Advance Version

COMPLIANCE COMMITTEE **CC/ERT/ARR/2012/18**
16 May 2012

Report of the individual review of the annual submission of Monaco submitted in 2011

Note by the secretariat

The report of the individual review of the annual submission of Monaco submitted in 2011 was published on 15 May 2012. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decision 4/CMP.4), the report is considered received by the secretariat on the same date. This report, FCCC/ARR/2011/MCO, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.

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Report of the individual review of the annual submission of Monaco submitted in 2011*

* In the symbol for this document, 2011 refers to the year in which the inventory was submitted, and not to the year of publication.

Contents

I. Introduction and summary

A. Overview

1. This report covers the centralized review of the 2011 annual submission of Monaco, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 5 to 10 September 2011 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Ms. Anke Herold (Germany) and Mr. Paul Filliger (Switzerland); energy – Ms. Kristien Aernouts (Belgium), Mr. Vishwa Bandhu Pant (India) and Mr. Glen Whitehead (Australia); industrial processes – Ms. Youngsook Lyu (Republic of Korea) and Mr. Menouer Boughedaoui (Algeria); agriculture – Mr. Michael Anderl (Austria) and Mr. Jacques Kouazounde (Benin); land use, land-use change and forestry (LULUCF) – Mr. Nagmeldin Elhassan (Sudan) and Mr. Hector Ginzo (Argentina); and waste – Mr. Davor Vesligaj (Croatia). Ms. Herold and Mr. Elhassan were the lead reviewers. The review was coordinated by Mr. Javier Hanna and Mr. Roman Payo (UNFCCC secretariat).

2. In accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1) (hereinafter referred to as the Article 8 review guidelines), a draft version of this report was communicated to the Government of Monaco, which made no comment on it.

B. Emission profiles and trends

3. In 2009, the main greenhouse gas (GHG) in Monaco was carbon dioxide (CO_2), accounting for 93.8 per cent of total GHG emissions[1] expressed in CO_2 eq, followed by nitrous oxide (N_2O) (3.2 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 2.3 per cent of the overall GHG emissions in the country, while methane (CH_4) accounted for the remaining 0.6 per cent. The energy sector accounted for 96.3 per cent of total GHG emissions, followed by the industrial processes sector (2.3 per cent) and the waste sector (1.3 per cent). Monaco has no agriculture sector and therefore has reported those emissions as not occurring ("NO") and not applicable ("NA"). Monaco has reported all CO_2 and N_2O emissions from the solvents and other product use sector as not estimated ("NE"). Total GHG emissions for 2009 amounted to 90.94 Gg CO_2 eq and decreased by 15.7 per cent between the base year[2] and 2009. The information in the common reporting format (CRF) tables is consistent with the information in the national inventory report (NIR).

4. Tables 1 and 2 show GHG emissions from Annex A sources, emissions and removals from the LULUCF sector under the Convention and emissions and removals from activities under Article 3, paragraph 3, and, if any, Article 3, paragraph 4, of the Kyoto Protocol (KP-LULUCF), by gas and by sector and activity, respectively. In table 1, CO_2, CH_4 and N_2O emissions included in the rows under Annex A sources 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 CO_2 eq excluding LULUCF, unless otherwise specified.

[2] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The base year emissions include emissions from Annex A sources only.

Table 1

Greenhouse gas emissions from Annex A sources and emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, by gas, base year to 2009[a]

			Gg CO_2 eq								*Change (%)*
		Greenhouse gas	*Base year*[a]	*1990*	*1995*	*2000*	*2005*	*2007*	*2008*	*2009*	*Base year–2009*
Annex A sources		CO_2	105.37	105.37	111.81	112.77	98.59	92.06	90.00	85.34	–19.0
		CH_4	0.66	0.66	0.80	0.81	0.63	0.63	0.60	0.57	–12.8
		N_2O	1.75	1.75	2.75	3.41	3.14	3.14	3.03	2.91	66.4
		HFCs	0.01	NA, NE, NO	0.01	2.60	1.77	1.89	1.86	2.02	26 749.2
		PFCs	NA, NO	NA, NE, NO	NA, NO	NA, NO	0.06	0.06	0.02	0.02	NA
		SF_6	0.10	0.16	0.10	0.10	0.08	0.08	0.08	0.08	–15.1
KP-LULUCF	Article 3.3[b]	CO_2							NO	NO	
		CH_4							NO	NO	
		N_2O							NO	NO	
	Article 3.4[c]	CO_2	NA						NA	NA	NA
		CH_4	NA						NA	NA	NA
		N_2O	NA						NA	NA	NA

Abbreviations: KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable, NE = not estimated, NO = not occurring.

[a] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The "base year" for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

[b] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation. Only the inventory years of the commitment period must be reported.

[c] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation. For cropland management, grazing land management and revegetation the base year and the inventory years of the commitment period must be reported.

Table 2
Greenhouse gas emissions by sector and activity, base year to 2009[a]

			Gg CO_2 eq								*Change (%)*
		Sector	*Base year*[a]	*1990*	*1995*	*2000*	*2005*	*2007*	*2008*	*2009*	*Base year–2009*
Annex A		Energy	107.02	107.02	114.24	115.81	101.20	94.66	92.51	87.60	–18.2
		Industrial processes	0.10	0.16	0.10	2.69	1.91	2.04	1.95	2.12	1 927.3
		Solvent and other product use	NE	NE	NE	NE	NE	NE	NE	NE	NA
		Agriculture	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA
		Waste	0.75	0.75	1.12	1.18	1.17	1.16	1.11	1.23	62.5
		LULUCF	–0.01	–0.01	–0.01	–0.01	–0.01	–0.02	–0.02	–0.02	97.6
		Total (with LULUCF)	**107.87**	**107.92**	**115.45**	**119.67**	**104.27**	**97.85**	**95.56**	**90.91**	**–15.7**
		Total (without LULUCF)	**107.88**	**107.94**	**115.46**	**119.68**	**104.28**	**97.86**	**95.57**	**90.94**	**–15.7**
		Other[b]	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
KP-LULUCF	Article 3.3[c]	Afforestation and reforestation							NO	NO	
		Deforestation							NO	NO	
		Total (3.3)							**NO**	**NO**	
	Article 3.4[d]	Forest management							NA	NA	
		Cropland management	NA						NA	NA	NA
		Grazing land management	NA						NA	NA	NA
		Revegetation	NA						NA	NA	NA
		Total (3.4)	**NA**						**NA**	**NA**	**NA**

Abbreviations: LULUCF = land use, land-use change and forestry; KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable, NE = not estimated, NO = not occurring.

[a] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The "base year" for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

[b] Emissions/removals reported in the sector other (sector 7) are not included in Annex A to the Kyoto Protocol and are therefore not included in national totals.

[c] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation. Only the inventory years of the commitment period must be reported.

[d] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation. For cropland management, grazing land management and revegetation the base year and the inventory years of the commitment period must be reported.

5. Table 3 provides information on the most important emissions and removals and accounting parameters that will be included in the compilation and accounting database.

Table 3
Information to be included in the compilation and accounting database in t CO_2 eq

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]	*Accounting quantity*[c]
Commitment period reserve	445 699			445 699	
Annex A emissions for current inventory year					
CO_2	85 339			85 339	
CH_4	571			571	
N_2O	2 913			2 913	
HFCs	2 017			2 017	
PFCs	16			16	
SF_6	82			82	
Total Annex A sources	**90 938**			**90 938**	
Activities under Article 3, paragraph 3, for current inventory year					
3.3 Afforestation and reforestation on non-harvested land for current year of commitment period as reported	NO			NO	NA
3.3 Afforestation and reforestation on harvested land for current year of commitment period as reported	NO			NO	NA
3.3 Deforestation for current year of commitment period as reported	NO			NO	NA
Activities under Article 3, paragraph 4, for current inventory year[d]					
3.4 Forest management for current year of commitment period					
3.4 Cropland management for current year of commitment period					
3.4 Cropland management for base year					
3.4 Grazing land management for current year of commitment period					
3.4 Grazing land management for base year					
3.4 Revegetation for current year of commitment period					
3.4 Revegetation in base year					

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

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustments.

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] "Accounting quantity" is included in this table only for Parties that chose annual accounting for activities under Article 3, paragraph 3, and elected activities under Article 3, paragraph 4, if any.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

6. Monaco submitted a complete set of CRF tables for the period 1990–2009 on 9 March 2011 and an NIR on 18 March 2011. Monaco also submitted information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, accounting of Kyoto Protocol units, changes in the national system and in the national registry, and minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were not submitted. Monaco is not required to submit the SEF tables because it has not yet transferred or acquired any units. The annual submission was submitted in accordance with decision 15/CMP.1.

7. Where necessary, the expert review team (ERT) also used previous years' submissions during the review. In addition, the ERT used the standard independent assessment report (SIAR), parts I and II, to review information on the accounting of Kyoto Protocol units and on the national registry.[3]

8. During the review, Monaco provided the ERT with additional information which is not part of the annual submission (see annex I). The full list of documents used during the review is provided in annex I to this report.

Completeness of inventory

9. The inventory covers all sectors existing in the country, is complete in terms of gases, years and geographical coverage and covers most categories. Compared with the 2010 annual submission, Monaco has improved the completeness of its inventory submission by providing estimates for N_2O emissions from fertilizer use in parks and gardens (settlements remaining settlements), which had previously not been estimated (see para. 60 below). The use of the notation key "not estimated" ("NE") has decreased. HFC emissions from several categories that were reported as "NE" in previous submissions are now reported as "not occurring" ("NO"), as recommended in the previous review report. The categories reported as "NE" include CO_2 and N_2O emissions from the solvent and other product use sector, N_2O emissions from wastewater handling, and CO_2 emissions from asphalt roofing. For these categories, there are no descriptions of methods or emission factors (EFs) available in 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) or the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines).

[3] The SIAR, parts I and II, is prepared by an independent assessor in line with decision 16/CP.10 (paras. 5(a), 6(c) and 6(k)), under the auspices of the international transaction log administrator using procedures agreed in the Registry System Administrators Forum. Part I is a completeness check of the submitted information relating to the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and to national registries. Part II contains a substantive assessment of the submitted information and identifies any potential problem regarding information on the accounting of Kyoto Protocol units and the national registry.

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

Overview

10. The ERT concluded that Monaco's national system continued to perform its required functions. Monaco has reported in its NIR that the "Code de l'Environnement" is ready for parliamentary discussion. The adoption of this law will strengthen Monaco's national system.

Inventory planning

11. The NIR described the national system for the preparation of the inventory. The Direction de l'Environnement, within the Département de l'Equipement, de l'Environnement et de l'Urbanisme, has overall responsibility for the national inventory. Data for the preparation of the inventory are collected by the Direction de l'Environnement from several private and public companies and government institutions, the most important of which are: the Société Monégasque de l'Electricité et du Gaz (SMEG); the Société Monégasque d'Assainissement; and the Division des Statistiques de la Direction de l'Expansion Economique. The NIR reports that Monaco has a quality assurance/quality control (QA/QC) plan in place, which is in accordance with the IPCC good practice guidance. The cooperation with the Centre Interprofessionnel Technique d'Etudes de la Pollution Atmosphérique (CITEPA) of France has continued. In 2009, CITEPA reviewed Monaco's inventory for the year 2007; the next similar review is planned for 2012. The ERT commends Monaco for this cooperation, which is an important part of the QA of the inventory.

Inventory preparation

Key categories

12. Monaco has reported a key category tier 1 analysis, both level and trend assessments, as part of its 2011 submission. The key category analysis performed by the Party and that performed by the secretariat[4] produced similar results. Monaco has included the LULUCF sector in its key category analysis, which was performed in accordance with 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). However, due to the small contribution of this sector, no LULUCF category was identified as a key category. There are no activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol in Monaco; therefore, no key category analysis for KP-LULUCF has been performed. To increase transparency, the ERT recommends that Monaco include in its NIR the full list of categories considered in the key category analysis, instead of presenting only tables with the identified key categories, and use the analysis to prioritize improvements.

[4] 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 IPCC *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.

Uncertainties

13. Monaco has reported a tier 1 uncertainty analysis in its 2011 submission, including for the LULUCF sector. The estimated combined uncertainty for the overall GHG inventory for 2009 was 6.6 per cent, while the uncertainty associated with the overall emission trend was 1.5 per cent. Monaco mostly uses default uncertainty estimates from the IPCC good practice guidance. The ERT notes that this approach is in accordance with the IPCC good practice guidance, but encourages Monaco to develop country-specific uncertainties.

14. Monaco presents the uncertainties as standard deviations, rather than using the 95 per cent confidence interval, as recommended in the IPCC good practice guidance. This means that the reported uncertainty values are around half of the uncertainty values that would be estimated if the 95 per cent confidence interval were used. The ERT reiterates the recommendation of the previous review report that Monaco use the 95 per cent confidence interval to report uncertainties, as recommended in the IPCC good practice guidance, to enable a better comparison with other Parties' uncertainties. In response to a question raised by the ERT during the review, Monaco indicated that it plans to implement this improvement in its next annual submission.

15. As noted by previous ERTs, Monaco does not include in the NIR information on procedures for using the results of the uncertainty analysis as a tool to prioritize inventory improvements. The present ERT, therefore, reiterates the recommendation contained in previous review reports that Monaco use the results of the uncertainty analysis to improve the inventory in its future annual submissions.

Recalculations and time-series consistency

16. Recalculations have been performed and reported in accordance with the IPCC good practice guidance. The ERT noted that recalculations reported by Monaco of the time series 1990 to 2008 have been undertaken to take into account: new data on N_2O emissions from human sewage due to revised data on protein consumption (waste sector); and N_2O from the use of fertilizer in parks and gardens (LULUCF sector). The magnitude of the recalculations' impact is an increase in total GHG emissions in 1990 (by 0.1 per cent) and in 2008 (by 0.1 per cent). Both recalculations have been performed in response to a recommendation in the previous review report.

Verification and quality assurance/quality control approaches

17. Monaco has a QA/QC plan in place (included in annex 8 to the NIR), which is in accordance with the IPCC good practice guidance. The plan includes general QC procedures (tier 1), which have been implemented. No tier 2 QC procedures are mentioned. As an important QA procedure, an external review of the 2007 inventory was carried out in 2009 by CITEPA, and a report on this review was prepared by CITEPA. In the NIR, Monaco stated that a similar review by CITEPA will take place in 2012. The ERT commends this activity and underlines the importance of the CITEPA review to assure the quality of Monaco's inventory. To improve transparency, the ERT recommends that Monaco include additional information on sector-specific QA/QC and verification procedures.

Transparency

18. Monaco has increased the transparency of its 2011 submission by including: a detailed overview table on used methods and EFs; more detailed information in some sectoral chapters (e.g. fluorinated gases (F-gases) under industrial processes, waste); and additional information on recalculations. The NIR structure follows in general the outline

included in annex I to the UFCCC reporting guidelines (i.e. the main chapters follow the outline but the subchapters are in some case aggregated). The ERT commends the Party for these improvements and encourages Monaco to continue improving the transparency of its inventory as discussed in the sectoral chapters of this report.

Inventory management

19. The NIR reports that Monaco has a centralized archiving system, which includes the archiving of disaggregated EFs and activity data (AD) and documentation on how these factors and data have been generated and aggregated for the preparation of the inventory. The archived information also includes internal documentation on QA/QC procedures, external and internal reviews, and documentation on annual key categories and key category identification and planned inventory improvements. All data and copies of the documents used for the preparation of the inventory are archived at the Direction de l'Environnement.

3. Follow-up to previous reviews

20. Monaco has improved its inventory in its 2011 submission in response to recommendations made in previous review reports, in particular by providing estimates on N_2O emissions from the use of fertilizers and from wastewater handling, by improving the use of notation keys, by including the results of the key category analysis in the CRF tables and by improving the transparency in the NIR. Other recommendations made in previous review reports, but not yet implemented by Monaco, include that Monaco report its uncertainty analysis in accordance with the IPCC good practice guidance (see para. 14 above) and revise its reporting of CRF table summary 3 (see para. 26 below).

4. Areas for further improvement

Identified by the Party

21. The 2011 NIR does not identify specific areas for improvement. However, in its response to questions raised by the ERT during the review, Monaco indicated that it is working to carry out a tier 2 key category analysis. The ERT recommends that Monaco report the planned improvements, including those in response to the review process, in its next annual submission.

Identified by the expert review team

22. During the review, the ERT identified cross-cutting issues for improvement. These are listed in paragraph 90 below.

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

B. Energy

1. Sector overview

24. The energy sector is the main sector in the GHG inventory of Monaco. In 2009, emissions from the energy sector amounted to 87.60 Gg CO_2 eq, or 96.3 per cent of total GHG emissions. Since 1990, emissions from this sector have decreased by 18.2 per cent. The key driver for the fall in emissions is the 31.6 per cent reduction in emissions from the residential sector, caused by the decrease in energy used and the shift from liquid to gaseous fuels over the period 1990–2009 (see para. 34 below). In 2009, within the energy sector, 35.5 per cent of the emissions were from other sectors (residential and

commercial/institutional), followed by 34.3 per cent from transport, 30.3 per cent from energy industries and 0.002 per cent from other. The remaining 0.01 per cent were fugitive emissions from oil and natural gas.

25. Monaco has made no recalculations for the energy sector between the 2010 and 2011 submissions.

26. Monaco has reported in CRF table summary 3 the use of a tier 1 methodology and IPCC default EFs for its estimations of all categories and gases in the energy sector. However, as identified by the previous review reports, the description of the methodology for estimating CH_4 and N_2O emissions from road transportation provided in the NIR is consistent with the tier 2 approach. The ERT, therefore, reiterates the recommendation made in the previous review reports that Monaco revise its reporting of CRF table summary 3.

2. Reference and sectoral approaches

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

27. For 2009, Monaco reports in CRF table 1.A(c) that CO_2 emissions estimated using the reference approach are 0.3 per cent lower than those estimated using the sectoral approach. The ERT noted that Monaco has reported the apparent consumption of municipal solid waste for incineration as "NO" or "NA, NO" in table 1.A(b) for the entire time series, but has included estimates in table 1.A(c) under other. The ERT recommends that Monaco report this consumption and related emissions in a consistent way in table 1.A(b) and table 1.A(c).

28. As stated in previous review reports, a comparison of Monaco's estimates with international data was not possible for the review, because data for Monaco are included as part of the French submission to the International Energy Agency and not reported separately.

International bunker fuels

29. In order to separate emissions from international and domestic navigation, Monaco performed a survey in 2005 which concluded that 91.0 per cent of the total fuel consumption was estimated to be for international navigation. The ERT encourages Monaco to repeat this survey regularly to confirm or update the percentage identified in 2005.

30. The estimation of CO_2 emissions from international aviation is based on the fuels sold in Monaco's heliport; these emissions increased by 7.2 per cent between 1990 and 2009. However, between 2008 and 2009 such CO_2 emissions decreased by 21.0 per cent. The ERT identified large inter-annual changes in the estimated CO_2 emissions from international aviation (ranging from –21.0 per cent between 2008 and 2009 to 15.8 per cent between 1999 and 2000). This had already been identified in the previous review report, which recommended that Monaco include in its submission the explanations provided during the previous reviews, namely that, as Monaco is a small country with no airports, the emissions reported for international aviation result from the movement of helicopters, occurring mainly between the city of Nice (France) and Monaco. As calculations of emissions are based on fuel sales and the annual traffic volume is highly variable, the CO_2 emissions estimated for this category also show significant inter-annual variation. The ERT reiterates the recommendation in the previous review report that Monaco include these explanations in the NIR of its next annual submission.

Feedstocks and non-energy use of fuels

31. In its previous annual submission, Monaco had changed the notation key for use of lubricants from "NO" to "NE" in CRF table 1.A(d). As indicated in the previous review report, in response to the question as to whether the Party had checked the use of these fuels, Monaco responded that the notation keys for lubricants and bitumen would be checked for the next annual submission. However, in its 2011 submission, the notation key for lubricants remains "NE", while the notation key for bitumen was changed from "NO" to "NE". In response to a question raised by the ERT during the review, Monaco answered that this was a mistake, and the notation key for bitumen should be "NO", because no bitumen is used in Monaco. Therefore, the ERT recommends that Monaco revise the notation key for bitumen in its next annual submission. The ERT also recommends that Monaco check its use of lubricants, explain how lubricants are disposed of in the country and, if necessary, report emissions from the disposal of lubricants in its next annual submission.

3. Key categories

Stationary combustion: liquid, gaseous and other fuels – CO_2

32. Emissions of CO_2 from incineration with energy recovery of municipal solid waste (MSW) and sludge are reported as emissions from the consumption of other fuels in the category public electricity and heat production. The emissions were estimated using a tier 1 method and default values for the fossil fraction and carbon content of municipal waste and sewage sludge from the IPCC good practice guidance (table 5.6 of the waste section). In response to a question raised by the ERT during the review, Monaco clarified that, in February 2011, 12 engineering companies were asked to participate in a survey to review the waste composition and provide data to the Direction de l'Environnement. Unfortunately, no proposal was received. Taking this into consideration, the Direction de l'Environnement decided that the consultation was unsuccessful. The ERT welcomes Monaco's effort, regrets the lack of response and encourages Monaco to make a new attempt to get the study started, for example by expanding the scope of companies invited, or to collaborate directly with the incineration plant to improve the information on the characteristics of the MSW incinerated.

33. The inter-annual changes of CO_2 emissions from the incineration of MSW and sludge range from –23.0 per cent for 2005–2006 to 32.5 per cent for 2006–2007. As indicated in the previous review report, Monaco explained that in 2006 the amount of waste incinerated was low due to the temporary closure of the incineration plant. In addition, the Party stated that the amount of waste incinerated will probably decrease in the coming years as Monaco has started to separate and recycle MSW, thereby reducing the amount of waste incinerated. The ERT reiterates the recommendation made in previous review reports that, in order to improve the transparency of its reporting, Monaco include this information on trends in its NIR, as well as data on the quantity of waste incinerated.

34. GHG emissions from the residential and commercial/institutional categories accounted for 35.5 per cent of the total emissions from the energy sector in 2009. The trend in these emissions shows an overall decrease, with a reduction of 31.6 per cent between 1990 and 2009, which is the key driver for the overall decreasing trend in the total GHG emissions from the energy sector in Monaco. As indicated in the previous review report, Monaco clarified that the decreasing emission trend observed in the residential sector is due to the fact that the domestic use of light fuel oil in new buildings has been forbidden since 16 September 2003 and the fact that citizens decided to change their heating systems from light fuel oil to natural gas; however, this information is not provided in the NIR of the

2011 submission. The ERT reiterates the recommendation from the previous review report that Monaco include this information in its next annual submission.

35. Previous review reports identified that Monaco had not reported separate data for the commercial/institutional category but reported these emissions under residential, and recommended that Monaco investigate the possibility of obtaining separate data for its next annual submission. In response to a question raised by the ERT during the 2011 review on whether Monaco had investigated the possibility of a split between residential and commercial/institutional emissions, Monaco answered that, after analysis, it appeared that the split would not have an impact on the quantity of emissions and that Monaco preferred to focus on other issues. The ERT acknowledges that the split would not have an impact on total emissions, but it would improve the transparency of the inventory for these important categories that for 2009 accounted for 34.2 per cent of the total GHG emissions of the country. Therefore the ERT recommends that Monaco report emissions for the commercial/institutional category separately from emissions for the residential category in its next annual submission.

Road transportation: liquid fuels[5] – CO_2, CH_4 and N_2O

36. Monaco estimates CO_2 emissions from road transportation on the basis of the amount of fuel sold and using default EFs from the Revised 1996 IPCC Guidelines. Monaco estimates CH_4 and N_2O emissions based on information on the vehicle stock per type of vehicle/technology (which is used to allocate the fuel sold), using net calorific values and EFs from the Revised 1996 IPCC Guidelines and, for biofuels, from CITEPA. This is consistent with a tier 2 approach of the IPCC good practice guidance. To improve transparency, the ERT recommends that Monaco change the description of the methodology for N_2O and CH_4 in CRF summary table 3 from tier 1 to tier 2.

37. The trend in CO_2 emissions from road transportation shows an overall decrease (by 17.2 per cent), from 32.34 Gg in 1990 to 26.76 Gg in 2009. The previous review report indicated that Monaco clarified that this decrease in emissions was due to an increase in the use of public transportation, such as buses and trains, as a result of government incentives targeting the people living in Monaco and commuters, but this information was not included in the 2010 or the 2011 annual submissions. The ERT, therefore, reiterates the recommendation in the previous review report that Monaco include this explanation in the NIR of its next annual submission. Furthermore, the ERT noticed that this decrease in emissions was also due to the increasing percentage of biofuels used each year (except for biofuels blended with gasoline in 2009 compared with 2008), as presented in annex 2 to the NIR. The ERT recommends that Monaco provide more information on this emission trend in its next annual submission.

38. In 2009, N_2O emissions from road transportation accounted for 61.9 per cent of the total N_2O emissions from the energy sector. Emissions of N_2O from road transportation have increased by 261.0 per cent since 1990, because of the high EF for passenger cars running on gasoline equipped with a catalytic converter (0.05 g/km, or 20 kg/TJ, from table 1-36 of the Revised IPCC 1996 Guidelines). The ERT reiterates the recommendation in previous review reports that Monaco include this explanation and more explanations on trends of N_2O emissions from road transportation in the NIR of its next annual submission.

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

C. Industrial processes and solvent and other product use

1. Sector overview

39. In 2009, emissions from the industrial processes sector amounted to 2.12 Gg CO_2 eq (or 2.3 per cent of total GHG emissions) and emissions from the solvent and other product use sector are reported as "NE". Since 1990, emissions have increased by 1,217.1 per cent in the industrial processes sector and since the base year emissions have increased by 1,927.3 per cent. Within the industrial processes sector, all emissions are from consumption of halocarbons and SF_6.

40. Monaco has not made recalculations for the industrial processes sector between the 2010 and 2011 submissions. Monaco has not made recalculations for the solvent and other product use sector between the 2010 and 2011 submissions.

2. Key categories

Consumption of halocarbons and SF_6 – HFCs, PFCs and SF_6

41. Monaco has reported total actual emissions of HFCs from 1994 onwards. The trend in emissions is increasing over the period 1994–2009. As also indicated in the previous review report, the ERT noted that all inter-annual changes in emissions of HFCs were high, except for the periods 1994–1995, 2002–2003, 2003–2004, 2004–2005, ranging between –97.3 per cent and 5,259.3 per cent. The highest inter-annual change occurs for 1995–1996. The ERT reiterates the recommendation in the previous review report that Monaco explain the inter-annual changes in the reported emissions of HFCs in its next annual submission.

42. In CRF table 2(I), Monaco has reported potential emissions of HFCs and PFCs from refrigeration and air-conditioning equipment as "included elsewhere" ("IE") and allocated them under the total potential emissions of halocarbons and SF_6 imported in products. The ERT reiterates the recommendation in the previous review report that Monaco provide estimates of total potential emissions of HFCs and PFCs for this category in CRF table 2(I) and discuss in the NIR of its next annual submission why potential emissions imported in bulk were included with potential emissions imported in products, in order to improve transparency and consistency with the CRF tables.

43. Monaco has reported in the NIR that, following a recommendation made in the 2007 review report, a survey was conducted to complete the time series back to 1990. However, Monaco has reported potential and actual emissions of HFCs and PFCs for all subcategories under consumption of halocarbons and SF_6 as "NE" between 1990 and 1993; therefore the ERT recommends that Monaco complete the time series or, if applicable, revise the notation key in its next annual submission. The ERT considered that the explanation in the NIR on how data were collected to estimate actual emissions for the period 2004–2009 and how time-series consistency is ensured is not clear. The ERT recommends that Monaco describe in its next submission the data collection process for the period 2004–2009 and how time-series consistency is ensured.

44. Monaco has improved its reporting on SF_6 emissions from electrical equipment following the recommendation of the previous review report, and the ERT commends Monaco for this improvement.

3. Non-key categories

Solvent and other product use – CO_2 and N_2O

45. CO_2 and N_2O emissions from the solvent and other product use sector are still reported as "NE" for the whole time series. The ERT reiterates the encouragement of previous review reports that Monaco explore approaches available in the scientific literature

to estimate emissions for those categories that do not have methodologies prescribed in the Revised 1996 IPCC Guidelines or the IPCC good practice guidance.

46. Monaco has reported that emissions of N_2O from its use for degreasing and dry cleaning, anaesthesia, fire extinguishers, aerosol cans and other uses of N_2O (if any) are reported as "NE" because AD are not available. No information related to these emissions is reported in the NIR. In response to a question on the improvement plan to estimate these emissions raised by the ERT during the review, Monaco responded that it is working with CITEPA in order to estimate the feasibility of the assessment of these emissions. The ERT encourages Monaco to elaborate a plan to improve emission estimates from these subcategories and to report on it in its next submission.

D. Agriculture

Sector overview

47. Monaco has indicated in its NIR that there is no livestock production, pasture management or farmland for agriculture in the country. Monaco has reported all categories in this sector as "NO" or "NA" in the CRF tables. The ERT recommends that Monaco revise the use of "NA" for categories that do not occur in the country.

E. Land use, land-use change and forestry

1. Sector overview

48. In 2009, the net removals from the LULUCF sector amounted to 0.02 Gg CO_2 eq. Since 1990, net removals have increased by 97.6 per cent.

49. The category settlements remaining settlements is the only LULUCF category occurring in the country (as Monaco is a city state, emissions and removals from the LULUCF sector occur only in settlements).

50. Monaco has made recalculations for the LULUCF sector between the 2010 and the 2011 submissions in response to the 2010 annual review report. The impact of those recalculations on the LULUCF sector is an increase in total GHG emissions including LULUCF emissions of 0.02 per cent in 2008 and 0.02 per cent in 1990. The recalculations took place for the N_2O emissions for the settlements remaining settlements category (see para. 60 below).

51. Removals of CO_2 derived from the growth of lawns in parks and in both public and private gardens are considered to be offset by CO_2 emissions from the frequent yearly clipping of those lawns.

52. Monaco has reported in its NIR (page 40) that emissions from incineration with energy recovery as part of the stewardship of lawns in parks and gardens, and wood removed during the pruning of trees (collectively denominated by Monaco as "green waste"), are not reported under the waste sector but in the energy sector, under what Monaco denominated (in its NIR) the "biomass" sector. Monaco has explained in its NIR that the quantities of "green waste" were added to the municipal solid waste incinerated for the entire time series, which increased slightly the CH_4 and N_2O emissions in particular for 1990. However, no recalculations are reported for CH_4 or N_2O for any of the sectors involved. In addition, the ERT considers that the carbon removed as "green waste" should be included as harvest or biomass loss in the LULUCF sector, in accordance with the Revised 1996 IPCC Guidelines. The ERT strongly recommends that Monaco improve the description of this "biomass" sector in the NIR, improve the consistency of the information

between the NIR and the CRF tables and ensure consistency in the reporting and allocation of emissions and carbon stock changes between the LULUCF, the waste and the energy sectors in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF.

53. The sector is transparently reported in the NIR, except for the description of the "biomass" sector mentioned in para. 52 above. The methodologies used for estimating both CO_2 and N_2O emissions from settlements remaining settlements were tier 1 methods with IPCC default EFs (IPCC good practice guidance for LULUCF, appendix 3a.4, settlements).

54. Monaco reported the uncertainty in AD to be 20 per cent and the uncertainty in the relevant parameters for estimating the growth of trees to be 30 per cent. Monaco has reported the uncertainty in AD to be 0.5 per cent and the uncertainty in the EF used for estimating N_2O emissions from the use of fertilizers to be 50 per cent. Since the overall uncertainty of the LULUCF sector was not reported, the ERT recommends that Monaco report this uncertainty in its next annual submission.

2. Non-key categories

Settlements remaining settlements – CO_2 and N_2O

55. In 2009, this category was a sink for GHGs equal to 0.02 Gg CO_2 eq. The removals of CO_2 by the growth of the 968 trees recorded in the country were 0.04 Gg, and the emissions of N_2O from nitrogen fertilization amounted to 0.01 Gg CO_2 eq. This net sink had a negligible effect on Monaco's total emissions for 2009: it offset them by 0.03 per cent.

56. The method used for estimating the increase in biomass by trees is based on the estimation of the area covered by the projection of tree canopies on the ground (crown cover) multiplied by a default EF, which is the annual rate of increase in carbon per unit of crown area. This method is a basic one identified as tier 1a in the IPCC good practice guidance for LULUCF. As indicated in the previous review report, Monaco has stated that the computation of crown projections was based on the assimilation of them to various geometrical shapes (i.e. a cone, a half sphere or a column). Monaco is considering using aerial photographs to improve the estimation of crown projections, but Monaco indicated that it is not yet ready to implement this improvement because of its complexity. The current ERT, therefore, recommends that Monaco advance in the development of the suggested, more precise remote-sensing methodology for estimating crown cover area and report on progress in its next annual submission.

57. Monaco only reports gains in living biomass; losses are reported as "NA". In the previous review report, it was recommended that Monaco report gains and losses of living biomass separately in the current annual submission, and also include all necessary methodological descriptions in order to increase transparency. Monaco did so, and explained that biomass loss is reported as "NA" because only trees that are 20 years old or younger are included in the estimations. For these trees, which make up about 15 per cent of Monaco's tree population, the methodology assumed that carbon losses were zero by default. The ERT commends Monaco for this improvement.

58. However, with the removal of "green waste" (see para. 52 above) Monaco has reported on losses from the pruning of trees in parks and public gardens, which should be considered under losses of living biomass in the inventory estimation and seems to contradict the assumption that carbon losses are zero by default. The ERT recalls its recommendation in paragraph 52 above and further recommends that Monaco improve the consistency of the emission estimation related to biomass losses of trees in the LULUCF, energy and waste sectors and ensure that emissions estimated and reported as memo items

from tree biomass in the energy sector are appropriately accounted as biomass losses in the LULUCF sector.

59. Monaco reports the carbon stock changes in both dead biomass and mineral soils as "NE". The ERT reiterates the recommendation of the previous review report that Monaco provide estimates in accordance with the IPCC good practice guidance for LULUCF in its next annual submission.

60. In the previous annual submission, Monaco reported N_2O emissions from the use of nitrogen fertilizers in parks and gardens in its NIR, but not in its CRF tables (N_2O emissions for the category settlements remaining settlements were reported as "NE" in CRF table 5, and as blank for the category other in CRF table 5(I)). In its 2011 annual submission, for N_2O emissions in the period 1990–2009, Monaco has reported estimates for the category settlements remaining settlements in CRF table 5, but reported "NA" in the category other in table 5(I). In response to a question raised by the ERT during the review, Monaco replied that the CRF Reporter software failed to properly report those emissions. As this issue is still unresolved, the ERT recommends that Monaco satisfactorily and conclusively address it by its next annual submission.

F. Waste

1. Sector overview

61. For 2009, emissions from the waste sector amounted to 1.23 Gg CO_2 eq, or 1.3 per cent of total GHG emissions. Since 1990, emissions have increased by 62.5 per cent (by 0.47 Gg CO_2 eq), although the strongest increase took place from 1990 to 1991 (by 34.1 per cent) because waste incineration started in 1991. The key driver for the rise in emissions is the incineration of sludge from wastewater treatment; its emissions increased to 0.40 Gg CO_2 eq by 2009. For 2009, within the sector, 67.7 per cent of the emissions were from wastewater handling (specifically from domestic and commercial wastewater), followed by 32.3 per cent from waste incineration. Solid waste disposal on land does not occur in Monaco and all waste is incinerated in one incineration plant.

62. Monaco has performed recalculations for the waste sector between the 2010 and 2011 submissions in response to a recommendation in the 2010 annual review report and increased the value for protein consumption per capita from a constant value to a value that is changing in accordance with age classes in the population. The impact of these recalculations on the waste sector is an increase in total GHG emissions of 0.1 per cent for 2008 and of 0.1 per cent for 1990 (the impact on emissions from the waste sector is an increase of 7.3 per cent for 2008 and of 18.0 per cent for 1990). The main recalculations took place in the category wastewater handling (see para. 65 below).

63. Similar to previous submissions, Monaco does not explain the trend of emissions in the waste sector, and the ERT therefore reiterates the recommendation in the previous review report that Monaco add information on the reasons for the emission trends. Some additional information was provided in the 2011 NIR submission with regard to N_2O emissions from human sewage, but the NIR still does not provide a full description of the methodologies and parameters used; in particular, the ERT recommends that Monaco report its next annual submission the values of the CH_4 and N_2O EFs as well as the source of the AD of the sludge and waste burned in the incineration plant.

64. Owing to the small contribution of the waste sector to GHG emissions, no category was identified as a key category.

2. Non-key categories

Wastewater handling – N_2O

65. Monaco estimates N_2O emissions from human sewage using the method described in the Revised 1996 IPCC Guidelines and a protein consumption value of 32.3 kg/person/year for the period 1990–2005 and a value of 30.1 kg/person/year for the period after 2006. These values were revised upwards compared with the previous submissions and the revised values are based on information provided by the Direction de l'Action Sanitaire et Sociale, which estimated the values based on the age and gender classes in the population.

66. The NIR indicates that 90 per cent of the wastewater is treated in an aerobic wastewater treatment plant. In response to a question raised by the ERT during the review, Monaco clarified that the remaining 10 per cent of wastewater is directly issued into the sea as overflows in periods of heavy rainfall. The sludge from wastewater treatment is transported to an incineration plant, where it is burned. During this transport, emissions could occur, but Monaco clarified during the review that the transport is only for a distance of 20 metres and via an underground hermetically sealed canalization. Therefore it is unlikely that emissions occur during sludge transport. The ERT recommends that Monaco incorporate these additional explanations in the NIR of its next annual submission.

Waste incineration – CH_4 and N_2O

67. In the previous review report, it was recommended that Monaco report CH_4 and N_2O emissions from the incineration of sludge under the energy sector, in line with the IPCC good practice guidance, as the incineration is used to produce energy. In the 2011 submission, the emissions are still reported in the waste sector. In response to a question raised by the ERT during the review, Monaco explained that this approach is chosen because the calorific values of sludge are lower than those of MSW and that CITEPA had advised Monaco to report these emissions in the waste sector. The ERT strongly reiterates the recommendation of the previous review report that Monaco ensure that its reporting of emissions from both MSW and sludge incineration in the energy sector is consistent with the IPCC good practice guidance because energy use occurs in the incineration plant and because differences in the EFs do not justify a different allocation of emissions.

G. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol

1. Information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

Overview

68. Monaco elected annual accounting for its activities under Article 3, paragraph 3, of the Kyoto Protocol, and did not elect any activity under Article 3, paragraph 4, of the Kyoto Protocol.

69. Monaco has adopted the following parameter values for defining a forest: 10 per cent of minimum tree cover; 0.5 ha as the minimum land area; 5 m as the minimum tree height. These values are in line with paragraph 1(a) in the annex to decision 16/CMP.1. However, Monaco has indicated in its NIR of the 2011 submission that there are no areas in the country that meet the definition of forest and so all activities under Article 3, paragraph 3, of the Kyoto Protocol are reported as "NO" because they do not occur in its territory.

70. The ERT notes that these activities are reported as "NO" in tables NIR-1, NIR-2 and NIR-3, but net emissions/removals of CO_2 and emissions of CH_4 and N_2O are reported as "NA" in CRF table 5(KP). The ERT recommends that Monaco address this inconsistency in its next annual submission.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

71. Monaco has not reported information on its accounting of Kyoto Protocol units in the required SEF tables, as required by decisions 14/CMP.1 and 15/CMP.1. However, the ERT noted that Monaco is not required to report on its accounting of Kyoto Protocol units in accordance with section I.E of the annex to decision 15/CMP.1 because its national registry has not yet transferred or acquired any Kyoto Protocol units.

Accounting of activities under Article 3, paragraph 3, of the Kyoto Protocol

72. Monaco has reported information on its accounting of KP-LULUCF in the accounting table, as included in the annex to decision 6/CMP.3. Information on the accounting of KP-LULUCF has been prepared and reported in accordance with decisions 16/CMP.1 and 6/CMP.3. The ERT noted that Monaco has reported all activities as "NA" in the accounting table of the KP-LULUCF tables. Table 4 shows the accounting quantities for KP-LULUCF as reported by Monaco and the final values after the review.

Table 4
Accounting quantities for activities under Article 3, paragraph 3, and, if any, activities under Article 3, paragraph 4, of the Kyoto Protocol, in t CO_2 eq

	2011 submission[a]		*2010 submission*[b]	*"Net" accounting quantity*[c]
	As reported	*Revised estimates*	*Final*	*Final*	
Afforestation and reforestation	NA	NA	NA	NA	NA
Deforestation	NA	NA	NA	NA	NA
Forest management	NA	NA	NA	NA	NA
Article 3.3 offset[d]	NA	NA	NA	NA	NA
Forest management cap[e]	NA	NA	NA	NA	NA
Cropland management	NA	NA	NA	NA	NA
Grazing land management	NA	NA	NA	NA	NA
Revegetation	NA	NA	NA	NA	NA

Abbreviation: NA = not applicable.

[a] The values included under the 2011 submission are the cumulative accounting values for 2008 and 2009 as reported in the accounting table of the KP-LULUCF CRF tables for the inventory year 2009.

[b] The values included under the 2010 submission are the final accounting values as a result of the 2010 review and are included in table 4 of the 2010 annual review report (FCCC/ARR/2010/MCO, page 19).

[c] The "net" accounting quantity is the quantity of Kyoto Protocol units that the Party shall issue or cancel under each activity under Article 3, paragraph 3, and paragraph 4, if relevant, based on the final accounting quantity in the 2011 submission and where the quantities issued or cancelled based on the 2010 review have been subtracted ("net" accounting quantity=final 2011-final 2010).

[d] Article 3.3 offset: For the first commitment period, a Party included in Annex I that incurs a net source of emissions under the provisions of Article 3, paragraph 3, may account for anthropogenic greenhouse gas (GHG) emissions by sources and removals by sinks in areas under forest management under Article 3, paragraph 4, up to a level that is equal to the net source of emissions under the provisions of Article 3, paragraph 3, but not greater than

9.0 megatonnes of carbon times five, if the total anthropogenic GHG emissions by sources and removals by sinks in the managed forest since 1990 is equal to, or larger than, the net source of emissions incurred under Article 3, paragraph 3.

[e] In accordance with paragraph 11 of the annex to decision 16/CMP.1, for the first commitment period only, additions to and subtractions from the assigned amount of a Party resulting from forest management under Article 3, paragraph 4, after the application of paragraph 10 of the annex to decision 16/CMP.1 and resulting from forest management project activities undertaken under Article 6, shall not exceed the value inscribed in the appendix of the annex to decision 16/CMP.1, times five.

73. Based on the information provided in table 4 for the afforestation and reforestation activities, Monaco shall not issue or cancel any Kyoto Protocol units in its national registry.

74. Based on the information provided in table 4 for the deforestation activities, Monaco shall not issue or cancel any Kyoto Protocol units in its national registry.

National registry

75. The ERT took note of the SIAR and its finding that the reported information on the national registry is complete and has been submitted in accordance with the annex to decision 15/CMP.1. The ERT further noted from the SIAR and its finding that, although the national registry does not yet have a live connection to the international transaction log, it continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1. The national registry also has adequate security, data safeguard and disaster recovery measures in place and its operational performance is adequate. However, the SIAR identified that the national registry has not fulfilled the requirements regarding the public availability of information in accordance with section II.E of the annex to decision 13/CMP.1. Monaco indicated that, once the national registry is online, the information will be made publically available and will be accessible via the user interface.[6] The ERT recommends that Monaco fulfil the requirements regarding the public availability of information in accordance with paragraphs 44–48 of section II.E of the annex to decision 13/CMP.1 in its next annual submission.

Calculation of the commitment period reserve

76. Monaco has reported its commitment period reserve in its 2011 annual submission. Monaco reported that its commitment period reserve has not changed since the initial report review (445,699 t CO_2 eq) as it is based on the assigned amount and not the most recently reviewed inventory. The ERT agrees with this figure. However, the ERT noted that, in its calculations, Monaco has used an incorrect figure for the total GHG emissions for 2009 (95,486 t CO_2 eq compared with the correct figure, 90,938 t CO_2 eq), although the use of this incorrect figure does not lead to an incorrect calculation of the commitment period reserve as it is still based on the assigned amount. The ERT recommends that Monaco use the correct figures when calculating its commitment period reserve in its next annual submission.

3. Changes to the national system

77. Monaco has reported no changes to its national system in its annual submission. The ERT concluded that Monaco's national system continues to be in accordance with the requirements of national systems set out in decision 19/CMP.1.

[6] <https://www.registre-monaco.mc>.

4. Changes to the national registry

78. Monaco has provided information on changes to its national registry in its annual submission: the registry software has been updated (version 5). The ERT concluded that, taking into account the confirmed change in the national registry, Monaco's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).

5. Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol

79. Monaco did not provide information on changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol in its 2011 annual submission. However, the ERT noted that, as indicated in the previous review report, the Party provided this information during the 2010 review, and that in its 2011 submission Monaco has reported information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol in its NIR. Monaco has reported on its agreement with Tunisia to support clean development mechanism projects in the energy sector in order to promote foreign investment contributing to the achievement of national sustainable development goals and, in particular, to promote employment in the energy and industrial sectors. Monaco has also reported on the renewable energy used in some projects receiving Monaco's official development assistance. The ERT concludes that the information is complete and transparent.

III. Conclusions and recommendations

80. Monaco made its annual submission on 9 March 2011 (CRF tables) and 18 March 2011 (NIR). The annual submission contains the GHG inventory (comprising CRF tables and an NIR) and supplementary information under Article 7, paragraph 1, of the Kyoto Protocol, including information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, Kyoto Protocol units, changes to the national system and the national registry and the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. This is in line with decision 15/CMP.1.

81. The ERT concludes that the inventory submission of Monaco has been prepared and reported in accordance with the UNFCCC reporting guidelines. The inventory submission is generally complete and Monaco has submitted a complete set of CRF tables for the years 1990–2009 and an NIR; these are complete in terms of geographical coverage, years, gases and sectors, and generally complete in terms of categories. Monaco has improved the completeness of its inventory submission by providing estimates for fertilizer use in parks and gardens, which had previously not been estimated. The use of the notation key "NE" has decreased (see para. 9 above).

82. The submission of information required under Article 7, paragraph 1, of the Kyoto Protocol has been prepared and reported in accordance with decision 15/CMP.1.

83. Monaco'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 reporting of incinerated biomass (see paras. 52 and 58 above) and the allocation of emissions from waste incineration (see para. 67 above).

84. Monaco has performed recalculations for the inventory between the 2010 and 2011 submissions in response to recommendations of the 2010 annual review report and

following changes in AD. The impact of these recalculations on the national totals is an increase in estimated total emissions for 1990 (of 0.1 per cent) and for 2008 (of 0.1 per cent). The main recalculations took place in the following sectors/categories:

(a) LULUCF sector (N_2O from use of fertilizer in parks and gardens; see para. 60 above);

(b) Waste sector (protein consumption per capita; see para. 62 above).

85. Monaco has reported all activities under Article 3, paragraph 3, of the Kyoto Protocol as "NA" because there are no areas in its territory that meet the adopted definition of forest. Monaco did not elect any activities under Article 3, paragraph 4, of the Kyoto Protocol for the first commitment period.

86. Monaco has not reported information on its accounting of Kyoto Protocol units in the required SEF tables, as required by decisions 14/CMP.1 and in accordance with chapter I.E of the annex to decision 15/CMP.1. However, Monaco is not required to report on its accounting of Kyoto Protocol units in accordance with section I.E of the annex to decision 15/CMP.1, because its national registry has not yet transferred or acquired any Kyoto Protocol units.

87. The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1.

88. The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant CMP decisions. However, the ERT identified that the national registry has not fulfilled the requirements regarding the public availability of information in accordance with section II.E of the annex to decision 13/CMP.1. The ERT noted that Monaco indicated that, once the national registry will be online, the information will be made publically available and will be accessible via the user interface.

89. Monaco has reported information under chapter I.H of the annex to decision 15/CMP.1, "Minimization of adverse impacts in accordance with Article 3, paragraph 14", as part of its 2011 annual submission (see para. 79 above). The ERT concludes that the information is complete and transparent.

90. The ERT identifies the following cross-cutting issues for improvement in Monaco's next annual submission:

(a) The reporting of the categories considered in the key category analysis (see para. 12 above);

(b) The use of a 95 per cent confidence interval when reporting the uncertainty analysis (see para. 14 above) and the use of the result of this analysis to improve the inventory (see para. 15 above);

(c) The reporting of the planned improvements, including those in response to the review process (see para. 21 above);

(d) The consistency of the information between CRF summary table 3 and the NIR (see para. 26 above);

(e) The reporting of additional information and explanations in the sectoral chapters of the NIR on the selection of methodologies, EFs used, sources of AD and sector-specific QA/QC and verification measures.

91. In the course of the review, the ERT formulated a number of recommendations relating to the energy, industrial processes, agriculture and LULUCF sectors regarding the

methodologies to estimate emissions and the transparency of the information presented in Monaco's annual submission. The key recommendations are that Monaco:

(a) Increase the consistency of the information on:

(i) MSW incinerated between CRF tables 1.A(b) and 1.A(c) (see para. 27 above);

(ii) N_2O emissions from the use of nitrogen fertilizers in park and gardens (see para. 60 above);

(iii) Emissions and removals from activities under Article 3, paragraph 3, of the Kyoto Protocol (see para. 70 above);

(b) Review the information reported for lubricants (see para. 31 above);

(c) Increase the transparency of the information on international aviation bunkers (see para. 30 above), public electricity and heat production (MSW used as fuel) (see paras. 32 and 33 above), the residential and commercial/institutional categories (see paras. 34 and 35 above) and road transportation (see paras. 36–38 above);

(d) Increase the transparency of the information on emissions from refrigeration and air-conditioning equipment (see paras. 41–43 above) and electrical equipment (see para. 44 above);

(e) Review the notation keys in the agriculture sector (see para. 47 above);

(f) Improve the transparency and the consistency of the information on the incineration of "biowaste" from parks and gardens in the LULUCF sector, including the allocation of emissions (see paras. 52 and 58 above);

(g) Report the uncertainty for the LULUCF sector (see para. 54 above);

(h) Progress with the estimation of crown projections based on aerial photographs in place of the current method based on tree counting (see para. 56 above);

(i) Report the carbon stock changes in both dead biomass and mineral soils (see para. 59 above);

(j) Increase the transparency of the information on the methodologies and parameters used to estimate emissions from sludge and waste incineration (see para. 63 above) and on wastewater treatment (see para. 66 above);

(k) Review the allocation of emissions from incineration of MSW and sludge (see para. 67 above);

(l) Fulfil the requirements for national registries regarding the public availability of information (see para. 75 above);

(m) Revise the calculation of the commitment period reserve (see para. 76 above).

IV. Questions of implementation

92. No questions of implementation were identified by the ERT during the review.

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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B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Philippe Antognelli (Ministry of the Environment).

Annex II

Acronyms and abbreviations

AD	activity data
CH_4	methane
CITEPA	Centre Interprofessionnel Technique d'Etudes de la Pollution Atmosphérique
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CRF	common reporting format
EF	emission factor
ERT	expert review team
F-gas	fluorinated gas
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 without GHG emissions and removals from LULUCF
HFCs	hydrofluorocarbons
IE	included elsewhere
IPCC	Intergovernmental Panel on Climate Change
KP-LULUCF	land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
kg	kilogram (1 kg = 1,000 grams)
LULUCF	land use, land-use change and forestry
MSW	municipal solid waste
NA	not applicable
NE	not estimated
NO	not occurring
N_2O	nitrous oxide
NIR	national inventory report
PFCs	perfluorocarbons
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
SMEG	Société Monégasque de l'Electricité et du Gaz
t	tonne
TJ	terajoule
UNFCCC	United Nations Framework Convention on Climate Change