2D+2G-2		-80.271	-73.003	-55.286	-69.174
Total GHG emissions including any accepted revised estimate received from Italy and/or technical correction as proposed by the TERT			**574 668.737**	**541 516.390**	**491 473.207**	**501 248.485**
CO_2 emissions from 1.A.3.a Civil aviation	13 April 2012, ITA-2012-v1.3		**2 204.100**	**2 301.353**	**2 197.181**	**2 319.332**

Note: National totals exclude emissions from LULUCF and emissions reported under memo items (e.g. international aviation and maritime transport).

[4] Difference: technical correction – original estimates. A positive difference indicates an increase compared to reported emissions. A negative number indicates a decrease compared to reported emissions. For more information on technical corrections, see Annex 2.

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])
No	1.A.3.e. Other transportation All gases All years	There is no information regarding emissions from 1.A.3.e. Other transportation in the NIR. During the technical review Italy provided information related to AD, EF and fluctuation of emission trends in response to a question raised by the TERT. The TERT considers the information provided as satisfactory.	The TERT recommends that Italy includes in its NIR a transparent description of AD, EFs and methods used for estimating emissions from this category as provided during the technical review.	No	No
No	Energy: Feedstocks and non-energy use of fuels CO_2/Naphtha 2005–2010	Italy reports higher values for naphtha as feedstocks in the CRF than in the Eurostat data (for 2005: 184 PJ and 120 PJ, respectively) and a storage factor of 1. Italy explains in the NIR on page 105: 'the amount of quantity stored in products for each fuel is calculated as the difference between input (petrochemical input) and output (returns to refinery and internal consumption and losses)'. The TERT believes that there must be some off-gases and recovered fuels since there are steam crackers located at the refinery sites.	The TERT recommends that Italy increases the transparency of the NIR by including information on how it accounts for off-gases and recovered fuels.	No	No

[5] The GHG emission estimate for this category was revised by Italy 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])
No	2.A.7.a. Glass production CO_2 All years	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 emissions estimation independent of the methodological tier as this fraction does not cause CO_2 emissions. However, the IEF for CO_2 from glass production is rather low, which does not indicate an overestimation of emissions from glass production.	The TERT recommends that Italy adds an explanation in the NIR whether the amount of recycled glass used in the glass production (cullet) was taken into account in the estimation methodology.	No	No
No	2.C.2. Ferroalloys production CO_2 All years	Please see technical correction reference IT-2C+2D+2G-2 in Annex II	The TERT recommends that the inventory is revised to address the issues raised in the technical correction. Furthermore, the TERT recommends that time series consistency is ensured by implementing the revision for all relevant years of the time series.	No	Yes
No	2.E. Production of halocarbons and SF6 HFC-23 2005–2010	Italy reports notation keys NA and NO for HFC-23 emissions from HCFC-22 production. In the NIR it is explained that abatement systems reduce the emissions to zero. Italy explained in their reply to the TERT that the theoretical remaining HFC-23 emissions could be calculated as not exceeding 100 kg/year, but according to the analytical results on the sample flue gases (analysis performed by the operator) the remaining HFC-23 emissions in fact do not exceed 10 kg/year and that such a contribution has not been considered significant for the estimation of the national HFC-23 emissions from HCFC-22 production.	The TERT recommends that Italy considers its way of reporting these minor, but existing emissions and replaces the notation keys by emission data in the CRF tables.	No	No

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ([5])	Technical correction ([6])
Yes	4.D.1.2. Animal manure applied to soils N_2O All years	The amount of nitrogen spread on agricultural soils (after deduction of the volatilisation) reported in Table 4.Ds1 must be consistent with nitrogen excreted and reported in Table 4.B(b) in the different management systems, but this issue was unclear to the TERT. The final answer from Italy was satisfying. Italy provided an Excel spreadsheet with the necessary explanations. In fact, the value of $Frac_{GASM}$ reported by Italy refers to the fraction of N_NH3-NOx emissions compared to nitrogen recovered and stored instead of total nitrogen excreted. This issue only concerns the reporting of the parameter $Frac_{GASM}$ and does not affect the calculation of emissions.	The TERT recommends that Italy corrects the values reported under the parameter $Frac_{GASM}$ by reporting the ratio of N_NH_3-NOx emissions compared to total N excreted instead of N recovered and stored.	No	No
No	4.D.1.6. Other direct emissions Activity data All years	The amount of N in sewage sludge reported in the CRF is the total nitrogen amount from sewage not subtracted by the amount of nitrogen volatilised as NH_3 and NOx. This could be changed and the amount of nitrogen in sewage sludge could be adjusted by volatilisation.	In order to improve transparency, the TERT recommends that Italy reports the amount of nitrogen in sewage sludge adjusted by volatilisation in order to report in a harmonised way with manure animal application.	No	No
Yes	6.A.1. Managed waste disposal on land CH_4 recovery All years	Italy indicated during the technical review that CH_4 recovered and flared is estimated on the basis of total CH_4 recovered minus CH_4 recovered and used for energy purposes. Furthermore, Italy indicated that different national studies and technical publications from operators, quoted in the NIR, were used to estimate the recovery efficiency. However, the value of this efficiency is not provided and documented in the	The TERT recommends that Italy estimates CH_4 recovered and flared on the basis of monitored data (instead of an expert opinion on recovery efficiency) in order to be fully compliant with the 2000 IPCC Good Practice Guidance (GPG). When direct data from landfills are used, the completeness of the reporting should be presented and recalculations made for undocumented sites (e.g. closed landfills) should be	No	No

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ([5])	Technical correction ([6])
		NIR. The TERT nevertheless considers the national ratio of CH_4 recovered in managed SWDS (44 %) to be plausible.	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 purposes (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 documented.		
Yes	6.A.2. Unmanaged waste disposal sites MCF All years	It is specified in the NIR that 'before 2000 the existing unmanaged landfills were mostly shallow […]. To be conservative the default IPCC value reported for uncategorised landfill has been used'. This means that an MCF value of 0.6 has been applied instead of 0.4 (2000 IPCC GPG, Table 5.1). During the technical review, Italy provided qualitative information to support the use of a 0.6 value. The TERT considered the additional information provided by Italy to be satisfactory.	The TERT encourages Italy to improve the transparency of the NIR concerning the choice of the MCF value, for example by including in the NIR information provided during the technical review.	No	No
No	6.B.3.b. N_2O from human sewage N_2O All years	N_2O emissions from human sewage are calculated applying the Revised 1996 IPCC Guidelines on the basis of national population. N_2O emissions from sludge spreading (1,668 Gg) are also estimated. The NIR does not indicate that those emissions are subtracted from human sewage emissions but Italy confirmed during	The TERT encourages Italy to explain in the NIR that the N content in sludge spreading is subtracted from the N content of human sewage in order to improve transparency.	No	No

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ([5])	Technical correction ([6])
		the technical review that the N content in sludge spreading is subtracted from human sewage and is not accounted for twice.			

Annex 2 – Detailed technical correction

Name of technical correction	**CO2 emissions from ferroalloys production**				
Reference to transcript finding record	IT-2.C + 2.D + 2.G-2				
Subsector	1.A.2.a. Iron and steel / 2.C.2 Ferroalloys production				
Gas/fuel/activity	CO_2/Ferroalloys production				
	2005	**2008**	**2009**	**2010**	
Original estimate	14 774.595	13 549.245	8 767.573	14 092.180	Gg CO_2 eq.
Corrected estimate	14 694.323	13 476.242	8 712.287	14 023.006	Gg CO_2 eq.
The underlying problem	Italy reports CO_2 emissions from ferroalloys production based on the information about production and default EFs. CO_2 emissions from ferroalloys production (2.C.2) come from reducing agents (fuels - coke, coal) which are reported under category 1.A.2.a. If the amount of reducing agents is not subtracted from the amount reported under the 1.A.2.a category, this amount of carbon is double-counted. During the review Italy explained that a potential double-counting could occur between categories 2.C.2. and 1.A.2.a and confirmed that there are plans for future improvements of the GHG inventory for the source category 2.C.2. Italy made reference to preliminary investigation in the context of the national environmental permit of the Italian plant in 2005, which indicate that the amount of reducing agent (coke) that should be deducted from 1.A.2.a is about 90%. In addition, Italy highlighted that there will also be potential problems with time-series consistency and transparency in reporting under UNFCCC.				
The rationale for the technical correction	The TERT concluded that CO_2 emissions from ferroalloys production are double-counted. To avoid double-counting, this amount of carbon/CO_2 emissions has to be subtracted from the 1.A.2.a category.				
The assumptions, data and methodology used to calculate the technical correction	The data provided in Italy's NIR and CRF, the IPCC methodology and the study 'CO_2 emission factors for non-energy use in the non-ferrous metal, ferroalloys and inorganics industry' (M. Sjardin, University of Utrecht, 2003) were used to calculate the technical correction. 90 % of CO_2 emissions reported under the 2.C.2. category are deducted from the category 1.A.2.a.				

Response from Italy on technical correction

Italy accepts the technical correction.

Final remarks by TERT

The TERT thanks Italy for the very good cooperation during the review process.

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
15 March 2012	Final CRF and NIR submission under the MMD, version ITA-2012-v1.2
21, 23 May 2012	Initial questions raised by the TERT during the desk review
7, 13, 14 June 2012	Additional questions raised by the TERT during the centralised review
4, 8, 15 June 2012	Responses from Italy to TERT questions
21 June 2012	Draft technical corrections from TERT to Italy
27 June 2012	Response from Italy to TERT draft technical corrections
13 July 2012	Draft review report from TERT to Italy
17 July 2012	Response from Italy to draft review report
14 August 2012	Draft final review report from TERT to Italy
15 August 2012	Response and additional information from Italy to final review report
17 August 2012	Final review report to European Commission