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Report of the individual review of the inventory submission of Malta submitted in 2012*

* In the symbol for this document, 2012 refers to the year in which the inventory was submitted, and not to the year of publication.

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I. Introduction and summary

1. This report covers the centralized review of the 2012 inventory submission of Malta, coordinated by the UNFCCC secretariat, in accordance with decision 19/CP.8. The review took place from 10 to 15 September 2012 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Mr. Paul Filliger (Switzerland) and Ms. Batima Punsalma (Mongolia); energy – Ms. Duduzile Nhlengethwa-Masina (Swaziland) and Ms. Songli Zhu (China); industrial processes – Ms. Valentina Idrissova (Kazakhstan), Mr. Predrag Novosel (Montenegro) and Mr. Jacek Skoskiewicz (Poland); agriculture – Mr. Jorge Alvarez (Peru) and Mr. Daniel Bretscher (Switzerland); land use, land-use change and forestry (LULUCF) – Ms. Oksana Butrym (Ukraine), Mr. Agustin Inthamoussu (Uruguay) and Ms. Thelma Krug (Brazil); and waste – Ms. Maryna Berezhnytska (Ukraine) and Mr. Sabin Guendehou (Benin). Ms. Berezhnytska and Ms. Krug were the lead reviewers. The review was coordinated by Mr. Roman Payo (UNFCCC secretariat).

2. In accordance with the “Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention”, a draft version of this report was communicated to the Government of Malta, which made no comment on it.

3. In 2010, the main greenhouse gas (GHG) in Malta was carbon dioxide (CO₂), accounting for 87.0 per cent of total GHG emissions¹ expressed in carbon dioxide equivalent (CO₂ eq), followed by methane (CH₄) (8.2 per cent) and nitrous oxide (N₂O) (1.6 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) collectively accounted for 3.3 per cent of the overall GHG emissions in the country. The energy sector accounted for 87.5 per cent of total GHG emissions, followed by the waste sector (6.6 per cent), the industrial processes sector (3.3 per cent), the agriculture sector (2.6 per cent) and the solvent and other product use sector (0.04 per cent). In 2010, total GHG emissions amounted to 3,035.08 Gg CO₂ eq and increased by 49.1 per cent between 1990 and 2010. Emissions from the industrial processes sector increased by 12.7 times (by 1,167.2 per cent) between 1990 and 2010, and emissions from the waste sector trebled during the same period (by 200.0 per cent). Conversely, emissions from the solvent and other product use and agriculture sectors decreased by 48.1 per cent and 11.6 per cent, respectively, between 1990 and 2010.

4. Tables 1 and 2 show GHG emissions under the Convention, by gas and by sector, respectively. In table 1, CO₂, CH₄ and N₂O emissions do not include emissions and removals from the LULUCF sector.

¹ In this report, the term “total GHG emissions” refers to the aggregated national GHG emissions expressed in terms of CO₂ eq excluding LULUCF, unless otherwise specified.

Table 1
Greenhouse gas emissions by gas, 1990 to 2010

Greenhouse gas	Gg CO ₂ eq							Change 1990–2010 (%)
	1990	1995	2000	2005	2008	2009	2010	
CO ₂	1 859.05	2 211.50	2 345.20	2 703.96	2 715.48	2 628.35	2 640.51	42.0
CH ₄	121.30	150.87	191.05	218.10	237.16	242.49	247.58	104.1
N ₂ O	48.05	57.33	59.16	54.52	51.17	50.03	47.72	–0.7
HFCs	7.50	17.76	5.52	48.72	88.37	93.74	97.50	1 199.8
PFCs	NA, NO	NA, NO	0.00006	0.00006	0.00006	0.00006	0.00006	NA
SF ₆	0.01	1.51	1.54	1.64	1.83	1.57	1.78	15 851.3

Abbreviations: NA = not applicable, NO = not occurring.

Table 2
Greenhouse gas emissions by sector, 1990 to 2010

Sector	Gg CO ₂ eq							Change 1990–2010 (%)
	1990	1995	2000	2005	2008	2009	2010	
Energy	1 871.28	2 224.25	2 360.38	2 720.23	2 732.03	2 644.66	2 657.16	42.0
Industrial processes	7.85	21.02	7.36	50.79	90.38	95.56	99.52	1 167.2
Solvent and other product use	2.48	2.48	3.01	2.26	2.10	1.60	1.29	–48.1
Agriculture	87.81	93.83	102.95	93.58	86.45	83.26	77.66	–11.6
LULUCF	–56.97	–56.97	–57.83	–59.00	–60.79	–60.78	–61.58	8.1
Waste	66.49	97.38	128.78	160.07	183.04	191.09	199.45	200.0
Other	NA	NA	NA	NA	NA	NA	NA	NA
Total (with LULUCF)	1 978.94	2 381.99	2 544.64	2 967.93	3 033.23	2 955.40	2 973.50	50.3
Total (without LULUCF)	2 035.91	2 438.96	2 602.47	3 026.93	3 094.01	3 016.18	3 035.08	49.1

Abbreviations: LULUCF = land use, land-use change and forestry, NA = not applicable.

II. Technical assessment of the inventory submission

A. Overview

1. Inventory submission and other sources of information

5. The 2012 annual inventory submission was submitted on 13 April 2012. It contains a complete set of common reporting format (CRF) tables for the period 1990–2010 and a national inventory report (NIR). The inventory submission was submitted in accordance with the “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories” (hereinafter referred to as the UNFCCC reporting guidelines). Malta officially submitted revised estimates and a revised NIR on 15 May 2012.

6. The expert review team (ERT) also used the previous year’s submission during the review. During the review, Malta provided the ERT with additional information, which is not part of the inventory submission. The full list of information and documents used during the review is provided in annex I to this report.

Completeness of inventory

7. The inventory is complete in terms of years and geographical coverage, but is incomplete in terms of categories, due to a lack of or insufficient activity data (AD). In annex 5 to the NIR, Malta has provided a list of the categories for which the estimates are missing, including:

(a) In the energy sector: emissions from agriculture/forestry/fisheries for the period 1990–2001 (see para. 27 below); fugitive emissions from the distribution of oil products for the period 1990–2010 (see para. 24 below); and feedstocks and non-energy use of fuels for the period 1990–2010 (see para. 29 below);

(b) In the industrial processes sector: emissions from lime production for the period 1990–1994 (see para. 56 below); and potential HFC and PFC emissions for the period 1990–2010 (see para. 54 below);

(c) In the agriculture sector: emissions from field burning of agricultural residues for the period 1990–2010 (see para. 63 below); and nitrogen (N)-fixing crops and crop residues for the period 1990–2010 (see para. 75 below);

(d) In the LULUCF sector: the carbon stock changes in dead organic matter, soils and living biomass for forest land remaining forest land, cropland remaining cropland and settlements remaining settlements for the period 1990–2010 (see paras. 80, 90, 94 and 95 below).

2. A description of the institutional arrangements for inventory preparation, including the legal and procedural arrangements for inventory planning, preparation and management

Overview

8. Malta has provided a description of the institutional arrangements in its NIR. The Party indicated that there have been no changes to the institutional arrangements since the previous inventory submission. The ERT concluded that the institutional arrangements continue to perform their required functions.

Inventory planning

9. The NIR submitted by the Party describes the institutional arrangements for the preparation of the inventory. The Malta Resources Authority has had overall responsibility for the national inventory since 2010. The Climate Change Unit of the Malta Resources Authority is responsible for all of the functions of the inventory system, including data collection, data management, and the preparation and submission of the annual inventory. The National Statistics Office is the main data provider. Additional data are provided by government entities (e.g. ministries and departments), public regulatory authorities, the private sector and published reports.

10. The information provided in the NIR on the inventory preparation process is rather limited in terms of the description of the allocation of specific responsibilities in the inventory development process, including those related to the choice of methods, and the processing, archiving and approval of the inventory. The ERT recommends that Malta provide more detailed information on the inventory preparation process in its next inventory submission.

Inventory preparation

Key categories

11. Malta has reported a tier 1 key category analysis, both level and trend assessment, as part of its 2012 inventory. The key category analysis performed by the Party and that performed by the secretariat² produced similar, but not identical, results owing to the different level of disaggregation used for the categories. Malta has included the LULUCF sector in its key category analysis, which was performed in accordance with the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) and the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF).

12. Stationary combustion of gaseous fuels was identified as a key category in the previous inventory, but has not been identified as a key category in the 2012 inventory submission because liquefied petroleum gas is now considered to be a liquid fuel, not a gaseous fuel.

13. The ERT noted that Malta has not used the key category analysis to prioritize the development and improvement of the inventory. Therefore, the ERT recommends that Malta use the results of the key category analysis to prioritize the development and improvement of the inventory, and include information on this process in the next inventory submission.

Uncertainties

14. Malta has reported the results of a tier 1 uncertainty analysis, both at the summary level and at the individual category level, in accordance with the UNFCCC reporting

² The secretariat identified, for each Party, the categories that are key categories in terms of their absolute level of emissions, applying the tier 1 level assessment as described in the Intergovernmental Panel on Climate Change *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. Key categories according to the tier 1 trend assessment were also identified for Parties that provided a full set of CRF tables for the base year or period. Where the Party performed a key category analysis, the key categories presented in this report follow the Party's analysis. However, they are presented at the level of aggregation corresponding to a tier 1 key category assessment conducted by the secretariat.

guidelines and the IPCC good practice guidance. The uncertainty of total GHG emissions, including emissions from the LULUCF sector, for 2010 was ± 4.1 per cent and the trend uncertainty was ± 5.4 per cent. The ERT noted that the Party has not reported an uncertainty analysis excluding the emissions from the LULUCF sector. To improve transparency, the ERT recommends that the Party report two uncertainty analyses, one including and one excluding the emissions from the LULUCF sector, in the next inventory submission. The ERT also noted that Malta has not reported the sources of the values used to calculate the uncertainty of the AD and emission factors (EFs) at the category level, or explained how the uncertainty analysis is used to prioritize further inventory improvements. Therefore, the ERT recommends that Malta improve the transparency of the uncertainty analysis and provide information to explain how the uncertainty analysis is used to prioritize further inventory improvements in the next inventory submission.

Recalculations and time-series consistency

15. Recalculations have been performed in accordance with the IPCC good practice guidance. The ERT noted that the recalculations reported by Malta for the period 1990-2009 have mainly been undertaken to take into account improvements in AD and methodologies, including for the energy sector (see para. 25 below), the industrial processes sector (see para. 48 below), the agriculture sector (see para. 64 below), the LULUCF sector (see para. 79 below) and the waste sector (see para. 100 below).

16. The impact of the recalculations on estimated total GHG emissions is a decrease of 1.4 per cent for 1990 and an increase of 5.2 per cent for 2009. The ERT noted that the rationale for these recalculations is mostly missing from CRF table 8(b), where reference is made to the explanations provided by the Party in the NIR. Malta has provided information on the recalculations in its NIR, both in the sectoral chapters and in chapter 10.

Verification and quality assurance/quality control approaches

17. According to the information provided in the NIR, Malta has implemented limited quality assurance/quality control (QA/QC) procedures and the QA/QC plan is expected to be completed in time for the compilation of the next inventory submission. The ERT reiterates the recommendation from the previous review report that Malta develop a QA/QC plan, in particular tier 1 QC procedures, such as that described in the IPCC good practice guidance, and provide information on the QA/QC plan in the NIR of its next inventory submission.

18. No information has been provided as to whether the inventory data are subject to any verification or independent review procedures. In response to a question raised by the ERT during the review, Malta explained that the AD and EFs used are logged in an Excel spreadsheet and given a unique data identifier. The Party also explained that there is no procedure for deciding on the best available sources of data for the different sectors. The ERT noted a number of inconsistencies between the NIR and the CRF tables in the energy sector (see paras. 29, 31 and 36 below), the industrial processes sector (see para. 58 below), the agriculture sector (see para. 73 below), the LULUCF sector (see paras. 87 and 89 below) and the waste sector (see para. 105 below). The ERT recommends that Malta improve the QA/QC and verification procedures in the next inventory submission.

Transparency

19. The ERT considers the NIR to be generally transparent. However, the ERT recommends that Malta improve the transparency of the information on the QA/QC procedures and uncertainty analysis in the next inventory submission.

Inventory management

20. The ERT noted that Malta does not yet have a centralized archiving system and that the information on archiving in the NIR is limited. The ERT reiterates the recommendation from the previous review report that Malta provide, in the next inventory submission, further information on archiving, including internal documentation on QA/QC procedures, external and internal reviews, and documentation on annual key categories and key category identification and planned inventory improvements.

3. Follow-up to previous reviews

21. The ERT noted that the inventory review report for the 2011 inventory submission was published on 18 October 2012, after the date of submission of the 2012 inventory submission (13 April 2012). The ERT further noted that the delay in the publication of the 2011 inventory review report negatively affected the ability of Malta to address the recommendations in a timely manner. However, the ERT commends the Party for managing to address some of the recommendations from the previous review report in its 2012 inventory submission, including:

- (a) The improvement of completeness (see paras. 25(d), 27, 37 and 79 below);
- (b) The improvement of comparability and time-series consistency (see paras. 28 and 41 below);
- (c) The improvement of accuracy (see paras. 39 and 46 below).

4. Areas for further improvement identified by the expert review team

22. During the review, the ERT identified several areas for improvement. These are listed in table 3 below.

23. Recommended improvements relating to specific categories are presented in the relevant sector chapters of this report and in table 3 below.

B. Energy

1. Sector overview

24. The energy sector is the main sector in the GHG inventory of Malta. In 2010, emissions from the energy sector amounted to 2,657.16 Gg CO₂ eq, or 87.5 per cent of total GHG emissions. Since 1990, emissions have increased by 42.0 per cent, mostly driven by the increase in emissions from public electricity and heat production (by 527.32 Gg CO₂ eq, or 38.6 per cent) and road transportation (by 188.31 Gg CO₂ eq, or 55.3 per cent), which more than compensated for the decrease in emissions from manufacturing industries and construction (by 13.28 Gg CO₂ eq, or 22.3 per cent). Within the sector, 71.3 per cent of the emissions were from public electricity and heat production, followed by 19.9 per cent from road transportation, 5.3 per cent from other sectors, 1.8 per cent from navigation and 1.7 per cent from manufacturing industries and construction. Malta has not reported any estimates for fugitive emissions from fuels for the period 1990–2010. Therefore, the ERT recommends that Malta estimate and report these emissions in the next inventory submission.

25. Malta has made recalculations for the energy sector between the 2011 and 2012 inventory submissions following changes in AD, EFs and methodologies and in order to correct identified errors. The impact of these recalculations on the energy sector is an increase in emissions of 5.0 per cent for 2009 (125.12 Gg CO₂ eq). The main recalculations took place in the following categories:

(a) Public electricity and heat production: the change to country-specific calorific values for residual fuel oil and gas/diesel oil resulted in an increase in GHG emissions of 39.45 Gg CO₂ eq (2.1 per cent) for 2009 (see para. 40 below);

(b) Manufacturing industries and construction: in the 2011 inventory submission, Malta reported only emissions from iron and steel under manufacturing industries and construction. However, in its 2012 inventory submission, the Party has reported emissions from iron and steel as included elsewhere ("IE") or not applicable ("NA"), and has reported all emissions from manufacturing industries and construction under other (manufacturing industries and construction) (see para. 41 below). As a result of the reallocation of part of the emissions from manufacturing industries and construction to commercial/institutional, GHG emissions from manufacturing industries and construction have decreased by 26.13 Gg CO₂ eq (39.2 per cent) for 2009 (see para. 28 below);

(c) Commercial/institutional: in the 2012 inventory submission, the Party has reported emission estimates (90.22 Gg CO₂ eq) for commercial/institutional, instead of using the notation keys "IE", "NA" reported in the previous inventory submission. In addition to the reallocation of part of the emissions from manufacturing industries and construction to commercial/institutional (see para. 28 below), Malta has reported additional combustion processes under this category which were not reported in the 2011 inventory submission, including heavy fuel oil for own use at oil storage facilities;

(d) Navigation: in response to a recommendation from the previous review report, Malta has revised the AD for navigation by using AD from the customs service instead of from the Malta Resources Authority and two other local operators, resulting in an increase in emissions of 15.80 Gg CO₂ eq (50.7 per cent) for 2009.

26. Overall, the NIR provides transparent information on the methods and EFs applied. Tier 1 methods and default EFs from the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines) and the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines) were generally used for all subcategories, except for public electricity and heat production, where country-specific calorific values for residual fuel oil and gas oil were used (see para. 40 below). To comply with the IPCC good practice guidance, the ERT recommends that Malta use a tier 2 method for every key category in its next inventory submission, where possible.

27. Compared with the 2011 inventory submission, the completeness of the inventory has improved significantly. For example, the time series of data for international bunker fuels and civil aviation has been expanded, and a complete time series of AD for navigation and commercial/institutional has been collected in order to cover additional sources. However, the time series of data for agriculture/forestry/fisheries is incomplete (data are missing for the years 1990–2001). The ERT recommends that Malta improve the completeness of the emission estimates for agriculture/forestry/fisheries in the next inventory submission.

28. In response to a recommendation from the previous review report, Malta has reallocated some of the AD in the energy sector, thereby reducing time-series inconsistency and improving comparability. Relevant AD have been reallocated from manufacturing industries and construction to commercial/institutional; emissions from diesel oil in fisheries, previously reported under navigation, have been reallocated to agriculture/forestry/fisheries; and emissions from liquefied petroleum gas have been reallocated to liquid fuels under both the reference and the sectoral approaches. The ERT commends Malta for the efforts made and recommends that the Party continue to improve the allocation of emissions in the next inventory submission.

29. The ERT noted some inconsistencies in the use of the notation keys. For example: in CRF table 1.A(b), Malta has reported all relevant entries for coking coal as not estimated (“NE”) but the NIR states that there is no fossil fuel production in Malta; in CRF table 1.A(d), all entries are reported as “NE” or “NA”, but in the NIR, the Party has reported that feedstocks and non-energy use of fuels do not occur in Malta; in CRF table 1.A(a), for public electricity and heat production, Malta has reported the AD and emissions of CO₂, CH₄ and N₂O for all fuels for the period 1990–2010 as “NA”, except liquid fuels and solid fuels (for the period 1990–1995), where figures are reported, but the NIR indicates that only liquid fuels are used, except for the period 1990–1995, where solid fuels were also used; and for petroleum refining, the AD and emissions of CO₂, CH₄ and N₂O for all fuels are reported as not occurring (“NO”), except for other fuels, which are reported as “NA”, but the NIR indicates that no petroleum refining occurs in the country. Therefore, the ERT strongly recommends that Malta revise its use of the notation keys to report AD and emissions for categories and fuels that do not occur as “NO” in the next inventory submission, in order to ensure that its reporting is in accordance with the UNFCCC reporting guidelines.

30. Malta has performed an uncertainty analysis using a tier 1 method. The ERT considers that this may lead to an underestimation of the uncertainty of the energy sector, for which Malta has used IPCC default EFs, particularly for CH₄ and N₂O emissions. For example, the uncertainty of the CH₄ and N₂O emissions from road transportation is estimated at 15.8 per cent, which is lower than the default uncertainty provided on page 2.49 of the IPCC good practice guidance (40 per cent for CH₄ emissions and 50 per cent for N₂O emissions). The ERT recommends that Malta justify the uncertainty values reported or use default uncertainty values from the IPCC good practice guidance in the next inventory submission.

31. The ERT noted that Malta does not appear to have developed QA/QC procedures for the energy sector. The ERT recommends that the Party develop and implement a QA/QC system for the energy sector in the next inventory submission, in particular to check the consistency of the information in the CRF tables and in the NIR (including the values reported for the AD, EFs and emission estimates) and the use of notation keys.

32. The ERT noted that Malta has generally used default EFs from the 2006 IPCC Guidelines instead of those from the Revised 1996 IPCC Guidelines or the IPCC good practice guidance. To improve the comparability of the inventories among all reporting Parties, the ERT recommends that Malta justify the applicability of the EFs and other data from the 2006 IPCC Guidelines to the national circumstances and provide relevant evidence to validate this explanation in an annex to the NIR of the next inventory submission.

2. Reference and sectoral approaches

Comparison of the reference approach with the sectoral approach and international statistics

33. Malta has estimated CO₂ emissions from fuel combustion using the reference approach for 2009 and 2010 but not for the years 1990–2008. The ERT reiterates the recommendation from the previous review report that the Party estimate CO₂ emissions using the reference approach for the years 1990–2008 in the next inventory submission.

34. For 2010, the CO₂ emission estimates are 6.1 per cent lower in the reference approach compared with the sectoral approach. The only explanation provided in the documentation box of CRF table 1.A(c) is a general reference to the NIR. In its NIR, Malta has indicated that the difference between the two approaches may be due to the incorrect allocation of some amounts of fuel to a particular year by fuel importers. The ERT encourages the Party to continue to investigate the reasons for the difference between the

two approaches, to make efforts to correct the difference and to report its findings in the next inventory submission.

35. Malta has reported as “NE” the total and per fuel apparent consumption in CRF table 1.A(b) for the period 1990–2008 (see para. 33 above), but has reported these data to the International Energy Agency (IEA). For 2009 and 2010, the total apparent consumption reported in CRF table 1.A(b) is lower than that reported to the IEA by 2.4 per cent and 3.3 per cent, respectively, mainly due to discrepancies in international bunkers and the fuel oil stock. No data are reported for civil aviation or navigation to the IEA, but Malta has reported emissions from both categories in CRF table 1.A(a). For international navigation, the energy consumption reported in CRF table 1.C agrees within 1.0 per cent with the IEA data between 2001 and 2004. However, large differences exist for other years, ranging between –83.6 per cent for 1999 and +69.6 per cent for 2000. For international aviation, the energy consumption reported in CRF table 1.C has large differences during the whole time series 1990–2010, ranging from –63.5 per cent for 1996 to +27.9 per cent for 2008. The ERT encourages Malta to investigate and correct the identified discrepancies and report thereon in the next inventory submission.

International bunker fuels

36. Malta has reported the consumption of bunker fuels for aviation (jet kerosene and gasoline) and navigation (gas/diesel oil and residual fuel oil) in CRF table 1.C for the whole time series (1990–2010). The ERT commends the Party for this improvement. However, Malta has reported these fuels as “NE” for all years except 2009 and 2010 in CRF table 1.A(b). The ERT recommends that the Party improve the consistency of the information in the CRF tables in the next inventory submission.

37. In response to a recommendation from the previous review report regarding the improvement of the completeness of the emission estimates for aviation bunkers (in the 2011 inventory submission, Malta reported only emissions from landing and take-off (LTO) but not from cruising), the Party has changed the methodology used to estimate emissions from a tier 3 to a tier 1 method. As a result, the estimates of emissions from international aviation bunkers for 2009 have increased by 665.8 per cent. In response to a question raised by the ERT during the review, Malta provided additional information on the EF used in the calculation. The ERT recommends that the Party include this information in the NIR of the next inventory submission.

38. The ERT noted that Malta has used different AD sources for international marine bunkers. The AD for the period 1990–2000 are from the main supplier of bunker fuels for the period, whereas the AD for the period 2001–2010 are either from the port authorities or from the customs service. As a result, emissions from international marine bunkers for 2000 and 2001 amount to 1,247.83 Gg CO₂ eq and 2,356.23 Gg CO₂ eq, respectively, reflecting the inconsistency of the time series for 1990–2010. The ERT encourages Malta to improve the time-series consistency of the emissions for international marine bunkers in the next inventory submission.

39. In response to a recommendation from the previous review report, Malta has revised the EFs for CH₄ and N₂O emissions from gas oil and heavy fuel oil used in international navigation. However, the changes are not reflected in the NIR, where the previous EFs are still reported (see page 28 of the NIR). The ERT recommends that Malta improve the consistency of the information between the NIR and the CRF tables in the next inventory submission.

3. Key categories

Stationary combustion: liquid fuels – CO₂

40. The ERT noted that the Party has used a country-specific calorific value for residual fuel oil and gas/diesel oil under public electricity and heat production for 2009 and 2010, based on verified emission reports submitted to the European Union under directive 2003/87/EC.³ Malta has used default calorific values from the Revised 1996 IPCC Guidelines for all other years of the time series. The ERT recommends that Malta provide, in the next inventory submission, information on how the consistency of the time series is ensured. In addition, the ERT encourages the Party to further develop plant-specific EFs in future inventory submissions, in order to move to the use of higher-tier methodologies, which would increase the accuracy of its reporting.

41. The fluctuation in both the emissions and the AD for manufacturing industries and construction has been significantly reduced in the 2012 inventory submission through the reallocation of part of the AD to commercial/institutional, in response to a recommendation from the previous review report. In addition, Malta has reported all emissions from manufacturing industries and construction under the subcategory other without disaggregation, as a first step recommended in the previous review report. The Party explained that the increased coordination between the different entities responsible for providing the AD for this category has begun to improve the quality of the data provided and has enabled the provision of data by subcategory. The ERT recommends that Malta continue its efforts to improve the time-series consistency and relevant QA/QC procedures for this category and that the Party allocate the emissions from manufacturing industries and construction to the appropriate subcategories in its next inventory submission.

42. The ERT noted that Malta has reported the emissions from agriculture/forestry/fisheries for the period 1990–2001 as “NE”. The ERT recommends that the Party continue its efforts to provide emission estimates for this category for the entire time series in its next inventory submission.

4. Non-key categories

Stationary combustion: solid fuels – CO₂

43. The ERT noted that bituminous coal was used for power generation during the period 1990–1995. The value of the CO₂ implied emission factor (IEF) used (92.71 t/TJ) is lower than the lowest value within the range of default values provided in the Revised 1996 IPCC Guidelines for all coal types (94.6–101.2 t/TJ). In response to a question raised by the ERT during the review, Malta clarified that the CO₂ EF used is from the 2006 IPCC Guidelines. However, the ERT noted that the default CO₂ EF for other bituminous coal in the 2006 IPCC Guidelines (table 2-2 on page 2.16) is 94.6 t/TJ. The ERT recommends that the Party justify the value of the CO₂ EF used for bituminous coal or recalculate the emissions from this category using the default EF from the Revised 1996 IPCC Guidelines in the next inventory submission.

Stationary combustion: liquid fuels – CH₄

44. In response to a question raised by the ERT during the review, Malta explained that default EFs from the 2006 IPCC Guidelines were used to estimate CH₄ emissions from the categories under other sectors (commercial/institutional, residential and

³ Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC.

agriculture/forestry/fisheries). The ERT recommends that the Party justify the use of the CH₄ EF from the 2006 IPCC Guidelines or recalculate the emissions from these categories using the default EF from the Revised 1996 IPCC Guidelines in the next inventory submission.

Civil aviation: liquid fuels – all gases

45. Similarly to international aviation bunkers (see para. 37 above), Malta has changed the methodology used to estimate emissions from civil aviation, resulting in a significant decrease in emissions (for example, for 2009, emissions from civil aviation have decreased by 61.1 per cent, from 1.60 Gg CO₂ eq to 0.62 Gg CO₂ eq). In response to a question raised by the ERT during the review, the Party explained that the emissions from civil aviation were overestimated in the previous inventory submission due to the inclusion of data on LTO emissions, since the final amount of CO₂ calculated using LTOs exceeded by threefold the amount of carbon contained in the fuel used. Malta further explained that this is probably due to the short duration of flights in domestic aviation and the engine-specific EFs from EEA⁴ which were used in the 2011 inventory submission. The ERT recommends that Malta include this information in the next inventory submission.

Road transportation: liquid fuels – CH₄ and N₂O

46. Malta has used a tier 1 method to estimate CH₄ and N₂O emissions from road transportation. In response to a recommendation from the previous review report, the EFs used in the 2011 inventory submission (default EFs from the Revised 1996 IPCC Guidelines) have been revised. The ERT noted that Malta has used default EFs from the 2006 IPCC Guidelines in the 2012 inventory submission. The ERT also noted that the Party has used a customized model to estimate emissions of indirect GHGs. The ERT therefore reiterates the recommendation from the previous review report that Malta estimate CH₄ and N₂O emissions from road transportation using the same model as the one used to estimate emissions of indirect GHGs in the next inventory submission.

C. Industrial processes and solvent and other product use

1. Sector overview

47. In 2010, emissions from the industrial processes sector amounted to 99.52 Gg CO₂ eq, or 3.3 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 1.29 Gg CO₂ eq, or 0.04 per cent of total GHG emissions. Since 1990, emissions have increased by 1,167.2 per cent in the industrial processes sector, and decreased by 48.1 per cent in the solvent and other product use sector. The key driver for the rise in emissions in the industrial processes sector is the increase in HFC emissions from refrigeration and air-conditioning equipment (from not occurring in 1990 to 93.83 Gg CO₂ eq in 2010). Within the industrial processes sector, 94.3 per cent of the emissions were from refrigeration and air-conditioning equipment, followed by 2.0 per cent from aerosols/metered dose inhalers, 1.8 per cent from electrical equipment, 1.7 per cent from fire extinguishers and 0.1 per cent from road paving with asphalt. Carbide production accounted for 0.1 per cent and soda ash production accounted for 0.05 per cent. The remaining emissions were from consumption of halocarbons and SF₆ in semiconductor manufacture and medical applications.

48. Malta has made recalculations for the industrial processes sector between the 2011 and 2012 inventory submissions following changes in AD and EFs. The impact of these

⁴ European Environment Agency (EEA). 2009. *European Monitoring and Evaluation Programme (EMEP)/EEA Air Pollutant Emission Inventory Guidebook – 2009*.

recalculations on the industrial processes sector is an increase in emissions of 120.3 per cent for 2009. The main recalculations took place in the following categories:

(a) HFC emissions from refrigeration and air-conditioning equipment: a revision of the AD has resulted in an increase in HFC emissions of 51.18 Gg CO₂ eq (133.9 per cent) for 2009;

(b) CO₂ emissions from lime production: the correction of an error in the EF used has resulted in the emissions for 2009 being reported as “NO” (see para. 56 below);

(c) Potential HFC emissions from refrigeration and air-conditioning equipment: Malta has recalculated the potential HFC emissions from refrigeration and air-conditioning equipment due to the availability of new, better-quality AD on imports of industrial gases for the years 2005–2010.

49. Malta has not made recalculations for the solvent and other product use sector between the 2011 and 2012 inventory submissions.

50. The ERT noted that QA/QC checks were not performed for any of the categories under the industrial processes sector. Malta has reported in section 1.6.1 of its NIR that addressing this problem is an important part of the development plan for its national system and that the Party will work towards resolving this issue prior to the submission of the 2013 inventory. The ERT recommends that Malta develop and implement a QA/QC plan for the industrial processes sector and report thereon in the next inventory submission.

51. The ERT noted that some of the assumptions used in the estimation of emissions from the industrial processes sector were not provided in the NIR. The ERT therefore recommends that Malta increase the transparency of the NIR in the next inventory submission, while maintaining confidentiality, if needed.

2. Key categories

Consumption of halocarbons and SE₆ – HFCs and PFCs⁵

52. Refrigeration and air-conditioning equipment was the largest contributor to emissions from the industrial processes sector, accounting for 94.3 per cent of total sectoral emissions and 3.3 per cent of total GHG emissions for 2010. As described in section 4.7.3.2 of the NIR, the AD used were based on a series of expert judgements, such as the assumption used for the year of introduction of different refrigerants or the assumption that gases which were not imported during the period 2005–2010 were not imported during the period 1990–2005 either. In response to a question raised by the ERT during the review, Malta explained that the AD for the years prior to 2005 are only partially available and that the inventory team is currently pursuing a possible collaboration with external experts to review and improve the current methodology used, including the assumptions. The ERT recommends that Malta improve the transparency of its reporting by improving the description of the assumptions used, including where expert judgement is used, in the next inventory submission.

53. The ERT noted that Malta has gathered the relevant AD for foam blowing, fire extinguishers, and aerosols and metered dose inhalers from surveys from the identified potential manufacturers and distributors. In response to a question raised by the ERT during the review, the Party explained that the QA/QC procedures to verify the values provided in the questionnaires and to ensure the complete coverage of potential sources are still under

⁵ Not all emissions related to all gases under this category are key categories, particularly PFC emissions. However, since the calculation procedures for the issues related to this category are discussed as a whole, the individual gases are not assessed in separate sections.

discussion with the relevant stakeholders and the National Statistics Office. The ERT recommends that Malta implement QA/QC procedures for these categories in order to ensure the complete reporting of HFC emissions in the next inventory submission.

54. The ERT noted that Malta has reported actual HFC emissions from fire extinguishers, aerosols and metered dose inhalers, and semiconductor manufacture for 2010 in CRF table 2(I), while potential emissions have been reported as “NO”. This is also the case for actual and potential PFC emissions from semiconductor manufacture. The ERT recommends that Malta replace the notation key “NO” with the appropriate estimate or notation key in the next inventory submission.

55. The ERT also noted that Malta has reported the following potential and actual emissions for 2010 in CRF table 2(II): the potential emissions of HFC-32 (3.32 t) are lower than the actual emissions (6.37 t); the potential emissions of HFC-125, HFC-152a and HFC-143a (11.36 t, 4.67 t and 8.41 t, respectively) are higher than the actual emissions (9.09 t, 2.59 t and 6.72, respectively); the potential emissions of HFC-134a, (27.55 t) are lower than the actual emissions (31.02 t); the potential emissions of HFC-227ea (0.21 t) are lower than the actual emissions (0.58 t); and estimates have been reported for the actual emissions of hexafluoroethane and octafluoropropane (0.000007 t and 0.0000001 t, respectively), but the potential emissions have been reported using the notation key “NO”. However, in response to a question raised by the ERT during the review, Malta explained that it now assumes that actual emissions are equal to potential emissions. The ERT recommends that Malta improve the transparency, completeness and consistency of its reporting and the adherence of its reporting to the IPCC good practice guidance by estimating and reporting actual emissions for all relevant subcategories under consumption of halocarbons and SF₆ in the next inventory submission.

3. Non-key categories

Lime production – CO₂

56. CO₂ emissions from lime production amounted to 1.32 Gg CO₂ at their peak in 1995 and in that year accounted for 75.3 per cent of emissions from the industrial processes sector and 0.1 per cent of total GHG emissions. As described in the NIR, lime production ceased in 1998. CO₂ emissions from lime production are reported as “NE” for the years 1990–1994, as values for the years 1995–1998 and as “NO” for the years 1999–2010. The ERT reiterates the recommendation from the previous review report that Malta complete the time series, if necessary using an extrapolation method, in line with the IPCC good practice guidance, for the years 1990–1994, in the next inventory submission.

57. The ERT welcomes the recalculations made by the Party for lime production in order to correct the EF used. Malta reported that the EF used in the 2011 inventory submission included twice the factor to account for the inefficiencies of the lime production process. The ERT commends the Party for this improvement.

58. The ERT identified a discrepancy between the NIR and the CRF tables regarding CO₂ emissions from high-calcium lime production for the period 1990–1994. On page 55 of the NIR, Malta explained that these emissions were not estimated due to data confidentiality, but in table 4-1 of the NIR these emissions were reported as “NO”, which indicates that the emissions are not occurring, and in CRF tables 2(I).A–G they were reported as “NE”, which indicates that the emissions occur but have not been estimated. In response to a question raised by the ERT during the review, Malta explained that this inconsistency will be resolved in the next inventory submission. The ERT recommends that the Party resolve this inconsistency in the next inventory submission.

Road paving with asphalt – CO₂ and non-methane volatile organic compounds

59. The ERT noted that Malta has reported the AD for road paving with asphalt as “NE” for the period 1990–1994 in CRF tables 2(I).A–G and the associated CO₂ emissions as “NA”. The ERT encourages the Party to estimate the AD, if necessary by extrapolation, in the next inventory submission. For consistency, the ERT recommends that, if the AD for the period 1990–1994 are not available, Malta report the CO₂ emissions from road paving with asphalt as “NE” in the next inventory submission.

60. The ERT also noted that Malta has used two sources of AD for this category, as indicated on page 57 of the NIR: statistics on asphalt imports (for the period 1995–2003) from research conducted for the first national communication to the Convention and AD on actual road paving supplied by Transport Malta (for the period 2004–2010). The ERT noted a strong increase in CO₂ emissions between 2003 (0.01 Gg CO₂) and 2004 (0.09 Gg CO₂) that may compromise the consistency of the time series. In response to a question raised by the ERT during the review, Malta indicated that it will investigate this issue. The ERT recommends that the Party investigate the potential time-series inconsistency in the estimates of CO₂ emissions from road paving with asphalt and report on its findings in the next inventory submission.

Carbide production – CO₂

61. Malta has reported, on page 58 of the NIR, that no carbide production occurs in the country; therefore, the Party has only reported emissions from carbide use, specifically calcium carbide (CaC₂). The ERT noted that Malta has used a country-specific EF (1,375 kg CO₂/t of imported CaC₂) calculated from the stoichiometric reaction and has assumed that all imported carbide is used immediately. However, the ERT also noted that the default EF for the use of CaC₂ from the Revised 1996 IPCC Guidelines (table 2-9 in the reference manual) (1,100 kg CO₂/t of used CaC₂), is different from the country-specific EF used by the Party. The ERT recommends that Malta justify why a higher-value EF better reflects the national circumstances or use the default EF from the Revised 1996 IPCC Guidelines in the next inventory submission.

D. Agriculture

1. Sector overview

62. In 2010, GHG emissions from the agriculture sector amounted to 77.66 Gg CO₂ eq, or 2.6 per cent of total GHG emissions. Since 1990, GHG emissions have decreased by 11.6 per cent. The key driver for the fall in emissions is the decrease in the cattle population. Within the sector, 40.1 per cent of the emissions were from manure management, followed by 37.6 per cent from enteric fermentation and 22.3 per cent from agricultural soils.

63. Malta has reported emissions from rice cultivation, prescribed burning of savannas and field burning of agricultural residues as “NO”, “NA” and “NA”, “NO”, respectively, in the CRF tables. However, the Party has reported on page 92 of the NIR that there are no AD available to estimate emissions from field burning of agricultural residues but that it is assessing the availability of AD from local sources. The ERT strongly recommends that Malta estimate and report CH₄ and N₂O emissions from field burning of agricultural residues; if this is not possible, the ERT recommends that the Party report these emissions as “NE” in the CRF tables. For rice cultivation, Malta has reported the AD and CH₄ emissions as “NO” in CRF table 4.C; however, on page 85 of the NIR, the Party has reported that this category is “not relevant”. The ERT noted that other Mediterranean Parties (e.g. Greece, Italy, Portugal and Spain) have reported emissions from rice

cultivation in irrigated lands. To ensure the completeness of its reporting, the ERT recommends that Malta continue to conduct research in order to confirm that rice cultivation does not occur in the country and report the findings in the next inventory submission.

64. In its NIR, Malta has only reported recalculations between the 2011 and 2012 inventory submissions for indirect N₂O emissions from agricultural soils, in order to rectify an error identified in the reporting of N₂O emissions from manure applied to soils for some years of the time series, although not for 2009. However, the ERT noted that Malta has also recalculated N₂O emissions from manure management in liquid systems (the impact of the recalculations for 2009 was a decrease in N₂O emissions of 0.02 Gg N₂O), but the Party has not explained this recalculation in the NIR or in CRF table 8(b). To increase the transparency of its reporting, the ERT recommends that Malta explain all recalculations in the NIR and in CRF table 8(b) in the next inventory submission.

65. The ERT considers that the transparency of the information on the agriculture sector could be improved. For example, Malta has reported many parameters as “NE” in CRF tables 4.A, 4.B(a) and 4.B(b) and 4.D (see paras. 68, 70, 73, 75 and 76 below). The ERT recommends that the Party report and describe in further detail the EFs and parameters used in the next inventory submission. The ERT also recommends that Malta evaluate the possibility of using the parameters used by reporting Parties with similar circumstances in the next inventory submission.

66. The ERT did not identify any information in the NIR on sector-specific QA/QC procedures or on the sectoral uncertainty analysis. The ERT recommends that Malta develop and implement QA/QC procedures for the agriculture sector and provide information on the uncertainty of this sector in the next inventory submission.

2. Key categories

Enteric fermentation – CH₄

67. Malta has estimated CH₄ emissions for all reported livestock (cattle, sheep, goats, horses, swine and rabbits) using a tier 1 method with default EFs except for rabbits. For rabbits, the Party has used the country-specific CH₄ EF from the Italian inventory. The ERT recommends that the Party justify the applicability of this CH₄ EF to national circumstances in the next annual submission. The Party has identified enteric fermentation as a key category. In line with the IPCC good practice guidance, the ERT recommends that Malta use a higher-tier method to estimate emissions for this category in the next inventory submission.

68. In the additional information box of CRF table 4.A, Malta has reported the average gross energy intake, the average CH₄ conversion rate and the parameters used in the calculations as “NE” for cattle (dairy and non-dairy), sheep, goats, horses, swine, poultry and rabbits. The Party has reported, on page 82 of the NIR, that the use of more disaggregated parameters for livestock categories is a planned inventory improvement. However, in response to a question raised by the ERT during the review, Malta explained that there is currently no planned work on this issue. The ERT recommends that Malta complete CRF table 4.A, including the additional information box, for the appropriate livestock categories and improve the accuracy of the information on planned inventory improvements in the next inventory submission.

69. For the period 1990–1999, Malta has reported, in table 6-1 of the NIR, constant populations for dairy cattle, poultry and rabbits, and no population data for non-dairy cattle. The Party has also reported that the population of sheep and goats doubled between 1994 and 1995. In response to a question raised by the ERT during the review, Malta explained

that data on the cattle population were not collected prior to the year 2000 and that it has no plans to gather more accurate data for the period 1990–1999. The Party also explained that, for sheep and goats, the original source of the population data for the period 1990–1994 cannot be verified. The ERT recommends that Malta, using expert judgement if appropriate, review the population data for these livestock categories and report on any recalculations in the next inventory submission.

70. Malta has reported emissions from enteric fermentation for cattle. However, the characteristics of dairy and non-dairy cattle are not reported in the NIR or in CRF table 4.A (reported as “NE”). In response to a question raised by the ERT during the review, Malta indicated that it is trying to characterize dairy and non-dairy cattle, but that the availability of data is limited. The ERT encourages the Party to continue its efforts to characterize dairy and non-dairy cattle and recommends that Malta provide, in the next inventory submission, more detailed information on the methods used to estimate emissions from enteric fermentation for cattle, including information on the parameters reported in CRF table 4.A and the EFs used.

3. Non-key categories

Manure management – CH₄ and N₂O

71. The ERT noted that the CH₄ IEFs for manure management for dairy cattle (44 kg/head/year) and other cattle (20 kg/head/year) are higher than the IEFs used by other reporting Parties in the same region. For example, the CH₄ IEF for dairy cattle is 9.55 kg/head/year for Greece, 15.95 kg/head/year for Spain and 11.26 kg/head/year for Italy, and the CH₄ IEF for other cattle is 1.69 kg/head/year for Greece, 1.16 kg/head/year for Spain and 5.78 kg/head/year for Italy. Malta reported that it has used the default EF from the 2006 EMEP/core inventory of air emissions (CORINAIR) guidebook⁶ to estimate CH₄ emissions, as well as the default EFs from table 4-5 of the Revised 1996 IPCC Guidelines. The ERT acknowledges that manure management is not a key category; however, in order to improve the accuracy of the inventory, the ERT recommends that Malta explore the possibility of using country-specific EFs or EFs from a country with similar characteristics and circumstances in the next inventory submission.

72. Malta has reported, on page 80 of the NIR, the same population data for poultry between 2007 and 2009, but a decrease in the population of 20.7 per cent between 2009 and 2010 (the decline is due to stricter regulations on poultry housing and increased competition from foreign producers). In response to a question raised by the ERT during the review, Malta explained that, prior to 2010, the latest stocktake of poultry numbers was conducted in 2007 and that this figure has been used as a constant up to 2009. The ERT recommends that the Party revise the poultry population data for 2008 and 2009 using one of the interpolation techniques indicated in the IPCC good practice guidance in the next inventory submission.

73. Malta has reported N₂O emissions from manure management for cattle, swine and poultry in figure 6-7 and section 6.3.2.2 of the NIR. However, the Party has reported the N excretion rate and the animal waste management systems (AWMS) as “NE” in CRF table 4.B(b). To increase transparency, the ERT recommends that Malta replace the appropriate notation keys with figures in CRF table 4.B(b) and ensure that the information in the NIR and in the CRF tables is consistent in the next inventory submission.

74. The ERT noted that the CH₄ EF for manure management depends on the AWMS used. However, in table 6-3 of the NIR, Malta has reported the CH₄ EFs for different livestock types without specifying the AWMS used. In response to a question raised by the

⁶ EEA. 2006. *EMEP/CORINAIR Emission Inventory Guidebook – 2006*.

ERT during the review, the Party explained that these EFs were obtained from the 2006 *EMEP/CORINAIR Emission Inventory Guidebook* for Western Europe and temperate climates, and that they are not linked to the AWMS used. To increase transparency, the ERT recommends that Malta review the EFs used to confirm that they correspond to the national characteristics and report information on the EFs for each AWMS in the next inventory submission.

Direct soil emissions – CH₄ and N₂O

75. Malta has reported the AD and N₂O emissions for N-fixing crops and crop residues as “NE” in CRF table 4.D. In addition, all fractions in the additional information box of CRF table 4.D have also been reported as “NE”. The NIR indicates that Malta is researching the availability of data. In response to a question raised by the ERT during the review, the Party explained that no data are currently available and that it is unlikely that data will be obtained in the near future. Malta also explained that some of the fractions in the additional information box have been used in the calculations but have not been reported. The ERT recommends that Malta estimate and report N₂O emissions for N-fixing crops and crop residues in the next inventory submission, and complete the additional information box of CRF table 4.D.

76. Malta has reported the fraction of livestock N excreted and deposited onto soil during grazing as “NE” in CRF table 4.D. In response to a question raised by the ERT during the review, the Party indicated that grazing does not occur in Malta. The ERT recommends that Malta report this information and replace the notation key “NE” with the notation key “NO” in CRF table 4.D in the next inventory submission.

77. The trend in the use of synthetic fertilizers is very unstable across the time series, especially between 1994 and 1995 (a fluctuation of 113.0 per cent) and between 1997 and 1998 (a fluctuation of 119.0 per cent). The ERT noted that Malta has used data from the Statistical Database of the Food and Agriculture Organization of the United Nations (FAOSTAT)⁷ for the years 1990–1994 and data from the National Statistics Office for the years 1995–2010. The ERT recommends that the Party review the consistency of the time series and explain the trend in the next inventory submission.

E. Land use, land-use change and forestry

1. Sector overview

78. In 2010, net removals from the LULUCF sector amounted to 61.58 Gg CO₂ eq. Since 1990, net removals have increased by 8.1 per cent, largely due to the increase in removals from living biomass in cropland and settlements. Within the sector, net removals of 48.69 Gg CO₂ eq were from forest land (they have remained almost constant since 1990), followed by net removals of 10.98 Gg CO₂ eq from cropland and 1.91 Gg CO₂ eq from settlements.

79. In response to a recommendation from the previous review report, Malta has included estimates for the net carbon stock changes in the following pools and subcategories which were previously reported as “NE” or “NO”: dead organic matter and mineral soils in forest land remaining forest land (CRF table 5.A); dead organic matter and mineral soils in cropland remaining cropland; and living biomass in land converted to cropland (CRF table 5.B). The ERT noted that this is an improvement compared with the previous inventory submission and commends Malta for the improvement in the completeness of its reporting. The Party has reported these emissions and removals using a

⁷ Available at <<http://faostat.fao.org/site/422/DesktopDefault.aspx?PageID=422#ancor>>.

tier 1 approach from the IPCC good practice guidance for LULUCF, which assumes a steady state condition. Hence, all net emissions are assumed to be equal to zero. However, in the CRF tables, these estimates are still reported as “NE” or “NO” (except in the case of mineral soils in cropland remaining cropland, for which a value of 0.0 Gg C is reported in CRF table 5.B). The ERT strongly recommends that Malta, in the next inventory submission, either report a value of “0.0” in the appropriate cells or provide information in the appropriate documentation box to clarify that the entry is equal to zero.

80. The inventory for the LULUCF sector is still incomplete. For example, in forest land remaining forest land, Malta did not provide estimates of the losses of carbon stocks in living biomass; in cropland remaining cropland, the area under mineral organic soils and the corresponding carbon stock changes were reported as “NE” in CRF table 5.B; and the losses of living biomass resulting from pruning and mortality were not estimated for settlements. The ERT recommends that Malta provide estimates for these pools/categories in the next inventory submission.

81. The Party has reported all entries in CRF tables 5.C and 5.D (grassland and wetlands, respectively) as “NO”, indicating in the NIR that there are no wetland areas in Malta, and that the extensive permanent grass areas or pastures typical of most European countries do not exist in Malta due to the shallow depth of Maltese soils and the prevailing semi-arid climate. The ERT recommends that Malta provide brief explanations in the appropriate documentation boxes of the CRF tables of the next inventory submission in order to justify the use of the notation keys.

82. Malta has reported as “NO” the following emissions: direct N₂O emissions from N fertilization of forest land remaining forest land and land converted to forest land (CRF table 5(I)); non-CO₂ emissions from drainage of soils and wetlands (CRF table 5(II)); N₂O emissions from disturbance associated with land-use conversion to cropland (CRF table 5(III)); CO₂ emissions from agricultural lime application (CRF table 5(IV)); and all CO₂, CH₄ and N₂O emissions from biomass burning (CRF table 5(V)), except for CO₂, CH₄ and N₂O emissions from controlled burning of cropland remaining cropland, which were reported as “NE”. No explanation was provided in the NIR to justify that these activities do not occur in the country, except for liming of agricultural soils, which do not occur due to the high calcium carbonate content in Maltese soils. To increase transparency, the ERT strongly recommends that Malta provide an explanation for the non-occurrence of emissions from all of the above-mentioned categories in the next inventory submission.

83. The Party has applied approach 1 for land area representation from the IPCC good practice guidance for LULUCF, where a loss of area in one land category has to correspond with an increase in any one of the other land categories. For Malta, other land is by far the largest land category, covering almost the entire territorial area of the country (for example, for 2010, Malta has reported an area of other land of 29,170.10 kha and an area of 29,172.53 kha for all land categories combined), and it is considered to be unmanaged. The ERT noted that the area of other land decreased by 546.49 kha between 1990 and 2010, but this decrease did not result in an increase in the area allocated to any of the other land categories. This inconsistency in land area representation occurs throughout the entire time series. The ERT recommends that Malta correctly apply approach 1 for land area representation from the IPCC good practice guidance for LULUCF and improve the transparency of the information in the NIR on the land-use change matrix in the next inventory submission.

84. The ERT also noted that the sum of the areas of all land categories, amounting to 29,172.53 kha for 2010, does not equal the total territorial area of the country, 32,000.00 kha.⁸ Malta has reported in the NIR that the area of other land is estimated by

⁸ Available at <<http://www.fao.org/countryprofiles/index/en/?iso3=MLT>>.

subtracting the area of forest land, cropland and settlements from the total area of the Maltese islands, but this calculation appears to be incorrect. In addition, the sum of the areas of all land categories is not constant over the period 1990–2010. For example, the sum of the areas of all land categories for 2010 (29,172.53 kha) is 1.8 per cent smaller than that for 1990 (29,718.5 kha). The ERT recommends that Malta revise the areas allocated to the individual land-use categories in order to ensure the consistency of its reporting in the next inventory submission.

85. Malta reported in the NIR that it is still developing QA/QC procedures for the LULUCF sector. The ERT recommends that the Party implement these procedures in line with the IPCC good practice guidance for LULUCF in the next inventory submission.

86. The reported uncertainty estimates for the AD and EFs for CO₂ emissions and removals from forest land remaining forest land, settlements remaining settlements, and other land remaining other land were the same: 18.0 per cent for the AD and 50.0 per cent for the EFs. For cropland remaining cropland, the corresponding uncertainties were 5.0 per cent and 50.0 per cent. To improve transparency, the ERT recommends that Malta report the sources of the uncertainty values in the next inventory submission.

87. The ERT identified some discrepancies between the information in the NIR and in the CRF tables. For example, table A5-0-1 in annex 5 to the NIR indicates that CO₂ emissions and removals from other land converted to cropland have not been estimated, but the area converted and the carbon stock changes in living biomass are reported in CRF table 5.B, and this category is not reported as “NE” in CRF table 9(a). The ERT recommends that Malta implement QA/QC checks to ensure the consistency of the reporting between the NIR and the CRF tables in the next inventory submission.

2. Key categories

Forest land remaining forest land – CO₂

88. The area of and net removals from forest land remaining forest land have remained almost constant throughout the time series (Malta has reported net CO₂ removals of 48.68 Gg CO₂ for 1990 and 48.69 Gg CO₂ for 2010). In the NIR, the Party has reported the methodology used to estimate the CO₂ emissions and removals from coniferous wooded land, mixed forest and shrubland, as well as the EFs used and the sources of data for the area under these subcategories. The total forest land area and the corresponding emissions and removals have remained almost constant throughout the entire time series, with marginal differences reported for 2009 and 2010, possibly due to rounding, implying that the forest land area can be assumed to be in a steady state condition.

89. Malta has reported in the NIR that “According to the Corine Land Cover 2006, forested areas account for 2.1 km² (0.7 per cent) on the land cover type in the Maltese Islands”. However, in CRF table 5.A, the Party has reported an area under forest land remaining forest land (which is the same as the area reported under forest land) of only 0.82 kha (0.0082 km²). The ERT recommends that Malta identify the reasons for this discrepancy between the information provided in the NIR and in the CRF tables, enhance the QA/QC procedures and provide consistent data in the next inventory submission.

90. Malta has indicated in the NIR that the annual carbon stock changes in dead wood, litter and mineral soils were estimated for the first time in the 2012 inventory submission, and that the estimates are in line with the IPCC good practice guidance for LULUCF. However, the ERT noted that the Party has reported the carbon stock changes in dead organic matter pools as “NE” and in mineral soils as “NO” in CRF table 5.A, although the NIR indicates that the Party has applied a tier 1 methodology which assumes a constant

carbon stock or no change. The ERT recommends that Malta, in the next inventory submission, revise the use of the notation keys and include an explanation in the documentation box of the appropriate CRF tables to explain that, under the tier 1 approach, the assumption is that no change in carbon stocks occurs in the dead organic matter and mineral soils pools.

91. In the estimation of the carbon stock changes in living biomass, Malta has not estimated any losses (losses are reported as “NE” in CRF table 5.A). The ERT recommends that the Party either clarify in the NIR that the area of forest land remaining forest land has not been subject to any type of losses in living biomass, including disturbances, during the reporting year, or provide an estimate and information on the corresponding methodology used in its next annual submission. In the NIR (chapter 7.2.1, page 94) the Party has stated that logging industries do not exist in Malta and that woodland is protected by legislation. The ERT recommends that Malta include a reference to the appropriate legislation in the NIR of the next inventory submission, in order to enhance the transparency of its reporting.

92. In the NIR, Malta has stated that an afforestation project (the conversion of land to forest land) was successfully implemented in 2005 (chapter 7.1, page 94) and a second one was implemented in 2010, but that no information on either of these projects was provided in the inventory due to their early stages of implementation. The ERT noted that Malta has reported the area of land converted to forest land as “NA” in CRF table 5.A. However, the ERT also notes that a Party shall report all land conversions regardless of the age of the stands. The ERT strongly recommends that Malta include any areas of land conversion in the next inventory submission, in order to ensure completeness, transparency and consistency.

3. Non-key categories

Cropland remaining cropland – CO₂

93. For the period 1990–1998, Malta has reported a constant area (1.02 kha) for cropland remaining cropland and has reported land converted to cropland as “NO”. For the period 1999–2002, the Party has reported a constant area (0.94 kha) for cropland remaining cropland and has reported land converted to cropland as “NO”. For 2003, Malta has also reported the area of cropland remaining cropland as 0.94 kha, but the area of other land converted to cropland has been reported as 0.14 kha. The ERT considers that the area reported by the Party of land converted to cropland (0.14 kha) should remain under the land conversion subcategory for a period of 20 years (the default transition period according to the IPCC good practice guidance for LULUCF). However, for 2004, Malta has already incorporated this area into the area of cropland remaining cropland (amounting to 1.04 kha) and, in addition, Malta has reported the area of land converted to cropland as 0.15 kha. For 2005, Malta has reported the area of cropland remaining cropland as 1.09 kha and the area of land converted to cropland as “NO”. For 2006, the Party has also reported the area of cropland remaining cropland as 1.09 kha, but has reported the area of land converted to cropland as 0.23 kha; this area was added to the cropland remaining cropland area for 2007 (1.32 kha). The ERT recommends that Malta revise the allocation of the area under cropland remaining cropland and under land converted to cropland to ensure adherence to the IPCC good practice guidance for LULUCF, including the reporting of conversion areas under the conversion subcategories for a period of 20 years, and ensure the consistent reporting of cropland in the next inventory submission.

94. The ERT also noted that Malta has only reported the gains in carbon stocks in living biomass and has reported the corresponding losses as “NE”. The ERT therefore recommends that the Party either explain that these losses do not occur (and subsequently change the notation key to “NO”) or provide an estimate in the next inventory submission.

Settlements remaining settlements – CO₂

95. Malta has provided estimates of CO₂ removals from living biomass in settlements remaining settlements, which, as a subcategory included in Appendix 3a.4 of the IPCC good practice guidance for LULUCF, is not of a mandatory nature. The ERT commends Malta for providing these estimates. The Party has used the IPCC default value for the area-based growth rate of crown cover (2.9 t C (ha crown cover)⁻¹ year⁻¹), and indicated that the data on the area cover of vegetation in settlements has been obtained from the CORINE Land Cover 2006 raster data.⁹ The ERT recommends that Malta justify the suitability of the CORINE data as an input to the IPCC methodology, in particular the total crown cover area, in the next inventory submission. The ERT noted that the Party has not estimated the potential losses of carbon stocks in settlements (reported as “NE” in CRF table 5.E). The ERT recommends that Malta include, in the NIR of the next inventory submission, an explanation as to why these losses do not occur, or provide an estimate for the losses.

Other land remaining other land – CO₂

96. Malta has reported, in table 7-3 of the NIR, the areas of other land remaining other land. The ERT noted that the areas reported in the NIR differ from those reported in CRF table 5.F for some years of the time series, including 1993 (a difference of 0.09 kha), 1995 (140.4 kha), 1999 (–0.08 kha), 2005 (–0.14 kha) and 2010 (0.6 kha). The ERT recommends that Malta correct these discrepancies between the NIR and the CRF tables, enhance the QA/QC procedures and ensure the consistency of its reporting in the next inventory submission.

F. Waste

1. Sector overview

97. In 2010, emissions from the waste sector amounted to 199.45 Gg CO₂ eq, or 6.6 per cent of total GHG emissions. Since 1990, emissions have increased by 200.0 per cent. The key driver for the rise in emissions is the accumulation of organic waste at the five managed landfills in Malta. Within the sector, 86.2 per cent of the emissions were from solid waste disposal on land, followed by 13.5 per cent from wastewater handling and 0.4 per cent from waste incineration. Malta has reported estimates of CH₄ and N₂O emissions from the other (waste) category, which contains emissions from the composting of organic waste and from anaerobic biodigestion. The estimates are provided for the period 1993–2006, but are reported as “NO” for the periods 1990–1992 and 2007–2010 (see para. 109 below).

98. The ERT notes that the inventory for the waste sector is complete in terms of gases, years and mandatory categories and is generally transparent (see paras. 102 and 105 below). In its 2012 inventory submission, Malta has reported quantitative uncertainty estimates using a tier 1 method from the IPCC good practice guidance in annex 7 to the NIR, but has not reported the assumptions or the sources of the uncertainty values used. To improve transparency, the ERT recommends that Malta report the assumptions and sources of the uncertainty values used for the AD and EFs in the next inventory submission.

99. The ERT notes that there is no information on sector-specific QA/QC procedures in the waste sector chapter of the NIR. The ERT recommends that Malta develop QA/QC procedures for the waste sector and report thereon in the next inventory submission.

⁹ Available at <<http://www.eea.europa.eu/data-and-maps/data/corine-land-cover-2006-raster-1>>.

100. Malta has made recalculations for the waste sector between the 2011 and 2012 inventory submissions following changes in AD. The impact of these recalculations on the waste sector is a decrease in emissions of 0.9 per cent for 2009. The main recalculations took place in the category solid waste disposal on land (a decrease of 27.42 Gg CO₂ eq, or 14.3 per cent, for 2009).

2. Key categories

Solid waste disposal on land – CH₄

101. To estimate CH₄ emissions from solid waste disposal on land, Malta has used the first-order decay (FOD) method from the 2006 IPCC Guidelines, country-specific AD and default EFs. To generate historical data on the amount of waste for the period 1977–1989, Malta has used extrapolation based on the population. The ERT recommends that Malta justify its use of the FOD method from the 2006 IPCC Guidelines in the next inventory submission.

102. CRF table 6.A contains information on CH₄ recovery. However, there is no transparent information in the NIR on CH₄ recovery. The ERT recommends that Malta provide detailed information on CH₄ recovery in the NIR of its next inventory submission.

103. In the previous inventory submission, the landfilling of sewage sludge was considered part of the landfilling of industrial waste. However, in the 2012 inventory submission, the landfilling of sewage sludge from the year 2009 onwards has been reported separately, using IPCC default values for degradable organic carbon, a constant methane generation rate and default IPCC values for the parameters for the different types of waste. According to the 2006 IPCC Guidelines, the FOD model requires a 50-year time series of historical AD to achieve accurate emission estimates. Malta's previous submission estimates, based on AD from 1977 to 2009 (34 years), were recalculated in the 2012 inventory submission (as described in section 8.2.2 of the NIR), based on AD from the period 1950–2010 (60 years). The recalculations have been performed in accordance with the IPCC good practice guidance.

3. Non-key categories

Wastewater handling – CH₄

104. CH₄ emissions from this subcategory amounted to 26.82 Gg CO₂ eq for 2010. They were calculated by applying a country-specific method based on multiplying AD based on biological oxygen demand and country-specific EFs.

105. Some discrepancies were identified between the information reported in the NIR and in the CRF tables. For example, Malta has reported the total wastewater handled as “NO” for industrial wastewater and as “NA” for domestic wastewater in CRF table 6.B (additional information), but in the NIR (section 8.3.2.2), the Party has reported that it has calculated CH₄ emissions from domestic and industrial wastewater. The ERT recommends that Malta identify the reasons for this discrepancy between the information in the NIR and in the CRF tables, enhance the QA/QC procedures, and provide consistent data in the next inventory submission.

Waste incineration – CO₂, CH₄ and N₂O

106. Malta has estimated and reported emissions of CO₂, CH₄ and N₂O from the incineration of municipal, clinical and industrial waste using a method from the 2006 IPCC Guidelines. The ERT recommends that Malta justify its use of the method from the 2006 IPCC Guidelines in the next inventory submission.

107. Malta has used default EFs from the 2006 IPCC Guidelines to estimate CH₄ emissions from the incineration of municipal solid waste (MSW). However, the Party has used the default CH₄ EF applicable to open burning (6,500 g CH₄/t waste) to estimate CH₄ emissions from the incineration of MSW. The ERT recommends that Malta justify the use of the default EF from the 2006 IPCC Guidelines and provide references in the NIR for the sources of the values presented in NIR table 8-4 in the next inventory submission.

Other (waste) – CO₂, CH₄ and N₂O

108. Malta has estimated CH₄ emissions generated during anaerobic biodigestion, net biogenic CO₂ emissions from flaring (the portion used for energy purposes is reported under the energy sector) and CH₄ and N₂O emissions from waste composting.

109. As the only composting plant ceased operation in 2007 and is currently undergoing an upgrading process, the emissions from this subcategory are reported as “NO” for the years 2007–2010. The ERT commends Malta for its efforts to provide transparent information on this subcategory, and encourages the Party to continue reporting information on these sources in its NIR and to include, in the documentation box of CRF table 6, a reference to the section in the NIR where the information has been reported.

III. Conclusions and recommendations

A. Conclusions

110. Malta made its inventory submission on 13 April 2012 and officially submitted revised estimates and a revised NIR on 15 May 2012. The inventory submission contains the GHG inventory (comprising CRF tables and an NIR). This is in line with the UNFCCC reporting guidelines.

111. The inventory submission is complete and Malta has submitted a complete set of CRF tables for the years 1990–2010 and an NIR. The inventory is complete in terms of years and sectors and is generally complete in terms of geographical coverage, categories and gases (see paras. 7 and 84 above).

112. The Party’s inventory is generally in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF, except for the categories for which estimates are missing (see para. 7 above) or the categories that have not been transparently reported (see the sector chapters of this report and table 3 below).

113. Malta has made recalculations for the inventory between the 2011 and 2012 submissions following changes in methodologies. The impact of these recalculations on the national totals is an increase in emissions of 5.2 per cent for 2009. The main recalculations took place in the following sectors/categories:

(a) In the energy sector: public electricity and heat production, manufacturing industries and construction, commercial/institutional and navigation (see para. 25 above);

(b) In the industrial processes sector: refrigeration and air-conditioning equipment (see para. 48 above);

(c) In the waste sector: solid waste disposal on land (see para. 100 above).

114. The institutional arrangements implemented by Malta for the preparation of the inventory continue to perform their required functions. However, the ERT identified some issues for improvement (see paras. 10, 13, 14, 17, 18, 19 and 20 above).

B. Recommendations

115. The ERT identified the issues for improvement listed in table 3 below.

Table 3

Recommendations identified by the expert review team

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph reference</i>
Overview	Inventory planning	Provide more detailed information on the inventory preparation process	10
	Inventory preparation	Use the results of the key category analysis to prioritize the development and improvement of the inventory, and include information on this process in the next inventory submission	13
	Uncertainties	Report two uncertainty analyses, one including and one excluding the emissions from the land use, land-use change and forestry (LULUCF) sector, improve the transparency of the uncertainty analysis and provide information to explain how the uncertainty analysis is used to prioritize further inventory improvements	14
	Quality assurance/quality control (QA/QC)	Develop a QA/QC plan, in particular tier 1 QC procedures, such as that described in the Intergovernmental Panel on Climate Change (IPCC) <i>Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories</i> (the IPCC good practice guidance), and provide information on the QA/QC plan in the national inventory report (NIR)	17
	Verification	Improve the QA/QC and verification procedures	18
	Transparency	Improve the transparency of the information on the QA/QC procedures and uncertainty analysis	19
	Inventory management	Provide further information on archiving, including internal documentation on QA/QC procedures, external and internal reviews, documentation on annual key categories and key category identification and planned inventory improvements	20
Energy	Sector overview	Estimate and report fugitive emissions from fuels for the period 1990–2010	24
		Use a tier 2 method for every key category	26
		Improve the completeness of the emission estimates for agriculture/forestry/fisheries	27
		Improve the allocation of emissions	28

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph reference</i>
		Revise the use of the notation keys in order to ensure that the reporting is in accordance with the “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories”	29
		Justify the uncertainty values reported or use default uncertainty values from the IPCC good practice guidance	30
		Develop and implement a QA/QC system for the energy sector	31
		Justify the applicability of the emission factors (EFs) and other data from the <i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i> (the 2006 IPCC Guidelines) to the national circumstances and provide relevant evidence to validate the explanation in an annex to the NIR	32
	Reference and sectoral approaches	Estimate CO ₂ emissions using the reference approach for the years 1990–2008	33
	International bunker fuels	Improve the consistency of the information in the common reporting format (CRF) tables, the information on the EFs used for aviation bunkers, and the consistency of the information on international navigation	36, 37 and 38
	Stationary combustion: liquid fuels – CO ₂	Provide information on how the consistency of the time series is ensured	40
		Continue the efforts to improve the time-series consistency and the relevant QA/QC procedures for this category and allocate the emissions from manufacturing industries and construction to the appropriate subcategories	41
		Continue the efforts to provide emission estimates for agriculture/forestry/fisheries for the entire time series	42
	Stationary combustion: solid fuels – CO ₂	Justify the value of the CO ₂ EF used for bituminous coal or recalculate the emissions from this category using the default EF from the <i>Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories</i> (the Revised 1996 IPCC Guidelines)	43
	Stationary combustion: liquid fuels – CH ₄	Justify the use of the CH ₄ EF from the 2006 IPCC Guidelines or recalculate the emissions from the categories under other sectors using the default EF from the Revised 1996 IPCC Guidelines	44
	Civil aviation: liquid fuels – all gases	Improve the transparency of the information on the recalculations	45

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph reference</i>
	Road transportation: liquid fuels – CH ₄ and N ₂ O	Estimate CH ₄ and N ₂ O emissions from road transportation using the same model as the one used to estimate indirect emissions	46
Industrial processes and solvent and other product use	Sector overview	Develop and implement a QA/QC plan for the industrial processes sector and report thereon	50
		Increase the transparency of the NIR, especially with regard to the assumptions used to estimate the emissions from the industrial processes sector	51
	Consumption of halocarbons and SF ₆ – HFCs	Improve the transparency of the reporting by improving the description of the assumptions used, including where expert judgement is used	52
		Implement QA/QC procedures for foam blowing, fire extinguishers, and aerosols and metered dose inhalers in order to ensure the complete reporting of HFC emissions and revise the use of the notation key “NO” (not occurring) in CRF table 2(I)	53 and 54
		Improve the transparency, completeness and consistency of the reporting and the adherence of the reporting to the IPCC good practice guidance by estimating and reporting actual emissions for all relevant subcategories under consumption of halocarbons and SF ₆	55
	Lime production – CO ₂	Complete the time series, if necessary using an extrapolation method, in line with the IPCC good practice guidance	56
		Improve the consistency of the information on CO ₂ emissions from high-calcium lime production for the period 1990–1994 between the CRF tables and the NIR	58
	Road paving with asphalt – CO ₂ and non-methane volatile organic compounds	Report the CO ₂ emissions from road paving with asphalt as “NE” (not estimated) if the activity data (AD) for the period 1990–1994 are not available; investigate the potential time-series inconsistency in the estimates of CO ₂ emissions from road transportation and report on the findings	59 and 60
	Carbide production – CO ₂	Justify why a higher-value EF better reflects the national circumstances or use the default EF from the Revised 1996 IPCC Guidelines	61
Agriculture	Sector overview	Estimate and report CH ₄ and N ₂ O emissions from field burning of agricultural residues – if this is not possible, report these emissions as “NE” in the CRF tables; to ensure completeness, continue to conduct research in order to confirm that rice cultivation does not occur in the country and report on the findings	63

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph reference</i>
		Explain all recalculations in the NIR and in CRF table 8(b)	64
		Report and describe in further detail the EFs and parameters used and evaluate the possibility of using the parameters used by reporting Parties with similar circumstances	65
		Develop and implement QA/QC procedures for the agriculture sector and provide information on the uncertainty of this sector	66
	Enteric fermentation – CH ₄	Use a higher-tier method to estimate emissions from this category and justify the applicability of the CH ₄ EF for rabbits to national circumstances	67
		Complete CRF table 4.A, including the additional information box, for the appropriate livestock categories; improve the accuracy of the information on planned inventory improvements	68
		Review the population data for the livestock categories, using expert judgement if appropriate, and report on any recalculations	69
		Provide more detailed information on the methods used to estimate emissions from enteric fermentation for cattle, including information on the parameters reported in CRF table 4.A and the EFs used	70
	Manure management – CH ₄ and N ₂ O	Explore the possibility of using country-specific EFs or EFs from a country with similar characteristics and circumstances	71
		Revise the poultry population data for 2008 and 2009 using one of the interpolation techniques indicated in the IPCC good practice guidance	72
		Replace the appropriate notation keys with figures in CRF table 4.B(b) and ensure that the information in the NIR and in the CRF tables is consistent	73
		Review the EFs used to confirm that they correspond to the national characteristics and report information on the EFs for each animal waste management system	74
	Direct soil emissions – CH ₄ and N ₂ O	Estimate and report N ₂ O emissions for nitrogen-fixing crops and crop residues and complete the additional information box of CRF table 4.D; improve the transparency of the information on grazing; review the consistency of the time series on the use of synthetic fertilizers and explain the trend	75, 76 and 77

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph reference</i>
LULUCF	Sector overview	Report a “0.0” value in the appropriate cells or provide information in the appropriate documentation box to clarify that the entry is equal to zero; provide estimates for the missing categories; provide brief explanations in the appropriate documentation boxes of the CRF tables in order to justify the use of the notation keys in CRF tables 5.B–D; improve the transparency of the information on the categories reported as “NO”	79, 80, 81 and 82
		Correctly apply approach 1 for land area representation from the IPCC <i>Good Practice Guidance for Land Use, Land-Use Change and Forestry</i> (the IPCC good practice guidance for LULUCF) and improve the transparency of the information in the NIR on the land-use change matrix; revise the areas allocated to the individual land-use categories in order to ensure the consistency of the reporting	83 and 84
		Develop and implement QA/QC procedures in line with the IPCC good practice guidance for LULUCF; report the sources of the uncertainty values; implement QA/QC procedures to improve the consistency of the information in the CRF tables and in the NIR	85, 86 and 87
	Forest land remaining forest land – CO ₂	Identify the reasons for the discrepancy in the reported area for forest land between the NIR and the CRF tables, enhance the QA/QC procedures and provide consistent data	89
		Revise the use of the notation keys and include an explanation in the documentation box of the appropriate CRF tables to explain that, under the tier 1 approach, the assumption is that no change in carbon stocks occurs in the dead organic matter and mineral soils pools	90
		Clarify that the area of forest land remaining forest land has not been subject to any type of disturbance during the reporting year, or provide an estimate and information on the corresponding methodology used; include a reference to the appropriate legislation on woodland; include any areas of land conversion	91 and 92
	Cropland remaining cropland – CO ₂	Revise the allocation of the area under cropland remaining cropland and under land converted to cropland to ensure adherence to the IPCC good practice guidance for LULUCF, including the reporting of conversion areas under the conversion subcategories for a period of 20 years, and ensure the consistent reporting of cropland	93
		Explain that the losses of carbon stocks in living biomass do not occur (and subsequently change the notation key to “NO”) or provide an estimate	94

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph reference</i>
	Settlements remaining settlements – CO ₂	Justify the suitability of the CORINE Land Cover 2006 raster data as an input to the IPCC methodology, in particular the total crown cover area. Include an explanation as to why losses of carbon stocks in settlements do not occur, or provide an estimate for the losses	95
	Other land remaining other land – CO ₂	Correct the discrepancies in the reported area of other land remaining other land in the NIR and in the CRF tables, enhance the QA/QC procedures and ensure the consistency of the reporting	96
Waste	Sector overview	Report the assumptions and sources of the uncertainty values used for the AD and EFs; develop QA/QC procedures for the waste sector and report thereon	98 and 99
	Solid waste disposal on land – CH ₄	Justify the use of the first-order decay method from the 2006 IPCC Guidelines; provide detailed information on CH ₄ recovery	101 and 102
	Wastewater handling – CH ₄	Identify the reasons for the discrepancy in the information on domestic and industrial wastewater between the NIR and the CRF tables, enhance the QA/QC procedures and provide consistent data	105
	Waste incineration – CO ₂ , CH ₄ and N ₂ O	Justify the use of the method from the 2006 IPCC Guidelines to estimate CO ₂ , CH ₄ and N ₂ O emissions from waste incineration; provide references in the NIR for the sources of the values presented in NIR table 8-4	106 and 107

Annex I

Documents and information used during the review

A. Reference documents

Intergovernmental Panel on Climate Change. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html>.

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FCCC/ARR/2011/MLT. Report of the individual review of the inventory submission of Malta submitted in 2011. Available at <http://unfccc.int/resource/docs/2012/arr/mlt.pdf>.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Godwin Sant (Climate Change and Policy Division, Malta Resources Authority), including additional material on the methodologies and assumptions used.

Annex II

Acronyms and abbreviations

AD	activity data
AWMS	animal waste management systems
C	carbon
CaC ₂	carbide
CH ₄	methane
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
CRF	common reporting format
EF	emission factor
EMEP	European Monitoring and Evaluation Programme
ERT	expert review team
FOD	first-order decay
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs and SF ₆ without GHG emissions and removals from LULUCF
HFCs	hydrofluorocarbons
IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
kg	kilogram (1 kg = 1,000 grams)
km ²	square kilometre
LTO	landing and take-off
LULUCF	land use, land-use change and forestry
MSW	municipal solid waste
N	nitrogen
N ₂ O	nitrous oxide
NA	not applicable
NE	not estimated
NIR	national inventory report
NO	not occurring
PFCs	perfluorocarbons
QA/QC	quality assurance/quality control
SF ₆	sulphur hexafluoride
TJ	terajoule (1 TJ = 10 ¹² joule)
UNFCCC	United Nations Framework Convention on Climate Change