



COMPLIANCE COMMITTEE

CC/ERT/ARR/2010/19
19 March 2010

**Report of the individual review of the annual submission of
Monaco submitted in 2009**

Note by the secretariat

The report of the individual review of the annual submission of Monaco submitted in 2009 was published on 17 March 2010. 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/2009/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.



**UNITED
NATIONS**



**Framework Convention
on Climate Change**

Distr.
GENERAL

FCCC/ARR/2009/MCO
17 March 2010

ENGLISH ONLY

**Report of the individual review of the annual submission of Monaco
submitted in 2009***

* In the symbol for this document, 2009 refers to the year in which the inventory was submitted, and not to the year of publication.

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I. Overview

A. Introduction

1. This report covers the centralized review of the 2009 annual submissions of Monaco, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 31 August to 5 September 2009 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Mr. Newton Paciornik (Brazil) and Mr. Tinus Pulles (Netherlands); energy – Mr. Gebru J. Endalew (Ethiopia), Ms. Erasmia Kitou (European Union) and Mr. Hongwei Yang (China); industrial processes – Mr. Menouer Boughedaoui (Algeria) and Mr. Jos Olivier (Netherlands); agriculture – Mr. Paul Duffy (Ireland) and Mr. Jacques Kouazounde (Benin); land use, land-use change and forestry (LULUCF) – Mr. Sandro Federici (Italy) and Mr. Motoshi Hiratsuka (Japan); and waste – Ms. Melissa Weitz (United States of America) and Ms. Kyoko Miwa (Japan). Mr. Duffy and Mr. Yang were the lead reviewers. The review was coordinated by Mr. Vitor Gois Ferreira (UNFCCC secretariat).

2. In accordance with the “Guidelines for review under Article 8 of the Kyoto Protocol” (decision 22/CMP.1), a draft version of this report was communicated to the Government of Monaco, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

B. Emission profiles and trends

3. In 2007, the main greenhouse gas (GHG) in Monaco was carbon dioxide (CO₂), accounting for 94.2 per cent of total GHG emissions¹ expressed in CO₂ eq, followed by nitrous oxide (N₂O) (3.1 per cent), and methane (CH₄) (0.6 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) collectively accounted for 2.1 per cent of the overall GHG emissions in the country. The energy sector accounted for 96.8 per cent of the total GHG emissions, followed by industrial processes (2.1 per cent), and waste (1.1 per cent). The agriculture sector is reported as not occurring (“NO”) and not applicable (“NA”), and solvent and other product use as not estimated (“NE”). Total GHG emissions amounted to 97.78 Gg CO₂ eq and decreased by 9.3 per cent between the base year² and 2007.

4. Tables 1 and 2 show total GHG emissions by gas and by sector, respectively. Table 1 includes emissions from Annex A sources only and excludes 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.

² “Base year” refers to the base year under the Kyoto Protocol, which is 1990 for CO₂, CH₄ and N₂O, and 1995 for HFCs, PFCs and SF₆. The base year emissions includes emissions from Annex A sources only.

Table 1. Total greenhouse gas emissions by gas, 1990–2007^a

Greenhouse gas	Gg CO ₂ eq							Change base year–2007 (%)
	Base year ^b	1990	1995	2000	2005	2006	2007	
CO ₂	105.37	105.37	111.81	112.77	98.59	89.28	92.06	–12.6
CH ₄	0.65	0.65	0.79	0.80	0.62	0.52	0.61	–5.1
N ₂ O	1.64	1.64	2.63	3.29	3.02	2.79	3.07	87.5
HFCs	0.01	NA, NE, NO	0.01	2.60	1.77	0.61	1.89	25 103.6
PFCs	NA, NE, NO	NA, NE, NO	NA, NE, NO	NA, NE, NO	0.06	0.07	0.06	NA
SF ₆	0.10	0.16	0.10	0.10	0.08	0.08	0.08	–15.3

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

^a Total GHG emissions includes emissions from Annex A sources only (exclude emissions/removals from the LULUCF sector).

^b Base year refers to the base year under the Kyoto Protocol, which is 1990 for CO₂, CH₄ and N₂O, and 1995 for HFCs, PFCs and SF₆. The base year emissions include emissions from Annex A sources only.

Table 2. Greenhouse gas emissions by sector, 1990–2007

Sector	Gg CO ₂ eq							Change base year–2007 (%)
	Base year ^a	1990	1995	2000	2005	2006	2007	
Energy	107.01	107.01	114.23	115.80	101.18	91.60	94.65	–11.6
Industrial processes	0.10	0.16	0.10	2.69	1.91	0.76	2.04	1 854.9
Solvent and other product use	NE	NE	NE	NE	NE	NE	NE	NE
Agriculture	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA
LULUCF	NA	–0.03	–0.04	–0.04	–0.04	–0.04	–0.04	NA
Waste	0.64	0.64	1.00	1.05	1.05	0.98	1.09	70.2
Other	NA	NA	NA	NA	NA	NA	NA	NA
Total (with LULUCF)	NA	107.78	115.29	119.51	104.10	93.31	97.74	NA
Total (without LULUCF)	107.76	107.81	115.33	119.55	104.14	93.35	97.78	–9.3

Abbreviations: LULUCF = land use, land-use change and forestry, NA = not applicable, NE = not estimated, NO = not occurring.

^a Base year refers to the base year under the Kyoto Protocol, which is 1990 for CO₂, CH₄ and N₂O, and 1995 for HFCs, PFCs and SF₆. The base year emissions include emissions from Annex A sources only.

C. Annual submission and other sources of information

5. The 2009 annual inventory submission was submitted on 9 April 2009; it contains a complete set of common reporting format (CRF) tables for the period 1990–2007, and a national inventory report (NIR). Monaco did not submit information required under Article 7, paragraph 1, of the Kyoto Protocol. The standard electronic format (SEF) tables were not submitted as the registry has not yet transferred or acquired Kyoto Protocol units. The annual submission was submitted in accordance with decision 15/CMP.1. The Party indicated that the 2009 submission is also its voluntary submission under the Kyoto Protocol.

6. In addition, the expert review team (ERT) used the Standard Independent Assessment Report (SIAR), Parts I and II, to review information on the national registry.³

7. During the review, Monaco provided the ERT with additional information. The full list of materials used during the review is provided in the annex to this report.

Completeness of the inventory

8. The inventory of Monaco covers all sectors relevant to the country and is complete in terms of years and gases, and reports information for most categories. The completeness of the inventory has not significantly improved since the previous submission. The ERT notes that the Party reported as “NE” for the following categories and subcategories for which methodologies are available in the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines), the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) or IPCC *Good Practice Guidance for Land Use, Land-use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF): HFC and PFC emissions from aerosols/metered dose inhalers, solvents, and other applications using ozone depleting substance (ODS) substitutes; and CO₂ from net carbon changes in dead organic matter (DOM) and soil organic carbon (SOC) in settlements remaining settlements (gardens and parks).

In addition, the ERT notes that Monaco reports emissions as “NO” in the CRF tables but as “NE” in the NIR for two categories: CO₂ and CH₄ fugitive emissions from natural gas, and direct N₂O emissions from nitrogen (N) fertilization of forest land and other (gardens and parks). The Party is also reporting emissions as “NE” for the following categories: CO₂ emissions from asphalt roofing and road paving with asphalt; SF₆ from aerosols/metered dose inhalers, solvents, other applications of ODS substitutes; HFC and PFC from electrical equipment; CO₂ from chemical products, manufacture and processing; C₂O from paint application, degreasing and dry cleaning, chemical products, manufacture and processing, and other (wood preserving and printing industry); and N₂O from degreasing and dry cleaning, use for anaesthesia, from fire extinguishers, aerosol cans, and other (wood preserving and printing industry).

9. The ERT notes that emissions from categories reported as “NE” are likely to represent only a small contribution towards the total GHG emissions and understands the Party’s justification that activity data (AD) are missing and difficult to obtain. The ERT notes, however, that the NIR includes a section devoted to discussion and justification of the categories reported as “NE” and commends the Party for

³ The SIAR, Parts I and II, is prepared by an independent assessor in line with decision 16/CP.10 (paragraphs 5(a), 6(c) and 6(k)), under the auspices of the international transaction log (ITL) 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. The SIAR is not publicly available.

this. During the review, Monaco acknowledged that more should be done to overcome these gaps in reporting, and stated that it is collaborating with the Centre Interprofessionnel Technique d'Etudes de la Pollution Atmosphérique (CITEPA)⁴ in order to improve the completeness of its future submissions. During the centralized review the Party informed the ERT of some on-going developments for the next annual submission, such as the estimate of NMVOC emissions from asphalt roofing and road paving with asphalt. The ERT encourages Monaco in these efforts to improve completeness and recommends that it prepare emission estimates especially for those categories that are known to occur within the Party and for which methodologies to estimate emissions are available in the Revised 1996 IPCC guidelines, the IPCC good practice guidance and in the IPCC good practice guidance for LULUCF. The ERT also encourages Monaco to explore approaches available in the scientific literature, to estimate emissions for categories that do not have methodologies prescribed in the Revised 1996 IPCC guidelines or in the IPCC good practice guidance, with a view to enhance further, to the extent possible, the completeness and accuracy of its inventory. The ERT recommends that the Party, when reporting emissions data for the first time for a given category, ensure that emissions data are provided for the entire inventory time-series, and that the choice of methods and emission factors (EFs) are clearly explained in the NIR.

D. Main findings

10. The inventory is generally in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. However, the ERT notes that Monaco uses IPCC tier 1 default methodology to estimate emissions for almost all categories (except road transportation and waste incineration), including for key categories. Most EFs were established on the basis of international references from IPCC CORINAIR or France (CITEPA), while the Party uses country-specific data only for the net calorific value (NCV) for incinerated wastes. The ERT acknowledges that, given Monaco's small size and the permeable nature of its borders with France, the use of EFs from its neighbouring country is justified.

11. The ERT notes that the NIR, although very concise, does cover most of the information required 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). However, the ERT notes that the transparency of the NIR could be improved by providing a more detailed discussion of the justifications to choose AD, methodologies and EFs. The ERT also notes the absence of a table of contents in the NIR, which diminishes the usability of the document.

12. Monaco has not submitted, on a voluntary basis, supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol in accordance with Part I of the annex to decision 15/CMP.1, namely information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, information on its accounting of Kyoto Protocol units, changes in the national system and in the national registry, and information on minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol. The ERT recommends that Monaco provide all the reporting of information required under Article 7, paragraph 1, of the Kyoto Protocol in its next annual submission. In response to the SIAR, Monaco explained that since its national registry had not yet transferred or acquired any Kyoto Protocol units, in accordance with section I.E of the annex to decision 15/CMP.1, no information has been reported with regard to the SEF tables.

13. The ERT concludes that the national system continues to perform its required functions as set out in the annex to decision 19/CMP.1, and no changes have been made to it.

⁴ CITEPA is responsible for preparing the emission inventory of France.

14. 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 decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).

15. In the course of the review, the ERT formulated a number of recommendations, including: increase the transparency of the NIR, and revise its structure in accordance with the requirements of the UNFCCC reporting guidelines; increase the completeness of its inventory by estimating categories currently reported as "NE" and for which there are methodologies available in the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF; prepare annual plans for the improvement of the inventory, and revise the uncertainty analysis using the 95 per cent confidence intervals.

16. The ERT encourages the Party to explore the possibility of structuring its reporting in its next annual submission following the annotated outline of the NIR, and the guidance contained therein, that can be found on the UNFCCC website.⁵

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

1. Overview

17. The ERT concluded that the national system continued to perform its required functions.

18. The NIR describes the national system for the preparation of the inventory. The Direction de l'Environnement, within the Département de l'Équipement, de l'Environnement et de l'Urbanisme, is the designated national entity with responsibility for inventory planning, preparation and management, as well as the archiving of information. Other organizations, governmental institutions and public and private companies are also involved in the inventory preparation through provision of required data.

2. Inventory planning

19. The national system of Monaco has been established in accordance with the guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol (decision 19/CMP.1). The ERT considers that the national system meets the basic mandatory requirements for implementation of the general and specific functions.

20. The Direction de l'Environnement has overall responsibility for the preparation of the inventory, including: selection of methodologies, AD and EF; collection of AD; preparation of emission estimates; key category analysis; uncertainty analysis; verification of the conformity of the inventory with the IPCC good practice guidance; implementation of the general procedures for quality control (tier 1); reporting of the NIR and the CRF tables; and the management and archiving of the inventory.

21. Data for the preparation of the inventory are collected by the Direction de l'Environnement from several private and public companies and governmental institutions, including: Société Monégasque d'Assainissement; Société Monégasque de l'Électricité et du Gaz (SMEG); Division des statistiques de la Direction de l'Expansion Economique; Direction de l'aviation civile; Compagnie des Autobus de Monaco; Société Monégasque des Eaux; Service de l'Aménagement Urbain, Mairie de Monaco, Service des Titres et Circulation, Direction du Contrôle des Concessions et des Télécommunications; l'Institut Géographique National of France; and the Service de l'Aménagement urbain. Surveys are also used to collect information from private industrial plants (consumption of halocarbons and SF₆), retailers

⁵ Available at <http://unfccc.int/files/national_reports/annex_i_ghg_inventories/reporting_requirements/application/pdf/annotated_nir_outline.pdf>

(solvent use), and the port administration of Monaco (navigation). Annex 5 to the NIR includes a detailed description of the procedures for data acquisition, with specific information for each category, and data processing.

22. Legislation (code de l'Environnement) is being developed that will provide a legal framework for the mandatory collection of data from both governmental and private institutions. The ERT commends Monaco for its efforts to strengthen the national system and recommends that Monaco report on the development of this legislation in its next annual submission.

23. The Département de l'Équipement, de l'Environnement et de l'Urbanisme submits the inventory results, including the CRF tables and the NIR, to the UNFCCC secretariat.

3. Inventory preparation

Key categories

24. Monaco has reported a tier 1 key category analysis, both level and trend assessment, as part of its 2009 submission. The key category analysis was performed in accordance with the IPCC good practice guidance. The key category analysis performed by the Party and that performed by the secretariat⁶ produced similar results. It is not clear from the information in the NIR and from the responses to the ERT during the centralized review whether the LULUCF was included in the analysis, in accordance with the IPCC good practice guidance for LULUCF, or whether it was excluded on account of its low contribution to total GHG emissions. The ERT recommends that Monaco check reporting of LULUCF categories in its next submission and revise the key category analysis, if necessary, in accordance with the IPCC good practice guidance for LULUCF.

Uncertainties

25. Monaco has reported a tier 1 uncertainty analysis in its 2009 submission, including the LULUCF sector. The overall uncertainties for 2007 was estimated as 6.93 per cent, while the trend uncertainty, from 1990 (or 1995 for HFCs, PFCs and SF₆) to 2007, was estimated as 1.78 per cent.

26. Monaco presents the uncertainties as standard deviations, rather than using the recommended 95 per cent confidence interval; the standard deviations, according to the NIR, show only around half of the uncertainty values that would be shown if the 95 per cent confidence interval was used. The ERT notes that the uncertainty analysis prepared by the Party is not in accordance with the IPCC good practice guidance, and the ERT recommends that Monaco use the 95 per cent confidence interval, as is recommended in the IPCC good practice guidance, to present uncertainties to enable a better comparison with other Parties.

27. The ERT notes that Monaco does not include procedures for using the results of the uncertainty analysis as a tool to prioritize inventory improvements. The ERT therefore recommends that Monaco use the uncertainty results to improve the inventory in its future submissions.

⁶ 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.

Recalculations and time-series consistency

28. Recalculations have been performed and reported for the all time-series. The ERT found that information on recalculations is included in CRF table 8(b), but that the NIR does not contain detailed discussions for each sector or category. The ERT noted that recalculations have been undertaken to take into account updated data on the composition of the fuel used in transport and international bunkers from 1992 to 2006. The ERT also noted that total emissions in 1990 were not recalculated (potential emissions from consumption of HFC, PFCs and SF₆ caused a decrease in total emissions, shown in CRF table 8(a), but the base year for fluorinated gases (F-gases) is 1995 and actual and potential emissions for 1995 were not recalculated), but in 2006, emissions decreased by 0.3 per cent owing to recalculations. The ERT recommends that the Party improve reporting of recalculations, and include explanations at the sector or category level, for the next annual submission.

Verification and quality assurance/quality control approaches

29. Monaco has a quality assurance/quality control (QA/QC) plan in place (included in annex 4 to the NIR), which is in accordance with the IPCC good practice guidance. The plan includes only general QC procedures (tier 1). QA measures include an external assessment of the inventory, conducted in 2005 by CITEPA. The NIR announces that CITEPA will again analyse Monaco's inventory during 2009. During the centralized review the Party confirmed that this external assessment has already taken place and will be reflected in the 2010 annual submission. The ERT commends Monaco for its efforts to improve the verification and quality assurance of the inventory, and recommends that the Party report on the results from the 2009 QA, for the next annual submission.

Transparency

30. Although the length and content of the 2009 NIR increased in comparison with that of 2008, Monaco's submission still lacks transparency, given its limited information on: references to non IPCC default EFs; explanations of the choice of methodology; assumptions on parameters used; and sources of AD. The ERT reiterates the recommendation of previous reviews that Monaco should improve the transparency of its inventory by including all this information in the NIR, and improve the descriptions at sector and category level. The ERT also recommends that Monaco include a table of contents in its NIR for the next annual submission.

4. Inventory management

31. The Direction de l'Environnement has responsibility for Monaco's archiving system and holds all disaggregated EFs, AD, and documentation on how these factors and data have been generated and aggregated for inventory preparation. Although most information is held by the expert responsible for the development of each individual sector, provisions are in place to allow all members of the inventory team to access all archives.

F. Follow-up to previous reviews

32. Monaco has made some progress in implementing the recommendations of earlier reviews within the limited human resources available to such a small country. The Party has improved some areas of the inventory, including:

- (a) Incorporation of net emissions/removals from the LULUCF sector in the uncertainty analysis;
- (b) Explanation of the main features of the QA/QC plan in the NIR.

33. The ERT notes that Monaco has not yet implemented other recommendations, the most important of which include:

- (a) Adapting the structure of the NIR to fully reflect the outline as provided in annex I to the UNFCCC reporting guidelines;
- (b) Improving transparency by including additional information on the identification of EFs used, explanations for the choice of methodologies, assumptions on parameters, and more detailed information on the sources of AD, at sector and category level.

G. Areas for further improvement

1. Identified by the Party

34. The 2009 NIR does not identify areas for improvement.

2. Identified by the expert review team

35. The ERT identifies the following cross-cutting issues for improvement:

- (a) A revision of the NIR structure is needed in order to fully reflect the requirement of the UNFCCC reporting guidelines. Monaco should include a table of contents to improve the usability of its NIR. The ERT encourages the Party to explore the possibility of structuring its reporting in accordance with the annotated outline of the NIR, and the guidance contained therein;
- (b) Greater transparency of the inventory, through the inclusion of additional information in the NIR on the identification of EFs used, improved descriptions of individual sectors and categories, explanations on the selection of methodologies, and information on the sources of AD;
- (c) The inclusion of annual plans for inventory improvement in the NIR;
- (d) The preparation of the uncertainty analysis in accordance with the IPCC good practice guidance, using the 95 per cent confidence interval;
- (e) The description of the QA/QC, including a description of the QA/QC and verification measures in relevant sections of the NIR;
- (f) The provision of estimates of emissions and removals for the categories reported as "NE", giving priority to missing categories for which methodologies are available at the Revised 1996 IPCC Guidelines, the IPCC good practice guidance or the IPCC good practice guidance for LULUCF.

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

II. Energy

A. Sector overview

37. The energy sector is the main sector in the GHG inventory of Monaco. In 2007, emissions from the energy sector amounted to 94.65 Gg CO₂ eq, or 96.8 per cent of total GHG emissions. Since 1990, emissions have decreased by 11.6 per cent. The key driver for the fall in emissions is the 34.9 per cent reduction in emissions from the residential sector, which is explained by changes in the type of fuel used

(see para. 46). Within the sector, 36.4 per cent of emissions were from transport, followed by 32.3 per cent from energy industries and 31.3 per cent from other sectors. Emissions from fuel combustion in manufacturing industries and construction and fugitive emissions are reported as “NA” or “NO” for the whole time-series.

38. For all sub-sectors and gases, Monaco reports tier 1 methodology and IPCC default EFs in CRF table summary 3. However, the ERT notes that the description of the methodology for road transportation in the NIR is consistent with the tier 2 approach, and the ERT recommends that the Party revise reporting in CRF table summary 3. The Party informed the previous ERT that it uses IPCC default EFs because the fuel composition in Monaco is not the same as that of average French fuels and the IPCC default EFs were considered as good estimators of European fuels. The ERT reiterates the recommendations made during the previous review that Monaco should consult fuel suppliers and large consumers to obtain more detailed information on the fuels used in Monaco and should review and revise fuel CO₂ EFs, for its next annual submission. The ERT also reiterates recommendations from the previous review that Monaco should improve the references for EFs and parameters that are not IPCC defaults, discuss reasons for significant trends, and improve the description of methodologies, in particular for the category road transportation.

B. Reference and sectoral approaches

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

39. For 2007, Monaco reports in CRF table 1.A(c) that CO₂ emissions estimated according to the reference approach are 31.6 per cent lower than those estimated according to the sectoral approach. However, the ERT noted that according to the information provided in the table, and if all fuel types are considered, CO₂ emissions estimated according to the reference approach (91.62 Gg CO₂) are 0.5 per cent lower than emissions estimated according to the sectoral approach (92.06 Gg CO₂). Also, the ERT noted that the difference in energy consumption between the two approaches is reported as 100 per cent, which is explained by the fact that apparent energy consumption excluding non-energy use and feedstocks is reported as “NA”. Otherwise, if the comparison is made with the reference approach before exclusion of non-energy use and feedstocks, the total energy consumption reported in the reference approach (1.42 PJ) is 0.08 per cent lower than in the sectoral approach (1.43 PJ). The ERT recommends that Monaco investigate ways to ensure that table 1.A(c) shows the correct percentage difference between the reference and sectoral approaches in its next annual submission. The ERT also recommends that Monaco report the appropriate value for the apparent energy consumption excluding non-energy use and feedstocks.

40. Monaco explains in the documentation box to CRF table 1.A(c) that the difference between the sectoral and reference approaches is due to differences in NCV and carbon EFs. The ERT reiterates recommendations from the previous review that Monaco should use the same NCV and EFs for all fuel types in the two approaches. The ERT also encourages Monaco to discuss why both the reference approach (apparent energy consumption, not excluding non-energy use and feedstocks) and the sectoral approach give very close values for same energy consumption for all years, in its NIR for the next annual submission.

41. A comparison of estimates from Monaco with international data was not possible for the review, as data for Monaco are included as part of the French submission to the International Energy Agency (IEA) and not reported separately. The ERT encourages that Monaco make efforts to submit its data independently.

2. International bunker fuels

42. In 2007, fuel consumption for international maritime navigation was estimated to be 91.2 per cent of the total fuel consumption for navigation, based on a survey conducted in 2005. The ERT recommends that Monaco repeat this survey regularly to confirm or update the percentage identified.

43. The trend in international aviation CO₂ emissions shows an overall increase and the 2007 value (3.91 Gg) is 59.7 per cent higher than the 1990 value (2.45 Gg). The following inter-annual changes have been identified as significant: 1999–2000 (15.8 per cent), 2001–2002 (–8.1 per cent) and 2003–2004 (–10.1 per cent). During the review, the Party explained that, as it is a small country with no airports, the emissions reported as international aviation result from movement of helicopters, occurring mainly between the city of Nice (France) and Monaco. As calculations are estimated using fuel sales and the annual traffic volume is highly variable, CO₂ emissions estimated for this category also show significant inter-annual variations. The ERT recommends that the Party include these explanations in its NIR for its next annual submission.

3. Feed stocks and non-energy use of fuels

44. Monaco reported emissions under feedstocks and non-energy use of fuels as “NO”. The ERT reiterates the recommendation made in the previous review report that Monaco should investigate the possibility of estimating emissions from feedstocks and non-energy use of fuels for the whole time-series, especially from the use of bitumen and lubricants in Monaco.

C. Key categories

1. Stationary combustion: liquid, gaseous and other fuels – CO₂

45. Emissions of CO₂ from municipal waste incineration with energy recovery are reported as emissions from consumption of other fuels in the category public electricity and heat production. The ERT commends Monaco for reporting emissions from incineration of municipal waste under other fuels instead of solid fuels, following the recommendations from previous reviews. Emissions from waste incineration were estimated using the IPCC tier 1 method, and IPCC default values for fossil fraction and for carbon content of the fuel. During the previous review, Monaco explained its plan to survey waste composition; the ERT reiterates supports this plan and encourages the Party to implement it as soon as possible. During the previous review Monaco explained that the decrease observed in the amount of waste incinerated in 2006 was due to the temporary closure of the incineration plant. During the centralized review, Monaco informed the ERT that the amount of waste incinerated will probably decrease in coming years as Monaco has started to separate and recycle municipal solid waste, thereby reducing the amount of waste incinerated. The ERT reiterates the recommendation made in the previous review report that, in order to improve transparency of its reporting, Monaco should include in its NIR data on the total quantity of waste incinerated and explanations of trend and inter-annual variations.

46. Emissions of CO₂ from the residential sector, which also includes emissions from the commercial/institutional sector, account for 20.4 per cent of the total CO₂ emissions from the energy sector in 2007. The trend shows an overall decrease, with a reduction in emissions of 48 per cent from 1990 to 2007, which has a significant effect on the trend of total GHG emissions. During the centralized review, Monaco clarified that the trend observed in the residential sector is due to the fact that domestic use of light fuel oil in new buildings has been forbidden since 16 September 2003 and citizens decided to change their heating systems from light fuel oil to natural gas. The ERT reiterates the recommendation made during the previous review that Monaco should investigate the possibility of obtaining separate data for the commercial/institutional sector, which are currently reported together with the residential sector, for its next annual submission.

2. Road transport: liquid fuels – CO₂ and N₂O

47. Monaco is using a tier 2 methodology to estimate emissions from road transportation, and using NCV values and EF from the Revised 1996 IPCC Guidelines and CITEPA. The trend in CO₂ emissions shows an overall decrease, as the 2007 value (31.35 Gg) is 3.0 per cent lower than the 1990 value (32.34 Gg). During the centralized review, Monaco clarified that this decrease in emissions is due to an increase in the use of public transportation, such as buses and trains, as a result of government incentives for those living in Monaco and for commuters. In 2007, emissions of N₂O from gasoline in the road transport sector accounted for 51.7 per cent of the total N₂O emissions in the energy sector. The 2007 emissions of N₂O show an increase of 499.1 per cent since 1990. This increase is caused by the high EF for passenger cars equipped with a catalytic converter (0.05 g/km). The ERT recommends that Monaco include this explanation in the NIR for the next annual submission.

48. The ERT also recommends that Monaco improve the transparency of reporting in the NIR, including the assumptions, data and sources of information for number of vehicles per category, annual kilometres travelled per vehicle, and the average litres consumed per kilometre travelled.

3. Navigation: liquid fuels – CO₂

49. Emissions of CO₂ from gas/diesel oil in the navigation sector have significantly increased; emissions are 229.4 per cent higher in 2007 than in 1990. The ERT reiterates the recommendation made during the previous review that Monaco should explain in the NIR the reasons for such a trend.

D. Non-key categories

Oil and natural gas: liquid and gaseous fuels – CH₄

50. Monaco reports fugitive emissions from its natural gas distribution system in the CRF tables as “NO”. However, the NIR states that such emissions do occur and even provides preliminary estimates, albeit less than 0.02 per cent of the overall quantity of gas distributed. The ERT notes that the Revised 1996 IPCC Guidelines indicate a minimum value of about 0.7 per cent for fugitive emissions from natural gas distribution systems and therefore reiterates the recommendation of the previous ERT that Monaco should further investigate this issue, consider data on similar systems in Europe, and provide a more detailed explanation and appropriate estimates of these emissions in its next annual inventory submission. The ERT also recommends that, in the mean time, the notation key in the CRF tables be changed from “NO” to “NE” if no estimates are provided.

III. Industrial processes and solvent and other product use

A. Sector overview

51. In 2007, emissions from the industrial process sector amounted to 2.04 Gg CO₂ eq, or 2.1 per cent of total GHG emissions and, since 1990, have increased by 1,170.1 per cent. Consumption of halocarbons and SF₆ is identified as a key category by the Party (emissions of HFC, PFC and SF₆ are added together in the analysis).

52. Under the industrial process sector Monaco reports only estimates of emissions (potential and actual emissions) for refrigeration and air conditioning equipment under the category consumption of halocarbons and SF₆. The NIR explains that most sub-sectors and categories are absent from the inventory on account of the small size of the territory and the lack of large industrial plants. Monaco uses the notation key “NE” to report emissions of: CO₂ from asphalt roofing and road paving with asphalt; HFC and PFC emissions from aerosols/metered dose inhalers, solvents, and other applications using ODS substitutes; SF₆ from aerosols/metered dose inhalers, solvents, other applications of ODS

substitutes; and HFC and PFC from electrical equipment. In its NIR, Monaco discusses the reasons for not having provided emission estimates for individual categories, but from this information it is not clear whether emissions are not estimated or included elsewhere (i.e. an issue of disaggregation). Monaco does not indicate in the NIR any plans to estimate emissions for all missing subcategories, but during the review the Party informed the ERT that it plans to contract CITEPA to improve the quality of the inventory. The ERT encourages Monaco in its efforts to improve completeness and recommends that it prepare emission estimates especially for those categories that are known to occur within the Party and for which methodologies to estimate emissions are available in the Revised 1996 IPCC guidelines and the IPCC good practice guidance.

53. Emissions of HFCs, PFCs and SF₆ from fire extinguishers are reported using the notation key “NO”. During the review, the Party explained that an annual survey by the Direction de l’Environnement, which collected data for 2005 and 2007 directly from users, concluded that companies providing fire extinguishers in Monaco do not use F-gases. The ERT recommends that the Party provide explanations in this its next annual submission.

54. No emission estimates of direct GHG are provided for the sector solvent and other products use, and, under this sector, the Party only reports emission estimates of non-methane volatile organic compounds (NMVOC) from the printing industry and wood preservation, both included under sub-category other (3.D.5). Monaco reports “NE” for categories: CO₂ from chemical products, manufacture and processing; CO₂ from paint application, degreasing and dry cleaning, chemical products, manufacture and processing, and other (wood preserving and printing industry); and N₂O from degreasing and dry cleaning, use for anaesthesia, from fire extinguishers, aerosol cans, and other (wood preserving and printing industry). Responding to the ERT during the centralized review, Monaco explained that it is unable to report such estimates because EFs are “NA” in the Revised 1996 IPCC guidelines and in the IPCC good practice guidance. The ERT encourages Monaco to explore approaches available in the scientific literature, to estimate emissions for categories that do not have methodologies prescribed in the Revised 1996 IPCC guidelines nor the IPCC good practice guidance, with a view to enhance further, to the extent possible, the completeness and accuracy of its inventory.

B. Key categories

Consumption of halocarbons and SF₆ – HFCs

55. Monaco prepared the inventory of emissions of HFCs and SF₆ by conducting a census. The results from this census (carried out for the years 2001, 2002 and 2003) show that Monaco does not produce or destroy these gases (although they are collected and destroyed in France) and that HFCs are only consumed in the refrigeration and air conditioning industries and SF₆ is only consumed in electricity production (Société Monégasque de l’Electricité et du Gaz (SMEG)). The ERT encourages the Party to continue efforts to update the time series and to provide updated information on this in its next annual submission.

56. Actual emissions of HFCs emissions were estimated for all years from 1995 to 2007. However, the time-series is very unstable and the following inter-annual significant changes have been identified for all years: 1995–1996 (5,259.3 per cent), 1996–1997 (–97.3 per cent), 1997–1998 (2,078.9 per cent), 1998–1999 (–50.8 per cent), 1999–2000 (2,130.8 per cent), 2000–2001 (–85.9 per cent), 2001–2002 (142.8 per cent), 2005–2006 (–65.6 per cent) and 2006–2007 (212.2 per cent). These large inter-annual variations are not commented on or explained in the NIR. During the centralized review, the Party explained that these fluctuations reflect both the quantity of gases purchased annually by local companies supplying air conditioning equipment (whose information is used to prepare the inventory) and the small size of Monaco. During the centralized review the Party informed the ERT of its intention to include these explanations in the NIR of its next annual submission, and the ERT commends the Party for that.

IV. Agriculture

Sector overview

57. As stated in the NIR, the absence of livestock production, pasture management and exploitation of agricultural soils in Monaco is a basis for considering sectoral GHG emissions as negligible. Monaco reports all categories as “NO” and “NA”.

V. Land use, land-use change and forestry

A. Sector overview

58. In 2007, net removals from the LULUCF sector amounted to 0.04 Gg CO₂ eq. Since base year, net removals have increased by 12.6 per cent.

59. Monaco reports only emission/removals from the category settlements remaining settlements (parks and gardens) since it is the only category present within the national territory. In addition, Monaco only reports emissions/removals for living biomass pool, and reports as “NE” net carbon stock change in DOM, and net carbon stock change in soils. According to the NIR, 43.82 ha of national territory were occupied by public and private gardens in 2007. Most trees (85 per cent) are older than 20 years and are considered mature and, for these, gains and losses are similar and net changes in the carbon pools are assumed to be close to zero. Monaco estimates net removals for the remaining 15 per cent of trees younger than 20 years.

60. According to the NIR, N fertilizers are used in parks, and emissions of N₂O were estimated at 0.000087 Gg. The ERT noted that these emissions have not been reported in the CRF tables, and the notation key “NE” is given instead. The ERT recommends the Party to revise this inconsistency and to report estimated emissions in the CRF tables as well as the NIR in its next annual submission.

B. Non-key categories

Settlements remaining settlements – CO₂

61. In the CRF tables, for carbon stock change in living biomass pool Monaco reports values only for net gains and uses the notation key “NA” to report losses. Although information reported under the LULUCF sector in the NIR is not sufficient enough for the ERT to assess fully the method and data used to estimate carbon stock change, the ERT did note that the IPCC default methodology used by Monaco (equation 3a.4.2 of the IPCC good practice guidance for LULUCF), would allow gains and losses to be reported separately. The ERT recommends that the Party, in its next annual submission, report gains and losses of living biomass separately and include all necessary data and methodological descriptions in order to increase transparency and allow for the replication of calculations.

62. The Party reports as “NE” net carbon stock changes in DOM and SOC in settlements remaining settlements (gardens and parks). The ERT recommends that the Party prepare net emissions/removals estimates for these pools in accordance with the IPCC good practice guidance for LULUCF, for the next annual submission.

VI. Waste

A. Sector overview

63. In 2007, emissions from the waste sector amounted to 1.09 Gg CO₂ eq, or 1.1 per cent of total GHG emissions. Since 1990, emissions have increased by 70.2 per cent. The key driver for the rise in emissions is waste incineration, which started in 1991. Within the sector, 65.6 per cent of the emissions

were from domestic and commercial wastewater handling (only N₂O emissions are reported), and the remaining 34.4 per cent were CH₄ and N₂O emissions from waste incineration.

64. Generally, transparency is lacking in the NIR as AD and methodological details are not provided, in particular explanations and references to country-specific parameters (e.g. protein consumption and water content of incinerated sludge). Responding to the ERT during the centralized review, Monaco stated that it does not estimate CH₄ emissions from anaerobic wastewater treatment (these emissions are reported as “NO”), as only 10 per cent of wastewater is treated anaerobically in the country. The ERT suggests that, in order to improve completeness, Monaco estimate CH₄ emissions from anaerobic wastewater treatment.

B. Non-key categories

1. Wastewater handling – N₂O

65. Monaco reports N₂O from wastewater treatment in the CRF tables but does not provide sufficient information on methodology or data in its NIR. The values for protein intake reported in the CRF tables are constant for the whole period 1990–2007. The ERT recommends that Monaco investigate updating protein values. The ERT reiterates the recommendation from the previous review that Monaco should provide a more detailed description on this category in its next annual submission.

2. Waste incineration – CH₄ and N₂O

66. Monaco reports both CH₄ and N₂O from sludge incineration in the CRF tables, but does not report sufficient information on methodology or data in its NIR. Other waste incineration is associated with energy and reported in the energy section. The waste incineration emissions of Monaco fluctuate over the time series and the following inter-annual changes have been identified as significant: 1990–1991 (34.4 per cent), 1992–1993 (10.5 per cent), 2002–2003 (3.7 per cent), 2004–2005 (–4.3 per cent), 2005–2006 (–5.3 per cent), 2006–2007 (9.5 per cent). Monaco provided information on this fluctuation during the centralized review and the ERT recommends that Monaco include this information in its next NIR. The ERT also reiterates the recommendation from the previous review that Monaco should provide a more detailed description on this category in its next annual submission.

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

A. Information on Kyoto Protocol units

1. Standard electronic format and reports from the national registry

67. Monaco has not reported information on its accounting of Kyoto Protocol units in the appropriate SEF tables, as required by decisions 15/CMP.1 and 14/CMP.1, since the national registry of Monaco has not yet transferred or acquired Kyoto Protocol Units. The ERT took note of the SIAR, which was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10.

2. National registry

68. The ERT took note of the SIAR and its finding that the national registry continues to perform the functions set out in the annex to decision 5/CMP.1 and the annex to decision 13/CMP.1 and continues to adhere to the technical standards for data exchange contained in decisions 16/CP.10 and 12/CMP.1. The national registry has adequate security, data safeguard and disaster recovery measures in place and its operational performance is adequate.

69. The ERT notes that the SIAR recommends that Monaco enhance, by 31 December 2009, the availability of public information referred to in paragraphs 45–48 of the annex to decision 13/CMP.1, and report, in its next annual submission, on any changes to that public information.

3. Calculation of commitment period reserve

70. Monaco has not reported its commitment period reserve in its 2009 annual submission. In response to questions raised by the ERT during the centralized review the Party reported its commitment period reserve to be 446,110 t CO₂ eq based on the assigned amount of 495,678 t CO₂ eq from the 2007 inventory. The ERT disagrees with this figure; its calculation of the commitment period reserve is 445,699 t CO₂ eq. based on an assigned amount of 495,221 t CO₂ eq. as reported in the initial report review of Monaco⁷. The ERT recommends that Monaco include detailed information on its commitment period reserve in its next annual submission.

B. Changes to the national system

71. Monaco has not reported on changes in its national system since the previous annual submission. The ERT concluded that, taking into account the information contained in the NIR from the 2009 annual submission and that of the 2008 annual submission, no changes to the national system have occurred. The ERT recommends that the Party, in its next annual submission, report whether or not there have been any changes to the national system.

C. Changes to the national registry

72. Monaco did not report on changes in its national registry since the previous annual submission. The ERT concluded that the Party's national registry meets the requirements 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. The ERT recommends that, in its next annual submission, Monaco report any change(s) in its national registry in accordance with section I.G of the annex to decision 15/CMP.1.

VIII. Conclusions and recommendations

73. Monaco made its annual submission on 9 April 2009. The Party indicated that it is also its voluntary submission under the Kyoto Protocol. The annual submission contains the GHG inventory (comprising CRF tables and an NIR). Monaco did not submit on a voluntary basis information required under Article 7, paragraph 1, of the Kyoto Protocol. The SEF tables were not submitted as the registry has not yet transferred or acquired Kyoto Protocol units. The ERT recommends that the Party submit supplementary information under Article 7, paragraph 1, of the Kyoto Protocol as required by decision 15/CMP.1 in its next annual submission. The ERT recommends that Monaco revise the calculations of the commitment period reserve and include details on its calculation in the NIR of the next annual submission.

74. The inventory is generally in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF; although the ERT notes that the methodological level is generally of low complexity (generalized use of tier 1 methodologies).

75. The ERT concludes that the inventory submission of Monaco has been generally prepared and reported in accordance with the UNFCCC reporting guidelines. The inventory of Monaco covers all sectors relevant to the country and is complete in terms of years and gases, and reports information for most categories. The Party has submitted a complete set of CRF tables. The NIR covers most

⁷ FCCC/IRR/2007/MCO.

information required under the UNFCCC reporting guidelines, but the ERT notes that the transparency of the NIR could be improved by providing a more detailed discussion of the justifications to choose activity data, methodologies and EFs. The ERT also notes the absence of a table of contents in the NIR, which diminishes the usability of the document.

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

77. The national registry continues to meet the requirements 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, Monaco should make account information publicly available, in accordance with paragraph 45 of the annex to 13/CMP.1.

78. In the course of the review, the ERT formulated a number of recommendations⁸ relating to the completeness of the annual submission and transparency of the information presented by Monaco. The key recommendations are that Monaco:

- (a) Revise the structure of the NIR to fully reflect the requirements of the UNFCCC reporting guidelines, and explore the possibility of structuring it following the annotated outline of the NIR;
- (b) Improve transparency of reporting through the inclusion of additional information in the NIR on the identification of EFs used, improved descriptions of individual sectors, explanations on the selection of methodologies, and information on the sources of AD;
- (c) Prepare and report an annual plan for inventory improvement;
- (d) The preparation of the uncertainty analysis in accordance with the IPCC good practice guidance, using the 95 per cent confidence interval;
- (e) Include a description of the QA/QC and verification measures in relevant sections of the NIR;
- (f) Provide estimates of emissions/removals for the categories currently reported as “NE”, giving priority to missing categories for which the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF provide methodologies for their estimation.

IX. Questions of implementation

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

⁸ For a complete list of recommendations, the relevant chapters of this report should be consulted.

Annex I

Documents and information used during the review

A. Reference documents

Intergovernmental Panel on Climate Change. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <<http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.html>>.

Intergovernmental Panel on Climate Change. *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. Available at <<http://www.ipcc-ggip.iges.or.jp/public/gp/english/>>.

Intergovernmental Panel on Climate Change. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. Available at <<http://www.ipcc-nggip.iges.or.jp/public/gp/lulucf/gp/lulucf.html>>.

“Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories”. FCCC/SBSTA/2006/9. Available at <<http://unfccc.int/resource/docs/2006/sbsta/eng/09.pdf>>.

“Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention”. FCCC/CP/2002/8. Available at <<http://unfccc.int/resource/docs/cop8/08.pdf>>.

“Guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol”. Decision 19/CMP.1. Available at <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=14>>.

“Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol”. Decision 15/CMP.1. Available at <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>>.

“Guidelines for review under Article 8 of the Kyoto Protocol”. Decision 22/CMP.1. Available at <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>>.

Status report for Monaco 2009. Available at <<http://unfccc.int/resource/docs/2009/asr/mco.pdf>>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2009. Available at <<http://unfccc.int/resource/webdocs/sai/2009.pdf>>.

FCCC/ARR/2008/MCO. Report of the individual review of the greenhouse gas inventory of Monaco submitted in 2007 and 2008. Available at <<http://unfccc.int/resource/docs/2009/arr/mco.pdf>>.

UNFCCC. *Standard Independent Assessment Report*, Parts I and II. Unpublished document.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr Bastien Nicaise (Département des Relations Extérieures), including additional material on the methodology and assumptions used.

Annex II**Acronyms and abbreviations**

AD	activity data	ITL	international transaction log
CH ₄	methane	LULUCF	land use, land-use change and forestry
CO ₂	carbon dioxide	NA	not applicable
CO ₂ eq	carbon dioxide equivalent	NE	not estimated
CRF	common reporting format	NCV	net calorific value
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol	NMVOC	non-methane volatile organic compounds
DOM	dead organic matter	NO	not occurring
EF	emission factor	N ₂ O	nitrous oxide
ERT	expert review team	NIR	national inventory report
F-gas	fluorinated gas	ODS	ozone depleting substances
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	PFCs	perfluorocarbons
HFCs	hydrofluorocarbons	QA/QC	quality assurance/quality control
IEA	International Energy Agency	SEF	standard electronic format
IPCC	Intergovernmental Panel on Climate Change	SF ₆	sulphur hexafluoride
		SIAR	Standard Independent Assessment Report
		SOC	soil organic carbon
		UNFCCC	United Nations Framework Convention on Climate Change
