



**UNITED  
NATIONS**

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**Framework Convention  
on Climate Change**

Distr.  
GENERAL

FCCC/ARR/2005/MCO  
18 January 2006

ENGLISH ONLY

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**Report of the individual review of the greenhouse gas inventory of  
Monaco submitted in 2005\***

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\* In the symbol for this document, 2005 refers to the year in which the inventory was submitted, and not to the year of publication.

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## I. Executive summary

1. This report covers the in-country review of the 2005 greenhouse gas (GHG) inventory submission<sup>1</sup> of Monaco, coordinated by the United Nations Framework Convention on Climate Change (UNFCCC) secretariat, in accordance with decision 19/CP.8. The review took place from 26 to 28 September 2005 in Monaco, and was conducted by the following team of nominated experts from the roster of experts: Mr. Mario Contaldi from Italy (for General Issues as well as the Energy and Industrial Processes sectors) and Mr. Sabin Guendehou from Benin (for the Waste and Land Use, Land-use Change and Forestry (LULUCF) sectors). Both experts were lead reviewers. The review was coordinated by Ms. Rocio Lichte (UNFCCC secretariat).

2. In accordance with the "Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention", a draft version of this report was communicated to the Government of Monaco, which provided comments that were considered and incorporated, as appropriate, in this final version of the report.

3. In 2003, the most important GHG in Monaco was carbon dioxide (CO<sub>2</sub>), which accounted for 96.7 per cent of total<sup>2</sup> national GHG emissions, followed by nitrous oxide (N<sub>2</sub>O), 2.5 per cent, and methane (CH<sub>4</sub>), 0.6 per cent. Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF<sub>6</sub>) (the fluorinated gases (F-gases)), taken together, accounted for 0.3 per cent of GHG emissions. However, this contribution was calculated on the basis of potential emissions, and thus might appear too high compared to countries that calculate F-gases on the basis of actual emissions. The Energy sector accounted for 98.9 per cent of total GHG emissions, followed by Waste, 0.8 per cent, and Industrial Processes, 0.3 per cent (the F-gases). Monaco has no agriculture or heavy industry.

4. Total GHG emissions in Monaco increased by 38.1 per cent in 1990–2003, to 133.2 Gg CO<sub>2</sub> equivalent. In the absence of a common reporting format (CRF) for 1990–2000 with detailed data for those years, trend analysis was only possible at the level of aggregate emission estimates. Most of the increase was registered between 1990 and 1992 (+23.9 per cent); thereafter the trends were in line with other European countries. Monaco attributed this large increase to climatic reasons and to the substantial amount of heating fuel recorded as being used in 1990–1991 but which was actually purchased in neighbouring France. In the period 1990–2003, the residential/commercial sector showed the largest increase in GHG emissions (in CO<sub>2</sub> equivalent), 59 per cent, followed by transport, about 35 per cent (tables 1 and 2).

5. Monaco is a small country (two square kilometres), a coastal city-state with 32,000 inhabitants. Monaco's border with France is unmarked, and the city of Monaco is embraced by four French municipalities. A large proportion of the people who work in Monaco live in France (60 per cent) or in Italy (10 per cent). These specific circumstances, including the free flow of goods and services between France and Monaco, add uncertainty to the estimates of fuel consumption in the country, because the registered quantities of fuels sold in the country reflect only partially the effective use of those fuels.

6. Monaco's 2003 inventory is fairly complete in that it covers almost all relevant sources of emissions existing in the country, as well as estimates of removals. Additional efforts are needed to report the full time series in the CRF tables (CRF tables have so far been provided only for the years 2001, 2002 and 2003) to more accurately discern the split between domestic and international uses of marine fuels, to improve some emission factors (EFs), in particular those relating to transport fuels, and to improve the CO<sub>2</sub> emissions estimate from the incineration of waste used as fuel.

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<sup>1</sup> The 2005 submission covers the inventory for the year 2003 including summary emissions data for the entire time series from the base year 1990.

<sup>2</sup> In this report, the term total emissions refers to the aggregated national GHG emissions expressed in terms of CO<sub>2</sub> equivalent excluding LULUCF, unless otherwise specified.

7. Although the estimation methodologies and data used were presented in a transparent manner during the review, the transparency and comprehensiveness of the national inventory report (NIR) should be further improved by including the additional information available and distributed during the review, i.e. more precise descriptions of methodologies, EFs and data used to estimate GHG emissions and removals. The following further actions are also needed: undertake a key-category analysis, perform quantitative estimates of uncertainty, establish and implement quality assurance/quality control (QA/QC) procedures in line with the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance), and prepare an NIR that is fully consistent with the requirements of 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 revised UNFCCC reporting guidelines).

8. Monaco improved its inventory after the previous review (i.e. the review of the 2004 inventory submission of Monaco, conducted as a centralized review in October 2004). The major changes included: exclusion of aviation fuel from helicopters and town bus fuel, as these are not sold in the country, and inclusion of fossil CO<sub>2</sub> emissions from incineration of municipal and industrial solid wastes (emissions from the fossil fraction of the waste). As a result, CO<sub>2</sub> emissions from aviation fuel no longer constitute a key category, and fossil CO<sub>2</sub> emissions from waste incineration now make up a new key category.

**Table 1. Greenhouse gas emissions by gas, 1990–2003**

GHG emissions	Gg CO <sub>2</sub> equivalent														Change 1990–2003 (%)
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	
CO <sub>2</sub> (with LULUCF)	94.2	110.1	116.6	117.7	119.7	116.2	121.7	121.4	116.7	124.5	126.0	131.1	127.1	128.8	36.8
CO <sub>2</sub> (without LULUCF)	94.2	110.1	116.6	117.7	119.7	116.2	121.7	121.4	116.7	124.5	126.0	131.1	127.1	128.8	36.8
CH <sub>4</sub>	0.6	0.7	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.7	20.8
N <sub>2</sub> O	1.6	1.9	2.0	2.3	2.5	2.7	2.9	3.1	3.1	3.3	3.4	3.5	3.4	3.3	103.9
HFCs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1	0.1	n.a.
PFCs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	n.a.
SF <sub>6</sub>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	n.a.
<b>Total (with CO<sub>2</sub> from LULUCF)</b>	<b>96.4</b>	<b>112.7</b>	<b>119.4</b>	<b>120.8</b>	<b>123.1</b>	<b>119.7</b>	<b>125.4</b>	<b>125.4</b>	<b>120.7</b>	<b>128.6</b>	<b>130.2</b>	<b>136.2</b>	<b>131.5</b>	<b>133.2</b>	38.1
<b>Total (without CO<sub>2</sub> from LULUCF)</b>	<b>96.4</b>	<b>112.7</b>	<b>119.4</b>	<b>120.8</b>	<b>123.1</b>	<b>119.7</b>	<b>125.4</b>	<b>125.4</b>	<b>120.7</b>	<b>128.6</b>	<b>130.2</b>	<b>136.2</b>	<b>131.5</b>	<b>133.2</b>	38.1

LULUCF = Land Use, Land-use Change and Forestry.  
n.a.: not applicable

**Table 2. Greenhouse gas emissions by sector, 1990–2003**

Sectors	Gg CO <sub>2</sub> equivalent														Change 1990–2003 (%)
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	
Energy	95.80	111.85	118.48	119.81	122.08	118.68	124.43	124.31	119.60	127.55	129.14	134.44	130.32	131.81	37.6
Industrial Processes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.71	0.18	0.34	n.a.
Solvent and Other Product Use	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Agriculture	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LULUCF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n.a.
Waste	0.64	0.90	0.90	1.00	1.00	1.00	1.02	1.05	1.05	1.02	1.05	1.04	1.03	1.07	67.5
Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

LULUCF = Land Use, Land-use Change and Forestry.  
n.a.: not applicable

## II. Overview

### A. Inventory submission and other sources of information

9. Monaco submitted an NIR on 31 May 2005. In its 2005 submission, Monaco submitted CRF tables for 2003 only. Where needed, the expert review team (ERT) also used previous years' submissions, including the CRF tables for 2002.

10. Prior to and during the review, Monaco provided the ERT with additional information sources. These documents are not part of the inventory submission but are referenced in some cases in the NIR and the CRF tables. The complete list of materials used during the review is provided in the annex to this report.

### B. Key categories

11. Monaco did not report a key-category analysis as part of its 2005 submission. The key-category analysis performed by the secretariat<sup>3</sup> using the tier 1 level assessment identified five key categories, including three in stationary combustion (CO<sub>2</sub> emissions from oil, other fuels and gas) and two in mobile combustion (CO<sub>2</sub> emissions from Road Vehicles and Navigation).

### C. Cross-cutting topics

#### 1. Completeness

12. Monaco submitted CRF tables only for 2003, and the country's NIR is not sufficiently comprehensive. Monaco made efforts to prepare a complete inventory; however, due to lack of resources, CRF tables have so far been completed for only three years, 2001, 2002 and 2003, in the 2003, 2004 and 2005 submissions, respectively. Estimates for the time series were provided only in the trend tables (table 10 of the CRF). Table 9 of the CRF, which should include information about sources that were not estimated or estimates that were included under a different category, as required by the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines), was not completed. As regards the NIR, the structure did not follow the revised UNFCCC reporting guidelines and not all required information was included. Monaco indicated it would follow the guidelines more closely for next year's submission.

13. The inventory for the year 2003 covers the most important sources and gases in Monaco, and shows major improvements since the inventory provided in the previous submission; however, the following possible and probable minor-source emissions were not estimated: fugitive emissions from fuel storage and distribution, emissions from solvents and other product use, lubricants, and road paving with asphalt. Furthermore, for F-gases, actual emissions were not estimated, only potential emissions. In the absence of CRF tables for all years of the time series, completeness of the past years' inventories could be assessed only to a limited extent; e.g. F-gases have been estimated only since the 2001 inventory.

#### 2. Transparency

14. The CRF tables and NIR contain all required data and emission estimates to allow calculation and evaluation of the implied emission factors (IEF). However, information provided in the CRF tables

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<sup>3</sup> The secretariat identified, for each Party, those source 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. Key categories according to the tier 1 trend assessment were also identified for those Parties that provided a full set of CRF tables for the year 1990. 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.

and NIR was often not sufficiently documented to enable the ERT to understand how some estimates were derived. Furthermore, the use of notation keys was not explained in table 9 of the CRF or in the NIR. Confidentiality concerns did not affect the reporting of emissions, so no use of the notation key C (confidential) was required. Reference to external sources of data (national statistical yearbook, other sources) should be inserted in every relevant paragraph of the NIR.

15. During the ERT's visit, the Party showed the utmost transparency, distributing to the ERT additional material concerning data sources, emissions calculations, and methodology and EFs used. The underlying circumstances that prevented the Party from delivering a complete inventory were openly discussed with the ERT.

### 3. Recalculations and time-series consistency

16. The ERT noted that recalculations of the time series 1990 to 2002 were undertaken to take into account recommendations from the 2004 inventory review. The major changes included: exclusion of aviation fuel from helicopters and town bus fuel (as both fuels are bought in France by the final users), and inclusion of fossil CO<sub>2</sub> emissions from incineration of municipal and industrial solid wastes. However, the recalculations table 8 of the CRF was completed only for 2002 and the Party did not deliver CRF tables for the full time series. The rationale for these recalculations was briefly described in table 8 (b) of the CRF and in the NIR.

17. The implemented changes produced major changes in the inventory: aviation fuel, a key category in the previous submission, was excluded in the 2005 submission, and fossil CO<sub>2</sub> emissions from waste incineration became in the latest submission a new key category, contributing 24.6 per cent to the total inventory in 2003. These changes resulted in an overall upward revision of the inventory for all years of the time series, which increased emissions reported for 1990 and the latest recalculated year (2002) by 31.8 per cent and 36.6 per cent, respectively.

### 4. Uncertainties

18. Monaco provided in CRF table 7 a qualitative assessment of its estimates for the various categories reported in its inventory. The evaluations provided were based on expert judgement. However, Monaco did not perform an evaluation of overall uncertainties of the inventory as a whole, nor did Monaco perform a quantitative uncertainty assessment according to IPCC good practice guidance and as required by the revised UNFCCC reporting guidelines.

### 5. Verification and quality assurance/quality control approaches

19. Monaco did not include in its NIR any information on the QA/QC procedures followed as required by the revised UNFCCC reporting guidelines. During the ERT's visit, the Party described how the data used in the inventory were checked (i.e. staff involved in the inventory preparation performed consistency checks of all data submitted by the data providers and requested clarifications and formal corrections in the case of any irregularities). According to the Party's officials, the reliability of statistical data was also assured by the fact that fuel consumption is monitored by financial offices for taxation purposes or directly published by the companies involved in the distribution of electricity and gas and the company that runs the municipal solid waste (MSW) incinerator (which are similar to state-owned companies). The ERT encourages Monaco to establish and implement a formal QA/QC plan and report on it in the NIR.

20. The "Direction de l'Environnement, de l'Urbanisme et de la Construction" (Directorate of Environmental Affairs, Town Planning and Construction, hereinafter referred to as the Directorate of Environmental Affairs) of the Government of Monaco contracted an expert from CITEPA<sup>4</sup> in France to

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<sup>4</sup> Centre Interprofessionnel Technique d'Études de la Pollution Atmosphérique, a consulting company which is extensively involved in the preparation of the French GHG inventory.

undertake an independent review of Monaco's 2003 inventory, provide technical advice and answer specific questions raised by the Party, mainly concerning establishment of boundaries to estimate emissions from the Energy sector, how to allocate fuel used in international transport, the proper coverage of the LULUCF sector and estimation of the fossil fraction in incinerated waste. During the review, the report of CITEPA containing recommendations on the identified issues was made available. Monaco plans to use the recommendations received to improve its next submission.

#### 6. Institutional arrangements

21. During the ERT's visit, Monaco explained the institutional arrangements involved in inventory preparation and submission. The Directorate of Environmental Affairs, which is responsible mainly for technical issues under the UNFCCC, has overall responsibility for preparing the national inventory. The directorate is also responsible for preparing the inventory for the United Nations Convention on Long-range Transboundary Air Pollution, and performs other international activities in the sector of water quality and oceanography. Monaco's "Direction des Relations Extérieures" (Department of External Relations) has overall responsibility for policy issues and is involved in the delivery of the inventory to the UNFCCC secretariat and acts as focal point for the UNFCCC.

22. The Directorate of Environmental Affairs collects activity data (AD) from various sources in the relevant sectors, and draws from a yearly publication on national statistics ("Monaco en chiffres"), which includes data on energy consumption, fuels sold in the country and incinerated waste. Other relevant data (i.e. F-gases consumption, fraction of forest residue incinerated, extension of gardens, amount of fuels used but not bought in Monaco) are acquired from commercial operators through a formal letter of enquiry from the Directorate. Some examples of correspondence with operators and the data thus obtained were provided to the ERT during its review. The same approach will be used to acquire the additional data needed to estimate bunker fuels, lubricants and fugitive emissions from the gas distribution network. Important data providers mentioned by Monaco include: Energy: Société Monégasque de l'Électricité et du Gaz (SMEG), Direction de l'Aviation Civile (Héliport), Compagnie des Autobus de Monaco (CAM), Division des Statistiques de la Direction de l'Expansion Economique; Waste: Société Monégasque d'Assainissement (SMA), Société Monégasque des Eaux (SMEaux); and LULUCF: Service de l'Aménagement Urbain, Mairie de Monaco, Société des Bains de Mer (SBM).

#### 7. Record keeping and archiving

23. Monaco does not yet have a centralized archiving system. Relevant documents are stored in the offices of staff responsible for preparing the inventory at the Directorate of Environmental Affairs. Copies of the most important documents, including procedures and additional copies in electronic form, are available at the Department of External Relations.

#### 8. Follow-up to previous reviews

24. The Party modified the inventory to take into account some of the recommendations from the previous review (see paragraphs 16 and 17). Other recommendations, on fugitive emissions, process emissions, uncertainties and QA/QC procedures, have not been implemented to date. Preliminary evaluations of the activities undertaken to fulfil the previous review recommendations (e.g. regarding missing sources) were shown to the ERT.

### **D. Areas for further improvement**

#### 1. Identified by the Party

25. The NIR did not clearly identify areas for improvement. In its response to the issues raised during the review, Monaco indicated that it is working to distinguish between emissions from domestic navigation and those from international navigation, complete the time-series for emissions of F-gases,



and estimate fugitive emissions from gas distribution. The Party also indicated that information required according to the revised UNFCCC reporting guidelines will be included in its next NIR.

## 2. Identified by the ERT

26. The ERT supports the areas for improvement indicated by Monaco, and, in addition, identifies the following main areas for further improvement:

- (a) Provide quantified uncertainty estimates according to IPCC good practice guidance at least for key categories;
- (b) Provide, in the NIR, more comprehensive and transparent information, i.e. more precise descriptions of methodologies, EFs and data used to estimate GHG emissions, and improve consistency between the CRF tables and the NIR;
- (c) Establish and implement a QA/QC management system, including a QA/QC plan;
- (d) Undertake a key-category analysis in line with the requirements of the revised UNFCCC reporting guidelines.

27. Recommended improvements relating to specific source categories are presented in the relevant sector sections of this report.

## **III. Energy**

### **A. Sector overview**

28. The Energy sector accounted for 98.9 per cent of Monaco's total GHG emissions in 2003 (all from combustion; fugitive emissions were not estimated). CO<sub>2</sub> accounted for 97.7 per cent of the sector's total, and N<sub>2</sub>O and CH<sub>4</sub> accounted for 1.8 per cent and 0.5 per cent, respectively. The transport subsector contributed 38.5 per cent of the sector's emissions, the residential/commercial and institutional subsector contributed 35.7 per cent and electricity and heat production contributed 25.8 per cent. Emissions from the Energy sector increased by 37.6 per cent between 1990 and 2003, most between 1990 and 1992, when emissions increased 23.7 per cent. Monaco attributed this large increase to climatic reasons (winter 1990 was very mild resulting in less demand for heating fuel in 1990 compared to the following years) and to a substantial amount of heating fuel used in Monaco that was bought directly in France, and thus not included in the 1990 inventory. The residential/commercial subsector showed the largest increase in GHG emissions (CO<sub>2</sub> equivalent) in the period 1990–2003, 59 per cent, followed by transport, where emissions increased by about 35 per cent.

### **B. Reference and sectoral approaches**

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

29. Monaco reported CO<sub>2</sub> emission estimates derived using both the reference and sectoral approaches for 2003. The difference between them is quite small, 0.6 per cent.

30. Comparison of national data with international energy statistics is not possible because Monaco does not report to the International Energy Agency (IEA). Monaco's energy consumption is included in the French report to the IEA. Moreover, there might be double counting of emissions, because all of Monaco's energy consumption and emissions might also be included in the French inventory reported under the UNFCCC. The ERT suggests that, given the specific national circumstance of Monaco and for the sake of consistency, Monaco take steps to establish contacts with the authorities responsible for the French inventory to investigate if, or how much of, the Energy sector emissions in the French inventory pertain to Monaco.

## 2. International bunker fuels

31. No bunker fuel emissions were reported. No aviation fuel is sold in Monaco (i.e. all helicopters are fuelled outside Monaco) and all marine consumption is considered domestic consumption in the 2003 inventory. A special survey of marine fuel use is under way to determine the amounts used in and outside Monaco, to allow a split between domestic and international navigation emissions in the next submission. Even a short trip from Monaco to a nearby French or Italian port could be considered international traffic according to IPCC methodology. Preliminary estimates indicate a possible substantial change in the reporting of emissions from navigation (currently all reported as domestic), as only about 10–30 per cent of marine fuel is estimated to be actually used domestically.

32. In the CRF tables for 2003 all bunker fuels were reported using the notation key “NE” (not estimated). Given that in the case of marine bunkers all fuels are included under domestic navigation, the notation key “IE” (included elsewhere) would have been more appropriate. In the absence of any fuel used for international aviation, aviation bunker fuels should be reported as “NO” (not occurring).

## 3. Feedstocks and non-energy use of fuels

33. Except for small quantities of lubricants, the feedstocks and non-energy use of fuels subsector is not applicable in Monaco. The Party plans to conduct a survey to determine the amount of lubricants used.

## 4. Country-specific issues

34. Monaco is a small country (two square kilometres), a coastal city-state with 32,000 inhabitants. Monaco's border with France is unmarked, and the city of Monaco is embraced by four French municipalities. The border is a series of roads and squares, on one side of which lies Monaco and on the other side lies France. A large proportion of the people who work in Monaco live in France (60 per cent) or Italy (10 per cent). These specific circumstances, including the free flow of goods and services between France and Monaco, add uncertainty to the estimates of consumption from the transport subsector (both road and marine), because the registered quantities of fuels sold in the country reflect only partially the effective use (domestic or international) of those fuels. Moreover, heating oil could be imported or even exported, depending on the supplier chosen.

## C. Key categories

### 1. Stationary combustion (1.A.4 Other sectors): oil – CO<sub>2</sub>

35. This source category accounted for 26.1 per cent of total emissions in 2003, and includes emissions from oil for heating purposes. Emissions were estimated using the IPCC tier 1 methodology with default EFs. The estimate was based on the fuel sold in the country as reported in the country's statistical yearbook or as directly reported (upon request of the national inventory experts) in official mail by the statistics office in Monaco. These data are also available for the early years of the time series, including 1990.

36. Party experts presented to the ERT the results of a recent enquiry aimed at determining the quantity of heating oil actually consumed in Monaco. To paraphrase the rationale for the enquiry, part of the heating fuel sold in Monaco is used in nearby French municipalities (so it could be considered exported back to France) and part of the heating fuel used in Monaco is purchased in France. The latter quantities are not reported in the inventory.

37. The ERT has noted the possibly higher uncertainties associated with the estimates of heating fuel consumed, in particular in the early 1990s. The ERT encourages Monaco to continue reporting on the basis of fuels sold in the country, and to tentatively perform an estimate of the fuel used in Monaco, based on technical evaluations and vendors' reports, and address the issue in its NIR for future reviews.

## 2. Mobile combustion – road vehicles: gasoline and diesel – CO<sub>2</sub>

38. This source accounted for 25.4 per cent of total emissions in 2003. Emissions have been estimated using the IPCC default methodology with default EFs and fuel sales data routinely reported in the country's statistical yearbook or as directly reported (upon request of the national inventory experts) in official mail by the statistics office in Monaco.

39. The ERT has noted that Monaco's IEF for gasoline was quite high (74.61 t CO<sub>2</sub>/TJ) compared to the IEFs of other reporting Parties and also higher than the IPCC default EF of 73.00 t CO<sub>2</sub>/TJ (Revised 1996 IPCC Guidelines, volume 3). The NIR does not contain any details regarding the actual EFs used, i.e. with regard to calorific values, conversion and oxidation factors, etc. The information contained in the additional materials provided prior to the review suggests that no oxidation factor was applied. Thus, after application of the IPCC default oxidation factor (0.99) the observed IEF would increase to 75.36 t CO<sub>2</sub>/TJ. During the review Monaco explained that the EF used for gasoline for road vehicles is based on the IPCC default value (73.00 t CO<sub>2</sub>/TJ) assuming a combustion efficiency of 100 per cent and taking into account conversion data provided by the Institut français du pétrole.

40. It seems that this high IEF, which was also noted in the previous review, results from the use of two different data sources (IPCC and other published literature) to derive the conversion factors for calculating the EF. The ERT recommends that Monaco correct the gasoline EF to make it consistent with the IPCC default EF, and provide in its next NIR sufficient background documentation on how the EFs used have been derived.

41. During the review, Monaco underlined its difficulty in estimating the quantity of fuel actually used in the country based on the quantities of fuels sold, due to the specific national circumstances (see paragraph 34). Monaco believes that much more fuel is sold in the country than is used in the country, due to its small size and the great number of workers who live in France or Italy and commute to Monaco by car.

42. During meetings with Monaco officials, the ERT acknowledged the challenge the country faces in developing an accurate estimate, but underlined that similar challenges concerning the correct allocation of fuels used in transport have been faced elsewhere, especially by some small European countries. In line with IPCC good practice guidance (page 2.48; 2.3.1.4 Completeness), the practice followed to date is to require that GHG emissions estimates be based on the quantities of fuels sold in the country. It follows a principle of economic attribution, which is often used in environmental estimates and which avoids complicated burden sharing relating to emissions from cross-border sales.

## 3. Stationary combustion: other fuels – CO<sub>2</sub>

43. Emissions from other fuels in stationary sources accounted for 24.6 per cent of total emissions in Monaco in 2003. This source includes CO<sub>2</sub> emissions from the fossil carbon fraction of MSW incineration. The heat produced by Monaco's incinerator is used both to generate electricity and to heat buildings, so this source is reported in the Energy sector. Emissions were estimated using the IPCC tier 1 methodology together with IPCC default values for the fuel's total carbon content and fossil fraction. Due to the relevance of this source in Monaco and uncertainty about carbon content of MSW reported in literature, the ERT encourages Monaco to perform a proper evaluation of the effective carbon content/fossil fraction of the MSW incinerated in the country. (The ERT's full analysis of this source is included in the chapter on waste in this report.)

44. This source was not estimated in the Party's previous submission, and its inclusion represents a major improvement in Monaco's inventory.

## 4. Mobile combustion – water-borne navigation: gasoline and diesel – CO<sub>2</sub>

45. This source accounted for 11.5 per cent of total emissions in 2003. Emissions were estimated using the IPCC tier 1 methodology. The ERT has noted that the EF used by Monaco for gasoline was

quite high (74.94 t CO<sub>2</sub>/TJ). As it did with regard to road transport (see paragraph 40), the ERT encourages Monaco to correct this EF to make it consistent with the IPCC default EF and to provide in its next NIR sufficient background documentation on how the EFs used have been derived.

46. The estimate was based on the fuel sold in the country for both domestic and international navigation (see paragraph 31), as routinely reported in the country's statistical yearbook. As mentioned, due to Monaco's size, even a short trip to a nearby French or Italian port can be considered international traffic according to IPCC methodology. Monaco plans to review these data in its next submission. The correction might be huge (i.e. the quantities of fuels transferred from domestic navigation to marine bunkers), as according to preliminary estimates only about 10–30 per cent of the marine fuel used is considered as fuel used domestically.

47. The ERT encourages Monaco to complete its ongoing work to estimate the average trip performed by the boats filling their tanks in Monaco and revise the inventory accordingly.

#### 5. Stationary combustion: gas – CO<sub>2</sub>

48. This source accounted for 9.2 per cent of total emissions in 2003, and includes all natural gas used in Monaco, for both residential heating/cooking and as a back-up fuel for the incinerator plant and district heating boilers. Emissions were estimated using the IPCC tier 1 methodology.

49. Natural gas is distributed by a Monaco company that also distributes electricity. The quantities used are well known and routinely reported in statistics. The ERT suggests that the Party acquire from this company additional data on the carbon and methane content of the natural gas and possibly an estimate of fugitive emissions.

### **D. Non-key categories**

#### Fugitive emissions, natural gas distribution network: CH<sub>4</sub>

50. No emissions were estimated for fugitive emissions from Monaco's natural gas network. Those emissions might not be negligible, and ERT encourages Monaco to report on this source.

51. No emissions were estimated from the fuel storage tanks in Monaco. Even if emissions from this source might be negligible, the ERT encourages Monaco to perform an estimate of the AD involved (number and size of tanks) and report this information in its next NIR.

### **E. Areas for further improvement**

#### 1. Identified by the Party

52. Marine fuel consumption will be split between domestic and international uses after the completion of an enquiry aimed at estimating the average journey of Monaco's fleet.

#### 2. Identified by the ERT

53. The ERT supports the ongoing efforts by Monaco to discern between domestic and international navigation fuel uses. In addition, it recommends the following improvements:

- (a) Improve the gasoline EF for CO<sub>2</sub> to make it consistent with the IPCC default EF;
- (b) Estimate fugitive emissions from the natural gas network;
- (c) Estimate fugitive emissions from fuel storage tanks and report on them in the next NIR;
- (d) Estimate emissions from the use of lubricants;

- (e) Perform a proper evaluation of the effective carbon content and fossil fraction of the MSW incinerated in the country (see also paragraphs 78–83).

## **IV. Industrial Processes and Solvent and Other Product Use**

### **A. Sector overview**

54. Only potential emissions of HFCs, PFCs and SF<sub>6</sub> were reported in this sector, covering emissions from consumption/purchase of products containing HFCs and PFCs mainly for refrigeration and air conditioning, as well as SF<sub>6</sub> from electrical equipment. Overall, they accounted for 0.3 per cent of Monaco's total GHG emissions in 2003. Actual emissions were not estimated for this source.

55. Most categories of the Industrial Processes sector (i.e. activities such as cement, lime, ammonia, nitric and adipic acid, iron and steel and aluminium production) were reported as not occurring. Some "light" industrial activities that run on electricity do occur (i.e. packaging). According to information provided during the review these do not cause any process emissions, except for some very minor production activities (e.g. food/bread production).

56. Some small sources of emissions in this sector were not considered in the inventory (e.g. no estimate of emissions from road paving were reported). These emissions are very small but may not be negligible. The ERT encourages Monaco to estimate emissions from this source.

57. Emissions from Solvent and Other Product Use were not estimated due to a lack of available data; however, an enquiry to collect data on solvent used in the country is currently being undertaken, according to information provided during the review.

### **B. Non-key categories**

#### F-gases

58. The inventory did not include an estimate of actual emissions of F-gases. Given that potential emissions are only a rough estimate and generally overestimate the actual emissions of these gases, the ERT encourages Monaco to also estimate actual emissions of F-gases. This task may not be too complex, at least for some sources (SF<sub>6</sub> in electrical equipment, HFCs and PFCs refrigeration and air conditioning in road and marine transport). As noted in the review of Monaco's 2004 submission, the ERT would expect to see emission estimates for other possible emissions of HFCs and PFCs associated with F-gas consumption (e.g. foam products containing HFC blowing agents, fire extinguishers, aerosols, solvents, etc.). With respect to fire extinguishers and foam blowing agents, the Party indicated that according to results of recent inquiries, no equipment containing HFCs and PFCs was purchased in the country. The ERT recommends that the outcome of such inquiries be provided in the NIR.

59. Time series estimates back to the base year were not provided for potential emissions of F-gases. Estimates were provided for only 2001, 2002 and 2003. In the case of SF<sub>6</sub>, emissions were estimated for only 2003. The ERT encourages Monaco to complete the time series, noting that due to a general increase in F-gases in most countries, this source may become a key category according to the IPCC tier 1 trend assessment.

### **C. Areas for further improvement**

#### 1. Identified by the Party

60. Monaco indicated that an enquiry to collect data on solvent used in the country is currently being undertaken and that emissions from this source are expected to be reported in the next submission.

## 2. Identified by the ERT

61. The ERT recommends that Monaco estimate actual emissions of F-gases, at least for some sources, and provide estimates of F-gas emissions from other uses of HFCs and PFCs that may exist in Monaco (see paragraph 58). Furthermore, Monaco is recommended to estimate emissions from road paving with asphalt using the default IPCC tier 1 methodology.

## V. Agriculture

62. Monaco noted that there is no agricultural activity in the country, and thus reported AD for all agriculture-related categories as “NO” in its CRF tables.

## VI. Land Use, Land-use Change and Forestry

### A. Sector overview

63. Monaco provided estimates for the LULUCF sector using the CRF LULUCF tables, as required by decision 13/CP.9. These estimates represent emissions and removals from mainly open parks and gardens, which according to the country’s CRF tables constituted a net source of 0.28 Gg of CO<sub>2</sub> emissions in 2003 (CO<sub>2</sub> emissions were estimated at 0.66 Gg and removals at 0.38 Gg). N<sub>2</sub>O emissions due to fertilizer use were also estimated, at 0.000087 Gg. Estimates were provided for 2003 only, but the Party explained during the review that it expects to provide estimates for the whole time series in the next submission.

64. The inclusion of estimates for the LULUCF sector, as recommended in the previous review, is a notable improvement in Monaco’s 2005 submission. However, the methodology used is not in line with the IPCC *Good Practice Guidance for Land Use, Land-use Change and Forestry* (hereinafter referred to as IPCC good practice guidance for LULUCF) as explained below.

65. Monaco reported estimates of carbon stock changes in living biomass under the Forest land remaining forest land and the Grassland remaining grassland categories. However, under the Forest land category only urban trees were considered, and the Grassland category covered only estimates from open parks. Furthermore, the land areas reported for these land-use categories were the same. During the review, the Party clarified that all lands in Monaco are settlements and that forest land, grassland and cropland probably existed a very long time ago (without being able to specify when all land was turned into settlements). The ERT recommends that Monaco provide in its next submission a description of the land uses existing in the country and how these correspond to the land-use categories of the IPCC good practice guidance for LULUCF (e.g. an explanation of why all lands in the country are classified as settlement), and to estimate emissions and removals using the methodologies in the IPCC good practice guidance for LULUCF for the corresponding land-use categories. Estimates should be allocated accordingly to the appropriate land-use category in the CRF tables.

### B. Sink and source categories

#### 1. Forest land remaining forest land – CO<sub>2</sub>

66. Monaco reported CO<sub>2</sub> removals due to biomass increment in urban trees in gardens and public parks using the number of trees as AD and default values provided in the IPCC good practice guidance for LULUCF for the necessary estimation parameters. However, the ERT noted that the value used for the annual increment in above-ground biomass corresponded to that for forests. During the review, the Party found that these data in fact do not correspond to its national circumstances (urban trees in parks and gardens). To calculate carbon stock changes in living biomass in urban trees, the ERT recommends the use of biomass growth rates of trees to estimate increases in carbon stocks and the consideration of biomass loss due to management practices in gardens and parks (e.g. cutting of trees) to estimate

decreases in carbon stocks, taking into account the basic methodological guidance provided in appendix 3a.4 “Settlements” of the IPCC good practice guidance for LULUCF. The resulting estimates should then be reported under the appropriate land-use category (i.e. settlements remaining settlements, even though this is not a mandatory category).

## 2. Forest land remaining forest land – N<sub>2</sub>O

67. Monaco used the method provided in the Revised 1996 IPCC Guidelines for the Agriculture sector to estimate N<sub>2</sub>O emissions from N fertilization of public gardens and parks, covering both direct and indirect N<sub>2</sub>O emissions. Data on the amounts and types of fertilizer used were obtained from various national sources (Service de l’Aménagement Urbain, Mairie de Monaco, Jardin Exotique, Société des Bains de Mers). The ERT recommends that Monaco use the methodology in the IPCC good practice guidance for LULUCF for Forest land, together with default EFs and the country-specific data on fertilizer use, which makes reference to the Revised 1996 IPCC Guidelines (chapter 4) for the estimation of fertilizer-based N<sub>2</sub>O emissions from forests. Monaco should continue to report N<sub>2</sub>O emissions from fertilizer, also taking into account indirect N<sub>2</sub>O emissions from N volatilized and from leaching and run-off resulting from N application.

## 3. Grassland remaining grassland – CO<sub>2</sub>

68. For the category grasslands (covering open parks according to the CRF and NIR), clarified by the Party as lawn during the review, the IPCC default data provided for above-ground net primary production of grassland were used to estimate the increase in biomass stocks, although the category is in fact not grassland (see also paragraph 65). During the review visit, the Party said that change in biomass stocks in grass is negligible. The gain in biomass is offset by the loss when the lawn is mowed. The Party agreed to consider this in its next submission.

69. Monaco also reported under this category CO<sub>2</sub> emissions from incineration of all garden and park waste, including from cutting of trees and lawn. According to information provided by the Party during the review, garden and park waste is included in MSW. To be in line with the IPCC good practice guidance and consistent with the reporting under the Waste and Energy sectors, the ERT recommends that the Party exclude these CO<sub>2</sub> emissions from the LULUCF sector and include the non-CO<sub>2</sub> emissions (CH<sub>4</sub>, N<sub>2</sub>O) from incineration of this biogenic waste under other fuels in the Energy sector (same as the biogenic fraction of MSW, which is reported by Monaco as other fuels in the Energy sector); whereas corresponding CO<sub>2</sub> emissions should be reported under biomass in the Energy sector (as a memo item only). The Party is also encouraged to increase transparency in reporting waste from gardens and parks in its next submission.

## **C. Areas for further improvement**

### 1. Identified by the Party

70. Monaco plans to provide estimates for the LULUCF sector for the whole time series in its next submission.

### 2. Identified by the ERT

71. The ERT welcomes Monaco’s intention to complete the time series of the LULUCF sector. The ERT recommends that Monaco consider the following improvements for its next submission:

- (a) Provide a description of Monaco’s land-use categories, taking into consideration the definitions provided in the IPCC good practice guidance for LULUCF, according to which public gardens and parks would be allocated to the settlements category;

- (b) Use the basic methodological guidance provided in appendix 3a.4 “Settlements” of the IPCC good practice guidance for LULUCF to estimate the change in carbon stocks in living biomass in urban trees and the corresponding CO<sub>2</sub> emissions or removals;
- (c) Allocate and report the resulting estimates in the appropriate land-use category (i.e. settlements) in the CRF tables;
- (d) Estimate direct and indirect N<sub>2</sub>O emissions from fertilizer use as recommended in paragraph 67;
- (e) Check whether emissions arising from the incineration of public garden and park waste are correctly considered under other fuels in the Energy sector (see paragraph 69).

## VII. Waste

### A. Sector overview

72. The Waste sector emitted 1.45 Gg CO<sub>2</sub> equivalent in 2003, contributing 0.8 per cent to Monaco’s total GHG emissions. Emissions in this sector include N<sub>2</sub>O from human sewage, and N<sub>2</sub>O and CH<sub>4</sub> from sludge incineration.

73. CH<sub>4</sub> emissions in the Waste sector (which accounted for 7.4 per cent of national CH<sub>4</sub> emissions) increased by 48.9 per cent from 1991 to 2003. (They were not reported for 1990 because the country’s sludge was incinerated in France that year.) N<sub>2</sub>O emissions from the sector (which accounted for 30.7 per cent of national N<sub>2</sub>O emissions) increased by 59.2 per cent from 1990 to 2003.

74. In the absence of landfills as a waste management practice, Monaco reported landfills as “NO”. Emissions from waste incineration were reported under the Energy sector as incineration of waste for energy generation. Estimates covered municipal and industrial solid waste burned at Monaco’s only incinerator. Clinical waste and lubricant waste are incinerated in France.

75. A large proportion of waste water (>90 per cent) is treated under aerobic conditions and CH<sub>4</sub> emissions are assumed negligible. However, the Party plans to contact the operator of the waste-water treatment system and collect information on CH<sub>4</sub> emissions. This information should be provided in the country’s next submission.

76. The estimates in the Waste sector were mostly complete, as they covered all relevant source categories and gases. Information about the methodologies used was not provided in the NIR, but this information was made available during the review. The ERT recommends that Monaco include this information in its next submission.

77. Monaco did not complete CRF tables 6.B and 6.C appropriately and the notation keys used were not explained in the NIR as recommended by the previous review. For example, the notation key “IE” should be used in CRF table 6.C for MSW because incineration is used to produce energy. With regard to the amount of incinerated waste reported in table 6.C, the Party mentioned during the review that it refers to the amount of sludge incinerated and that data relating to municipal and industrial solid waste incinerated was not included. Due to the way CRF table 6.C was completed, it is not clear whether the amount of incinerated waste refers to total waste or only to sludge, in which case this AD should be reported in the same line as corresponding sludge emissions. Also, the use of the notation key “IE” in table 6.B and in the associated additional information box is explained neither in the NIR nor in table 9 of the CRF. The ERT encourages the Party to properly complete the CRF tables and improve consistency in the tables and between the tables and the NIR.



## B. Key categories

### Waste incineration – fossil CO<sub>2</sub>

78. CO<sub>2</sub> emissions from waste incineration (from the fossil fraction of the waste) decreased by 10.4 per cent and 17.2 per cent between 2001–2002 and 2002–2003, respectively, due to a decrease in the amount of waste incinerated.
79. Monaco has made progress by including this source category in its 2005 submission and by reporting corresponding emissions accordingly in the Energy sector (as other fuels under stationary combustion). Monaco used the IPCC tier 1 method together with default data provided in table 5.6 of the IPCC good practice guidance. However, given that this category has been identified as a key category, the use of a higher tier approach (tier 2 or 3) is required according to the IPCC good practice guidance.
80. The ERT recommends that Monaco move to a higher tier method and use plant-specific data for the carbon content of waste, fossil carbon content and combustion efficiency, and that it provide detailed information on composition of waste incinerated and the differentiation between the biogenic and non-biogenic fractions. The Party should also perform recalculations for the whole time series.
81. The use of plant-specific data is recommended because the incinerator in Monaco incinerates waste from Monaco and elsewhere, including France and Italy.
82. Monaco said during the review that there is insufficient time available to collect the information necessary to fulfil this recommendation for its next submission, but that the recommendation would be taken into account for the 2007 submission.
83. The AD on the amount of waste incinerated were provided only during the review. This information should be provided in the next submission.

## C. Non-key categories

### 1. Waste-water handling: human sewage – N<sub>2</sub>O

84. Monaco used the IPCC default method together with the default EF. The average annual per capita protein consumption (kg protein/person/yr) was provided in CRF table 6.B. The Party is encouraged to continue reporting these N<sub>2</sub>O emissions.

### 2. Waste incineration – CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O

85. The methodology used to estimate CH<sub>4</sub> and N<sub>2</sub>O emissions from incineration of municipal and industrial solid waste was not provided in the NIR. According to the information provided in the CRF tables, the methodology and the EFs used were from CORINAIR. More information on the EFs used was provided by the Party during the review. The ERT recommends that the Party include this information in its next submission and explain how the parameters used correspond to national circumstances.
86. Monaco also estimated CH<sub>4</sub> and N<sub>2</sub>O emissions from incineration of sludge and reported these emissions under the Waste sector. Even though the sludge is incinerated together with the MSW, which is used for energy generation, the emissions from the sludge are reported separately due to the fact that the sole purpose of the incineration is elimination of the sludge. Furthermore, the calorific value used for sludge is 3.687 GJ/tonne sludge, whereas the one for MSW is 10.03 TJ/tonne waste, and the amount of sludge incinerated is low compared to that of MSW.

87. The ERT has noted that according to the IPCC good practice guidance, waste that is combusted in facilities with energy recovery should be included under other fuels in the Energy sector.<sup>5</sup> Although the separate reporting of sludge emissions as currently done by Monaco contributes to a greater transparency of the inventory (for example by allowing the calculation of separate IEFs for both types of waste and the analysis of trends separately), the inclusion of those emissions in the Energy sector would be needed to fully comply with the requirements of the IPCC good practice guidance.

88. The Party included garden and park waste in MSW and estimated CO<sub>2</sub> emissions from incineration of that waste. The ERT has noted that this is not in line with the IPCC good practice guidance and recommends that the Party not include these emissions in the national total. Instead, only CH<sub>4</sub> and N<sub>2</sub>O emissions should be included under Energy, because incineration is used to produce energy; biogenic CO<sub>2</sub> emissions should be reported as a memo item under Energy (see paragraph 69).

#### **D. Areas for further improvement**

##### **1. Identified by the Party**

89. Although the Party did not clearly mention any areas for future improvement in the NIR, it specified during the review that it will provide more information on CH<sub>4</sub> emissions from waste-water treatment, even though a large proportion of the country's waste water is treated in aerobic conditions.

##### **2. Identified by the ERT**

90. The ERT recommends that Monaco take into consideration for its next submissions the suggestions outlined in this section of the report, such as the recommendations relating to improvements of the NIR and CRF (i.e. by providing the required information on AD, EFs and methodologies used) as well as the correct allocation of emissions from MSW incineration between the Energy and Waste sectors. In particular, Monaco should make efforts to develop plant-specific data and EFs to estimate fossil CO<sub>2</sub> emissions from incineration of waste (see paragraphs 80 and 81).

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<sup>5</sup> Similarly, the Revised 1996 IPCC Guidelines specify that sludge that is incinerated as part of energy recovery should be reported in the Energy sector.

## Annex

### **Documents and information used during the review**

#### **A. Reference documents**

- IPCC. Good practice guidance and uncertainty management in national greenhouse gas inventories, 2000. Available at <<http://www.ipcc-nggip.iges.or.jp/public/gp/english/>>.
- IPCC. Good practice guidance for land use, land-use change and forestry, 2003. Available at <<http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.htm>>.
- IPCC/OECD/IEA. Revised 1996 IPCC Guidelines for national greenhouse gas inventories, volumes 1–3, 1997. Available at <<http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm>>.
- UNFCCC. 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/2004/8. Available at <<http://unfccc.int/resource/docs/2004/sbsta/08.pdf>>.
- UNFCCC. 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>>.
- UNFCCC secretariat. Status report for Monaco. 2005. Available at <[http://unfccc.int/files/national\\_reports/annex\\_i\\_ghg\\_inventories/inventory\\_review\\_reports/application/pdf/2005\\_status\\_report\\_monaco.pdf](http://unfccc.int/files/national_reports/annex_i_ghg_inventories/inventory_review_reports/application/pdf/2005_status_report_monaco.pdf)>.
- UNFCCC secretariat. Synthesis and assessment report on the greenhouse gas inventories submitted in 2005. FCCC/WEB/SAI/2005. Available at <[http://unfccc.int/files/national\\_reports/annex\\_i\\_ghg\\_inventories/inventory\\_review\\_reports/application/pdf/sa\\_2005\\_part\\_i\\_final.pdf](http://unfccc.int/files/national_reports/annex_i_ghg_inventories/inventory_review_reports/application/pdf/sa_2005_part_i_final.pdf)>.
- UNFCCC secretariat. Monaco: Report of the individual review of the greenhouse gas inventory submitted in the year 2004. FCCC/WEB/IRI/2004/MCO. Available at <[http://unfccc.int/files/national\\_reports/annex\\_i\\_ghg\\_inventories/inventory\\_review\\_reports/application/pdf/2004\\_irr\\_centralized\\_review\\_monaco.pdf](http://unfccc.int/files/national_reports/annex_i_ghg_inventories/inventory_review_reports/application/pdf/2004_irr_centralized_review_monaco.pdf)>.

#### **B. Additional information provided by the Party**

- Responses to questions during the review were received from Mr. André Veglia and his team (Direction de l'Environnement, l'Urbanisme et de la Construction) including additional material on the methodology and assumptions used.
- CITEPA, July 2005: Assistance et conseil concernant les calculs des émissions de gaz à effet de serre de la Principauté de Monaco (Assistance and advice regarding the estimation of GHG emissions of Monaco), final report.
- Principauté de Monaco, Département des Finances et de l'Économie, Direction de l'Expansion Économique, Division des Statistiques et des Études Économiques: Monaco en chiffres, édition 2004 (Monaco in numbers, 2004 edition), and excerpts from the editions 1996 (pages 42-46) and 2001 (pages 175–182).

Principauté de Monaco, Département des Finances et de l'Économie, Direction de l'Expansion Économique, Division des Statistiques et des Études Économiques: communications in response to requests for provision of data (fuel sales) for the years 1990–1996, 1997, 1998, 1999,2000, 2001, 2002, 2003 and 2004; internal documentation.

Direction de l'Environnement, l'Urbanisme et de la Construction: Calculation sheets containing equations and EFs and other parameters used in the calculation of emissions for each source category; internal documentation.

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