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

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 Hungary was reviewed in accordance with these guidelines.

This report presents the findings of the 2012 technical review of the greenhouse gas emission inventory of Hungary 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 Hungary 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 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 Hungary, 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 Hungary 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 received revised GHG emission inventory estimates from Hungary in response to its initial findings (see Table 2).
4. The TERT considers that the aggregated **revised** GHG emission inventory estimates from Hungary 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, Hungary **accepts** the aggregated GHG emission inventory estimates presented in Table 2 including any revised estimate received from Hungary and accepted by the TERT.
7. The TERT identified non-binding recommendations for improvements of Hungary's GHG inventory (see Table 3 in Annex 1).
8. The TERT considers that it received a response from Hungary that was sufficient in order to undertake the review appropriately.

Statement from Hungary on the conclusions of the TERT

Hungary agrees with the above conclusions of 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	4 May 2012, HUN-2012-v1.4		**79 486.246**	**73 291.666**	**66 864.214**	**67 679.050**
Revised estimates provided by Hungary ([4])						
Enteric Fermentation, Cattle, CH_4	3 August 2012, HU-4A+4B-2	Accepted by TERT	-111.623	-109.385	-104.985	-104.337
Poultry Manure Management, CH_4	6 July 2012, HU-4A+4B-5	Accepted by TERT	-70.814	-110.339	-118.202	-135.245
Direct Emissions from Agricultural Soils - N-fixing crops	3 August 2012, HU Notes.docx and HU N-fixing.xlsx, HU-4C-4F-3	Accepted by TERT	79.632	76.001	60.679	58.053
Total GHG emissions including any accepted revised estimate received from Hungary and/or technical correction as proposed by the TERT			**79 383.441**	**73 147.943**	**66 701.706**	**67 497.521**
CO_2 emissions from 1.A.3.a Civil aviation			**IE,NO**	**IE,NO**	**IE,NO**	**IE,NO**

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

[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.

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.2. Manufacturing industries and construction CH_4 and N_2O – biomass 2005	Hungary switched to default EF for CH_4 and N_2O after the UNFCCC in-country review of 2010, but the IEF varies over time and the TERT noted that there is no biomass use reported in 2005 or 2009 (for 1.A.2.f.). Hungary responded to questions that the biomass included biogas and firewood. Hungary checked the IEA questionnaire, and concluded that in 2005 there was more solid biomass use than reported as biomass in the CRF, but this omission would represent less than 0.2 Gg CH_4 and N_2O emission expressed in CO_2 eq. In addition, wood wastes are reported together with other mixed wastes as 'other fuels' in the inventory, so most of the abovementioned CH_4 and N_2O emissions may be included elsewhere as emissions from other fuels.	The TERT recommends that Hungary makes sure all biomass is included in activity data and associated emissions in sector 1.A.2.	No	No
Yes	1.A.3.b. Road	CO_2 from road transportation is a key category,	The TERT recommends that Hungary obtains the C	No	No

[5] The GHG emission estimate for this category was revised by Hungary 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])
	transportation CO_2 All years	however the 2000 IPCC Good Practice Guidance (GPG) states in this respect: 'For traded fuels in common circulation, it is good practice to obtain the carbon content of the fuel and net calorific values from fuel suppliers, and use local values wherever possible. If these data are not available, default values can be used.' The TERT notes that the implied EF is at the low end as compared with other MS, which could indicate an underestimation of emissions. The TERT also notes that the local or country-specific data should be available in Hungary and that therefore the use of the default value is not in line with good practice.	content and net calorific values of gasoline from fuel suppliers, develops a country-specific EF for CO_2 from gasoline that is representative for gasoline used in Hungary and revises data accordingly. If this is not possible, Hungary could consult neighbouring countries with country-specific EFs.		
No	2.A.2. Lime production CO_2 1990–2010	In 2.A.2. lime production, emissions are estimated based on production statistics. It is unclear whether emissions from the auto-production of lime (sugar producers) are included in Hungary's EU ETS annual emission report. Hungary was not able to clarify this question during the review. The TERT concluded that if emissions are excluded this could result in an underestimation.	The TERT recommends that Hungary investigates the issue of emissions from lime production in the sugar industry and whether they are included or not in their EU ETS emission report and where these emissions are accounted for in the GHG inventory.	No	No
Yes	2.B.1. Ammonia production CO_2 1990–2010	The TERT noted that a part of the ammonia production is hydrogen based (5 % according to NIR 2012) but that the NIR 2012, page 91 does not confirm whether hydrogen is produced in Hungary or not. This issue is still under investigation and was also an issue raised in the previous UNFCCC review.	The TERT recommends that Hungary clarify whether hydrogen is produced and if so whether emissions are included in the inventory. Where estimates are or need to be made the TERT recommends that Hungary also fully document the estimates this with activity data and EF for the entire time series in the NIR.	No	No

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ([5])	Technical correction ([6])
Yes	2.F(a).1. Refrigeration and Air Conditioning Equipment All years	HFC emissions from refrigeration and air conditioning equipment might be underestimated as the original total charge of retiring and disposal of equipment is not taken into account in Hungary's inventory due to lack of data. Although Hungary estimates both assembly and operation emissions from this subcategory, emissions from disposal are not included in the calculation of the estimates. Disposal of equipment at the end of its service life can have a significant effect on the total emissions. The chemical remaining in systems can be up to 90% of the original quantity used.	In order to improve the accuracy of the estimates and avoid underestimations, the TERT recommends that Hungary includes in this category emissions from disposal by collecting information on the average lifetime of equipment and the initial charge.	No	No
Yes	2.F(a).3. Fire extinguishers HFC 2008, 2009	HFC emissions from fire extinguishers have increased by a factor of almost 500 from 2005 to 2008. Estimates for the period 2008–2010 are very high compared to previous years. The explanation provided by Hungary is the volatility of the market and confirmed that the data had been double checked and were considered accurate. The TERT concluded that these trends are not typical of other MS and could not rule issues of completeness in the dataset.	The TERT recommends that Hungary continues its efforts in applying quality checks of the data, reviews the methods to elaborate the estimates and improves on the accuracy of the estimates, if applicable.	No	No
Yes	2.F(a).4. Aerosols HFC 2005	Most countries import a significant share of their total aerosol products. HFC emissions from aerosols in Hungary might be underestimated because it only includes produced HFCs and not imports. In addition, the TERT notes that both actual and potential emissions from aerosols are calculated by	In order to avoid an underestimation of HFC emissions from aerosols in Hungary, the TERT recommends that Hungary further investigate the domestic consumption of aerosols and collect the relevant information to include emissions from imported aerosols sold in Hungary. If import data is not available the TERT	No	No

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ([5])	Technical correction ([6])
		using the quantities used in aerosols by Hungarian companies in the current year (which corresponds to an emission factor of 100%). However, it is *good practice* to use a default emission factor of 50% of the initial charge per year for the broad spectrum of aerosol products to account for some storage of aerosol units before use (this means that half the chemical charge escapes within the first year and the remaining charge escapes during the second year).	recommends that Hungary collects national data from product distributors and specific end users (for example, in the case of MDIs, a limited number of pharmaceutical companies typically import products, and these companies can be surveyed to obtain the required information). The TERT also recommends that Hungary correct the calculation of both actual and potential emissions by using the default emission factor of 50% to estimate actual emissions and by considering that potential emissions are the emissions from the total amount of the F-gas used in these products during the reporting year.		
Yes	4.A.1. Cattle CH_4 All years	During the review the TERT identified that the estimated CH_4 emission from enteric fermentation is high. The TERT noted that this could be due to a too high estimated feed consumption. During the review Hungary provided revised estimates for this category. The TERT agreed with the revised estimates.	The TERT recommends that the revised estimates are reflected in future submissions. Furthermore, the TERT recommends that time-series consistency is ensured by implementing the revision for all relevant years of the time-series.	Yes	No
No	4.B.9. Poultry CH_4 All years	According to Hungary's submission, 26 % of the poultry manure in Hungary is handled as liquid manure with and MCF factor of 39 %. The TERT notes that poultry are not normally on liquid housing systems. In its response to the review, Hungary provided information showing that liquid systems were indeed being phased out and provided revised estimates for Poultry CH_4 for all years. The TERT agreed with these	The TERT recommends that the revised estimates are reflected in future submissions. Furthermore, the TERT recommends that time-series consistency is ensured by implementing the revision for all relevant years of the time-series.	Yes	No

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ([5])	Technical correction ([6])
		estimates.			
Yes	4.D.1. Direct soil emissions N_2O 1985–2010	On page 159 of the NIR it is stated that parameters used for the calculation of the nitrogen fixed by N-fixing crops and of the nitrogen in crops residues returned to soils were selected on the basis of the 2000 IPCC GPG default values in Table 4.16, on the similarity with another type of crop or are based on non-crop– specific default values mentioned in Table 4.19 of the Revised 1996 IPCC Guidelines' Reference Manual. According with the provisions in Table 6.27 of the NIR and with the calculation sheet on N-fixing crops and crop residue categories Hungary provided to the TERT, a value of 0.015 kg N/kg dry biomass has been used for the Fraction of nitrogen in N-fixing crops ($Frac_{NCRBF}$) relevant to the lucerne hay and red clover hay; in the calculation sheet associated with the crop residues category it is stated that this value is the default value from the Revised 1996 IPCC Guidelines l. Considering that lucerne hay and red clover hay are N-fixing crops, the value represents half the level of non-crop–specific value in the Revised 1996 IPCC Guidelines and is also not in line with the 2000 IPCC GPG, considering the elements specified previously. In response to a TERT question, Hungary stated that this is due to an error which led to an emission underestimation. Responding to the TERT	The TERT recommends that Hungary revise its GHG inventory following the revised estimates submitted to TERT.	Yes	No

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ([5])	Technical correction ([6])
		recommendation in the Draft report of the 2012 technical review of the greenhouse gas emission inventory of Hungary to support the determination of annual emission allocations under Decision 406/2009/EC, Hungary provided revised estimates associated to the N-fixing crops category and to the Lucerne hay and Red clover hay based on country-specific values for the FracNCRBF and for the dry matter fraction (FracDM). The TERT accepted the revised estimates.			

Annex 2 – Detailed technical corrections

There are no technical corrections applied to Hungary’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
4 May 2012	Final CRF and NIR submission under the MMD, version HUN-2012-v1.4
21, 23 May 2012	Initial questions raised by the TERT during the desk review
5, 7, 13, 16 June 2012	Additional questions raised by the TERT during the centralised review
1, 6, 8, 14, 18 June 2012	Responses from Hungary to TERT questions
21 June 2012	Draft technical corrections from TERT to Hungary
6 July 2012	Response from Hungary to TERT draft technical corrections
13 July 2012	Draft review report from TERT to Hungary
3 August 2012	Response from Hungary to draft review report
13 August 2012	Draft final review report from TERT to Hungary
15 August 2012	Response and additional information from Hungary to final review report
17 August 2012	Final review report to European Commission