

Final report of the 2012 technical  
review of the greenhouse gas emission  
inventory of Slovenia  
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<sup>(1)</sup> (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<sub>2</sub> 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 15<sup>th</sup> 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<sup>(2)</sup>. The 2012 greenhouse gas emission inventory of Slovenia was reviewed in accordance with these guidelines.

This report presents the findings of the 2012 technical review of the greenhouse gas emission inventory of Slovenia 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)<sup>(3)</sup>;

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<sup>(1)</sup> 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.

<sup>(2)</sup> 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.

<sup>(3)</sup> 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 Slovenia 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<sub>6</sub> + 2.F Consumption of Halocarbons and SF<sub>6</sub>; 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 15<sup>th</sup> of April, 2012 under the MMD. Resubmissions reported by Member States were taken into account until the 15<sup>th</sup> 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 Slovenia, 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 Slovenia for the years 2005, 2008, 2009 and 2010 submitted in 2012 under the MMD <b>included emission overestimates</b> .
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 Slovenia in response to its initial findings (see Table 2).
4. The TERT considers that the aggregated <b>revised</b> GHG emission inventory estimates from Slovenia for the years 2005, 2008, 2009 and 2010 <b>do not include emission overestimates</b> .
5. The TERT therefore suggests that <b>it is not necessary to implement technical corrections</b> to the GHG emission inventory estimates and to amend the reported GHG total (see Table 2).
6. As stated beneath Table 1, Slovenia <b>accepts</b> the aggregated GHG emission inventory estimates presented in Table 2 including any revised estimate received from Slovenia and accepted by the TERT, and technical corrections as proposed by the TERT.
7. The TERT identified non-binding recommendations for improvements of Slovenia's GHG inventory (see Table 3 in Annex 1).
8. The TERT considers that it received a response from Slovenia that was sufficient in order to undertake the review appropriately.

### Statement from Slovenia on the conclusions of the TERT

Slovenia agrees with the conclusions from the TERT, as presented in the Table 1 above.

**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	2008	2009	2010
			Gg CO <sub>2</sub> eq.			
<b>Total GHG emissions as reported in the 2012 submission under the MMD</b>	13 April 2012, SVN-2012-v1.3		<b>20 343.972</b>	<b>21 430.659</b>	<b>19 469.248</b>	<b>19 522.127</b>
<b>Revised estimates provided by Slovenia (<sup>4</sup>)</b>						
1A1a, Other fuels, N2O	SI-1A1, 1A2, 1A4, 1A5-1	Accepted by TERT			0.539	0.729
1A2F, Other fuels, N2O	SI-1A1, 1A2, 1A4, 1A5-5	Accepted by the TERT				0.248
1A4b. Solid fuels, all gases	7 June 2012, SI-1A1, 1A2, 1A4, 1A5-2	Accepted by TERT		4.336		
2.F.4. Aerosols, HFC	SI-2E+2F-2	Accepted by TERT				0.923

<sup>4</sup> 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.

Pigs, Enteric fermentation, CH <sub>4</sub>	SI-4A+4B-1		-1.748	-1.066	-0.924	-0.785
Pigs, Manure Management, CH <sub>4</sub>	SI-4A+4B-5		-8.290	-4.369	-4.313	-4.166
<b>Total GHG emissions including any accepted revised estimate received from Slovenia and/or technical correction as proposed by the TERT</b>			<b>20 333.934</b>	<b>21 429.560</b>	<b>19 464.549</b>	<b>19519.077</b>
<b>CO<sub>2</sub> emissions from 1.A.3.a Civil aviation</b>	13 April 2012, SVN-2012-v1.3		<b>1.681</b>	<b>1.452</b>	<b>1.575</b>	<b>1.675</b>

**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 <sup>(5)</sup>	Technical correction <sup>(6)</sup>
No	1.A.1.a. Public electricity and heat production CH <sub>4</sub> , N <sub>2</sub> O other fuels 2009, 2010	Slovenia reports CH <sub>4</sub> and N <sub>2</sub> O emission from other fuels in 1.A.1.a. (waste incineration) as NO. In response to a question from the TERT, Slovenia explained that no nitrogen was in the waste itself, so no N <sub>2</sub> O emissions occurred. However, the TERT notes that nitrogen in combustion is also a result of N <sub>2</sub> in the air used in the combustion process. Slovenia agreed that small amounts of N <sub>2</sub> O are emitted in the incineration of plastics and that they will use the 2006 IPCC Guidelines EF for waste plastics of 170 g N <sub>2</sub> O/t waste. During the review Slovenia provided estimates for N <sub>2</sub> O emission from waste incineration for 2009 and 2010. The TERT agreed with the estimates.	The TERT recommends that the revised estimates are reflected in future submissions. Furthermore, the TERT recommends Slovenia explores the opportunity to estimate and report CH <sub>4</sub> emissions associated with waste incineration.	Yes	No
No	1.A.4. Other sectors All gases, solid fuels	Slovenia reports solid fuels in sector 1.A.4. for 2005, 2009 and 2010 but the TERT noted that for 2006, 2007 and 2008, solid fuel emissions are reported to be NO. During the review week, Slovenia provided revised	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	Yes	No

<sup>5</sup> The GHG emission estimate for this category was revised by Belgium during the technical review.

<sup>6</sup> 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 <sup>(5)</sup>	Technical correction <sup>(6)</sup>
	2008	estimates for solid fuels for 2006, 2007 and 2008. The TERT agreed with the revised estimates.	time-series.		
No	1.B.2.b.ii. Production (4)/Processing Activity data 2008–2010	There is a difference in the AD of natural gas produced reported by Slovenia in the CRF Reference Approach (RA) and in Sectoral Approach (SA) calculations. Neither of the two sets of natural gas production data agrees with the data available from EUROSTAT, although the data are similar in magnitude. The difference in these two sets of gas production data can be seen in a decline in the values of the implied heating value (TJ/m <sup>3</sup> ) in the years 2008, 2009 and 2010 compared to earlier years in the time series. The value in later years is around 30 TJ natural gas produced/m <sup>3</sup> produced. A value close to 36 would be expected.	The TERT recommends that Slovenia investigates this discrepancy in the gas production data between the SA and the RA.	No	No
No	2.F(a).4. Aerosols HFC All years	Slovenia estimates HFC emissions from aerosols/metered dose inhalers using Austria's HFC-134a emissions from aerosols/metered dose inhalers divided by 4 (population ratio). The TERT noted that this may not be a representative approach as trend fluctuates IEF relate to changes in production of a country-specific aerosol in Austria. In addition, Slovenia uses 2009 data for 2010 as 2010 data is not available in time from the Austrian GHG inventory. . Following comments from the TERT Slovenia provided a revised estimate for 2010 (3.95). However this revised estimate did not match the estimate made by	The TERT recommends Slovenia to double check its calculation for all years of the timeseries and especially 2010. In order to increase the accuracy of the estimates the TERT recommends Slovenia to use country specific data to estimate the estimates or if this is not possible, to improve the method and assumptions by, for instance, quantifying the number of manufacturers of aerosols and the number of end users in both Slovenia and Austria, to develop more detailed and country specific ratios to apply.. The TERT also recommends that Slovenia improve the time series consistency by applying the same method during the whole time series and avoiding annual revision of	Yes	No

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate <sup>(5)</sup>	Technical correction <sup>(6)</sup>
		the TERT (4.95) using the method described by Slovenia in its NIR. The TERT concluded that Slovenia could be underestimating emissions. This could be an underestimation of emissions.	the end year data.		
Yes	4.A.8. Swine CH <sub>4</sub> All years	Slovenia is using a modified tier 1 default method for CH <sub>4</sub> emission from enteric fermentation from pigs on commercial farms and an increased value for private farms assuming that pigs on private farms are larger than those on commercial farms giving an approximate EF of 2.3 kg CH <sub>4</sub> /head/yr compared to the default value of 1.5 kg CH <sub>4</sub> /head/yr. The TERT notes that the tier 1 default CH <sub>4</sub> parameters assume a conservative estimate covering an average of all slaughter weights in a country and that Slovenia cannot apply the default to a subset (the commercial farms only) without justification that these represent a similar average of slaughter weights. During the review Slovenia provided revised estimates using the default EF for all swine. The TERT agreed with the revised estimate.	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
Yes	4.B.8. Swine CH <sub>4</sub> All years	Slovenia has in its inventory reported that pig manure is stored in anaerobic lagoons. Such systems have very high CH <sub>4</sub> emission, because virtually all organic matter is converted to CO <sub>2</sub> and CH <sub>4</sub> . The use of an MCF value of 90 % could lead to an overestimation of emissions. During the review Slovenia provided revised estimates based on newer scientific literature (Mangino et al.). This showed that a MCF of 68 % were more realistic for	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 <sup>(5)</sup>	Technical correction <sup>(6)</sup>
		the conditions in Slovenia. The TERT agreed with the revised estimates.			
No	4.B.9. Poultry CH4 All years	Slovenia assumes that poultry litter is handled in liquid manure management systems. In responses to the TERT questions on liquid poultry manure handling, Slovenia indicated that the manure is from caged hens and removed using, among other techniques conveyor belts. Liquid manure is normally considered fluid, can be pumped and is stored in slurry tanks with a maximum dry matter content of 10–12 %. Although Slovenia uses a tier 1 approach and default EF to estimate emissions, the TERT does not find that the explanation provided by Slovenia is consistent with liquid manure management systems and that the description was misleading.	Slovenia is therefore recommended to reclassify this amount of manure to a correct classification 'Other poultry manure' according to 2000 IPCC GPG Table 4.11.	No	No

## **Annex 2 – Detailed technical corrections**

There are no technical corrections applied to Slovenia'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 (<sup>7</sup>), as well as data from other international organisations.

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

## Annex 4 – Correspondence references

Date	Reference
<b>13 April 2012</b>	Final CRF submission under the MMD, version SVN-2012-v1.3
<b>21, 23 May 2012</b>	Initial questions raised by the TERT during the desk review
<b>28 May 2012</b>	Final NIR submission under the MMD
<b>7, 16 June 2012</b>	Additional questions raised by the TERT during the centralised review
<b>1, 7, 17 June 2012</b>	Responses from Slovenia to TERT questions
<b>21 June 2012</b>	Draft technical corrections from TERT to Slovenia
<b>4 July 2012</b>	Response from Slovenia to TERT draft technical corrections
<b>13 July 2012</b>	Draft review report from TERT to Slovenia
<b>20 July, 7 August 2012</b>	Response from Slovenia to draft review report
<b>13 August 2012</b>	Draft final review report from TERT to Slovenia
<b>13 August 2012</b>	Response and additional information from Slovenia to final review report
<b>17 August 2012</b>	Final review report to European Commission