

Final report of the 2012 technical
review of the greenhouse gas emission
inventory of Finland
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 Finland was reviewed in accordance with these guidelines.

This report presents the findings of the 2012 technical review of the greenhouse gas emission inventory of Finland 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 Finland 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 Finland, 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 Finland for the years 2005, 2008, 2009 and 2010 submitted in 2012 under the MMD do not include 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 received a revised GHG emission inventory estimate from Finland in response to its initial findings (see Table 2) and the draft review report.
4. The TERT considers that the aggregated revised GHG emission inventory estimates from Finland for the years 2005, 2008, 2009 and 2010 do not include emission overestimates.
5. The TERT considers 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, Finland accepts the aggregated GHG emission inventory estimates presented in Table 2.
7. The TERT identified non-binding recommendations for improvements of Finland GHG inventory (see Table 3 in Annex 1).
8. The TERT considers that it received a response from Finland that was sufficient in order to undertake the review appropriately.

Statement from Finland on the conclusions of the TERT

Finland appreciates the work of the TERT and accepts the aggregated GHG emission inventory estimates presented in Table 2.

Finland has the following comments to the review results:

1. The 2012 submission contained some errors in the agricultural data, which Finland would have wanted to correct during the review. Finland provided the corrected data with reasoning to the TERT in response to the draft review report. The revised estimates would have increased the emissions from agriculture with 1.6 Gg CO₂ eq for 2009 and 18.1 Gg CO₂ eq for 2010. The corrections were not considered and accepted by the TERT as these proposed corrections were not related to questions raised by the TERT during the review (see Table 2 and its footnote 5) Finland agrees that the guidelines for EU review support the decision by the TERT. Finland believes, however, that the objective of the reviews, to ensure “that that the European Commission has accurate, reliable and verified information on annual GHG emissions for the years 2005, 2008, 2009 and 2010 used to determine the annual emission allocations under Decision 280/2004/EC “ is not fulfilled in the best way by this approach. In this specific case, the impact of the revised emissions would have been almost negligible (in the order of 0,002% for 2009 and 0,02% for 2010 of total national emissions) but experience from UNFCCC reviews have shown that even more significant errors are not always

identified by reviewers. The contents of para 12 in the guidelines should be reconsidered for any potential future internal EU reviews.

2. Finland has also a comment to the recommendation related to CRF category 2.F(a).1. Refrigeration and air conditioning equipment. The recommendation by the TERT goes beyond what Finland can deliver, as part of the data is confidential. In the next NIR, more disaggregated information on activity data by HFC species will be presented, as well as the requested division between stationary and mobile sources, their emissions and IEFs, but only where possible without compromising the rules set for confidentiality in the Statistics Act.

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	24 April 2012, FIN-2012-v1.3		68 622.525	70 242.850	66 118.734	74 555.635
Revised estimates provided by Finland (⁴)						
1.A.3.b. Road transportation, Diesel oil, CO ₂	Difference between data submitted 20120415 and corrected data provided by MS 20120606. See document FI_Diesel_correction_06.06.2012.xls, FI-1A3+1C-5	Accepted by the TERT	0.0	-34.945	-39.751	-52.572
4.A, B and D Enteric fermentation, manure management and agricultural soils, CH ₄ and N ₂ O	2 August 2012 FI_agriculture_correction_20120801.xlsx	Not accepted by the TERT due to inconsistency with the review guidelines (⁵)			1.613	18.143

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.

⁵ Paragraph 12 of 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' stipulates: "The technical review will be performed on the basis of greenhouse gas emissions data and national inventory report (NIR) officially reported by Member States by 15th April to the UNFCCC secretariat. Resubmissions reported by Member States will subsequently be taken into account until 15th May, consistent with the reporting practice for resubmissions under Decision 280/2004/EC. Following this date, only data revisions which are provided by a

4.D.2. Pasture, range and paddock manure, N ₂ O	2 August 2012 FI_agriculture_correction_20120801.xlsx	Accepted by the TERT	7.903	7.865	8.007	8.184
Total GHG emissions including any accepted revised estimate received from Finland and/or technical correction as proposed by the TERT			68 630.428	70 215.769	66 086.990	74 511.247
CO₂ emissions from 1.A.3.a Civil aviation	24 April 2012, FIN-2012-v1.3		328.924	297.287	275.436	253.279

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

Member State in direct response to the technical review questions and findings will be considered." As the TERT did not raise any questions related to fur animal numbers and fertilizer use the revised estimates related to "4.A, B and D Enteric fermentation, manure management and agricultural soils, CH₄ and N₂O" submitted by Finland on 2 August 2012 were not provided in direct response to the technical review findings and questions. Therefore, the TERT decided to not accept these revised estimates.

Annex 1 – Recommendations, revised estimates and technical corrections

Table 3. Recommendations of the TERT

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ⁽⁶⁾	Technical correction ⁽⁷⁾
Yes	1.A.3.b. Road transportation CO ₂ /Diesel oil 2008–2010	The TERT identified errors for CO ₂ emissions from diesel oil used in road transport in 2008–2010. In response to the findings of the TERT Finland provided revised estimates, which were accepted by the TERT.	The TERT recommends that Finland includes the revised estimates in future submissions.	Yes	No
Yes	2.F(a).1. Refrigeration and air conditioning equipment HFCs 2005–2010	The TERT did not find any indications of potential under- or overestimates of emissions of fluorinated gases from the refrigeration and air conditioning sector in Finland (2.F.1.). The TERT concludes that the reported data are reasonable. This conclusion is based on the clear description in the NIR of the activity data collection procedure in Finland and on the comparisons performed by the TERT between countries in the EU. However, the lack of the reporting of activity data (also by HFC species) prevents the calculation of implied EFs, which would permit comparisons with other countries and facilitate the	The TERT recommends that Finland includes the relevant data in the CRF sectoral background tables or includes a table in its NIR presenting the activity data for each HFC species on which the calculation of emissions is based. This table should include the activity data for stationary sources and for mobile air conditioning separately and the resulting emissions and calculated implied EFs for each HFC based on those data.	No	No

⁶ The GHG emission estimate for this category was revised by Finland during the technical review.

⁷ 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 ⁽⁶⁾	Technical correction ⁽⁷⁾
		assessment of a reasonable level of emissions.			
Yes	4.D.1.4. Crop residue parameter All years	Frac _R is reported as 0.45 in Table 4.Ds2. The explanations provided in the NIR are sufficient on crop residues but the value of Frac _R in the CRF is confusing.	The TERT recommends that Finland corrects the value of Frac _R in the CRF or to report a notation key instead of 0.45, which is an outdated default value from the Revised 1996 IPCC Guidelines.	No	No
Yes	4.D.2. Pasture, range and paddock manure N ₂ O All years	The value in Table 4.Ds1 is the amount after the volatilised amount (NH ₃ -N) is subtracted. The TERT understands the intention of Finland to apply a mass flow approach for nitrogen, and to subtract the volatilisation of ammonia for pasture as is done for manure spreading. However, following all the IPCC guidelines (2000 IPCC Good Practice Guidance (GPG) and Revised 1996 IPCC Guidelines), nitrogen excretion during pasture should not be adjusted by volatilisation if the IPCC default EF is used. This assumption remains the same in the 2006 IPCC Guidelines and is even applied for all nitrogen application to soil. Finland submitted a revised time series 1990-2010 following the recommendation of the TERT, which was accepted by the TERT.	The TERT recommends including the revised estimates in future inventory submissions.	Yes	No
Yes	6.A. Solid waste disposal on land MCF All years	In the Finnish FOD methodology, the MCF value increases from 0.4 in 1948 to 1 up to 2002 in order to take into consideration the fact that waste is disposed in managed SWDS and that closed landfills (unmanaged when used) are now covered and under anaerobic condition. During the technical review, the TERT asked for evidence that covered closed landfills	The TERT encourages Finland to provide more information in its NIR in order to justify that closed landfills (unmanaged when used) can now be considered with a MCF of 1.	No	No

Key category	Gas, fuel, activity	Observation	Recommendation	Technical correction (7)	
				Revised estimate (6)	
		can now be considered as completely anaerobic (MCF=1). Finland provided more clarifications concerning mitigation techniques in closed landfills (extra compaction and isolation) in its answer and also provided the reference of a report (in Finnish) to support this affirmation.			
No	6.B. Wastewater handling MCF All years	The methodological description concerning the handling of wastewater emissions does not make transparent the approach used by Finland to estimate these emissions. In response to a question raised by the TERT during the technical review, Finland provided a table including the population shares connected to types of treatment plants.	The TERT recommends that Finland provides further information in the NIR concerning municipal wastewater treatment pathways, especially including a table presenting the proportion of the population connected to each type of treatment system.	No	No

Annex 2 – Detailed technical corrections

There are no technical corrections applied to the Finland'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 (⁸), as well as data from other international organisations.

⁸ Service contract 070307/2009/548866/SER/C4 to the European Commission

Annex 4 – Correspondence references

Date	Reference
24 April 2012	Final CRF and NIR submission under the MMD, version FIN-2012-v1.3
21, 23 May 2012	Initial questions raised by the TERT during the desk review
5, 7 June 2012	Additional questions raised by the TERT during the centralised review
31 May, 6, 7, 8 June 2012	Responses from Finland to TERT questions
13 July 2012	Draft review report from TERT to Finland
2 August 2012	Response from Finland to draft review report
13 August 2012	Draft final review report from TERT to Finland
14 August 2012	Response and additional information from Finland to final review report
17 August 2012	Final review report to European Commission