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**Report of the centralized in-depth review of
the fourth national communication of Monaco**

According to decision 4/CP.8, Parties included in Annex I to the Convention are requested to submit to the secretariat, in accordance with Article 12, paragraphs 1 and 2, of the Convention, a fourth national communication by 1 January 2006. This report presents the results of the in-depth review of the fourth national communication of Monaco conducted by an expert review team in accordance with relevant provisions of the Convention and Article 8 of the Kyoto Protocol.

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I. Introduction and summary

A. Introduction

1. Monaco has been a Party to the Convention since 1992 and to its Kyoto Protocol since 2006. Under the Kyoto Protocol, Monaco committed itself to reducing its greenhouse gas (GHG) emissions to 8 per cent in relation to the 1990 level during the first commitment period from 2008 to 2012.
2. This report covers the centralized in-depth review (IDR) of the fourth national communication (NC4) of Monaco, coordinated by the UNFCCC secretariat, in accordance with decision 7/CP.11. The review took place from 12 to 17 May 2008 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: Ms. Maryse Courchesne (Canada), Ms. Jane Ellis (Organisation for Economic Co-operation and Development), Ms. Fatou Ndeye Gaye (Gambia), Mr. Knut Vrålstad (Norway), Mr. Abdelkrim Ben Mohamed (Niger), Mr. Bhawan Singh (Trinidad and Tobago) and Mr. Vlad Trusca (Romania). Ms. Ellis and Mr. Ben Mohamed were the lead reviewers. The review was coordinated by Ms. Ruta Bubniene (UNFCCC secretariat).
3. During the IDR, the expert review team (ERT) examined each part of the NC4. Monaco ratified the Kyoto Protocol on 27 February 2006 and it entered into force on 28 May 2006; therefore the provision of Article 3, paragraph 2, of the Kyoto Protocol regarding demonstrable progress by 2005 is not applicable.
4. 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, as appropriate, in this final version of the report.

B. Summary

5. The ERT noted that Monaco's NC4 complies to some extent with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications" (hereinafter referred to as the UNFCCC reporting guidelines).

1. Completeness

6. The ERT noted that the NC4 covers most of the sections required by the UNFCCC reporting guidelines, except for sections on projections and the total effect of policies and measures (PaMs), vulnerability assessment, climate change impacts and adaptation measures. The section on emission inventories is incomplete. The following elements are not provided in the NC4: emission trends, effects of PaMs and their impacts on longer-term trends in anthropogenic GHG emissions and removals. Monaco has provided no explanation in its NC4 of why some of the mandatory elements are not reported but informed the ERT on the steps taken to report on these elements in its next national communication.

2. Timeliness

7. The NC4 was submitted on 2 March 2006. Decision 4/CP.8 requested Parties to submit their NC4 by 1 January 2006.

3. Transparency

8. The ERT acknowledged that Monaco's NC4 is limited in scope. This is in part owing to the small size of the country and to limited data availability, as reported by the Party. The ERT noted that the structure of the NC4 does not fully follow the outline contained in the annex to the UNFCCC

reporting guidelines. In the course of the review, the ERT formulated a number of recommendations that could help Monaco to further increase the transparency of its reporting, such as a recommendation to provide information on projections.

II. Technical assessment of the reviewed elements

A. National circumstances relevant to greenhouse gas emissions and removals

9. In its NC4, Monaco has provided a description of its national circumstances. However, the ERT noted that Monaco did not provide the following reporting elements required by the UNFCCC reporting guidelines: how these national circumstances affect GHG emissions and removals in Monaco; and how national circumstances and changes in national circumstances affect GHG emissions and removals over time. The ERT recommends that Monaco provide this information in its next national communication.

10. The ERT noted that the main drivers of emission trends in Monaco includes development of the energy production, transport, residential and tourism sectors. Table 1 illustrates the national circumstances of the country by providing some indicators relevant to GHG emissions and removals.

Table 1. Indicators relevant to greenhouse gas emissions and removals for Monaco

	1990	2005	2006	Change 2005–2006 (%)	Change 1990–2006 (%)
Population (million)	0.03	0.03	0.03	0.0	0.0
GDP (2000 USD billion using PPP)	NA	NA	NA	NA	NA
TPES (Mtoe)	NA	NA	NA	NA	NA
GDP per capita (2000 USD thousand using PPP)	NA	NA	NA	NA	NA
TPES per capita (toe)	NA	NA	NA	NA	NA
GHG emissions without LULUCF (Tg CO ₂ eq)	0.11	0.10	0.09	-10.2	-13.1
GHG emissions with LULUCF (Tg CO ₂ eq)	0.11	0.10	0.09	-10.2	-13.1
CO ₂ emissions per capita (Mg)	3.49	3.29	2.98	-9.3	-14.5
CO ₂ emissions per GDP unit (kg per 2000 USD using PPP)	NA	NA	NA	NA	NA
GHG emissions per capita (Mg CO ₂ eq)	3.56	3.47	3.12	-10.2	-12.4
GHG emissions per GDP unit (kg CO ₂ eq per 2000 USD using PPP)	NA	NA	NA	NA	NA

Data sources: (1) Population data: International Energy Agency. (2) All other data: Monaco's 2008 inventory submission.

Abbreviations: GDP = gross domestic product, GHG = greenhouse gas, LULUCF = land use, land-use change and forestry, NA = not applicable, PPP = purchasing power parity, TPES = total primary energy supply.

Note: The ratios per capita and per GDP unit are calculated relative to GHG emissions without LULUCF; the ratios are calculated using the exact (not rounded) values and may therefore differ from a ratio calculated with the rounded numbers provided in the table.

11. Monaco has provided limited information on GHG emissions by sector and activity. This information is broadly consistent with the 2005 national GHG inventory submission. However, the ERT noted that Monaco did not provide a summary of information on GHG emission trends for the period 1990–2006 as required by the UNFCCC reporting guidelines (para. 10). Summary tables, including trend tables for emissions in carbon dioxide equivalent (CO₂ eq) given in the common reporting format, are also not provided.

12. Total GHG emissions excluding emissions and removals from land use, land-use change and forestry (LULUCF) decreased by 13.1 per cent between the base year and 2006; total GHG emissions including net emissions and removals from LULUCF also decreased by 13.1 per cent (see table 2). This was mainly attributed to CO₂ emissions in the energy sector, which decreased by 14.2 per cent over this period. Emissions of CO₂ accounted for 97.9 per cent of total GHG emissions in the base year and 95.6 per cent in 2006. Emissions of fluorinated gases, which have been in use in Monaco since 1995,

accounted for 0.8 per cent of total GHG emissions in 2006. Table 2 provides an overview of GHG emissions by sector from the base year to 2006.

Table 2. Greenhouse gas emissions by sector in Monaco, 1990–2006

	GHG emissions (Gg ^a CO ₂ eq)					Change (%)		Shares ^b by sector (%)	
	1990	1995	2000	2005	2006	1990–2006	2005–2006	1990	2006
1. Energy	107.01	114.27	115.91	101.29	91.84	-14.2	-9.3	99.4	98.1
A1. Energy industries	28.22	36.11	42.69	29.95	23.04	-18.4	-23.1	26.2	24.6
A2. Manufacturing industries and construction	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA	NA	NA	NA
A3. Transport	33.37	41.24	36.87	34.17	34.15	2.3	-0.1	31.0	36.5
A4.– A5. Other	45.42	36.92	36.34	37.17	34.65	-23.7	-6.8	42.2	37.0
B. Fugitive emissions	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA	NA	NA	NA
2. Industrial processes	NA,NE,NO	0.10	2.69	1.91	0.76	NA	-60.3	NA	0.8
3. Solvent and other product use	NE	NE	NE	NE	NE	NA	NA	NA	NA
4. Agriculture	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA	NA	NA	NA
5. LULUCF	-0.03	-0.04	-0.04	-0.04	-0.04	9.6	-0.5	0.00	0.0
6. Waste	0.64	1.00	1.05	1.05	0.98	53.9	-6.0	0.60	1.1
GHG total with LULUCF	107.62	115.34	119.62	104.21	93.54	-13.1	-10.2	100.0	100.0
GHG total without LULUCF	107.65	115.38	119.65	104.25	93.58	-13.1	-10.2	100.0	100.0

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

Note: The changes in emissions and the shares by sector are calculated using the exact (not rounded) values and may therefore differ from values calculated with the rounded numbers provided in the table.

^a Gigagrams are used in this table instead of teragrams to better represent the relatively small values.

^b The shares of sectors are calculated relative to GHG emissions without LULUCF; for the LULUCF sector, the negative values indicate the share of GHG emissions that was offset by GHG removals through LULUCF.

B. Policies and measures

13. As required by the UNFCCC reporting guidelines, Monaco has provided in its NC4 information on its package of PaMs implemented, adopted and planned in order to fulfil its commitments under the Convention and its Kyoto Protocol. Each sector has its own textual description of the principal PaMs. However, the ERT noted that Monaco did not provide the following reporting elements required by the UNFCCC reporting guidelines: information on PaMs adopted to implement commitments under Article 4, paragraph 2(a) and (b), of the Convention organized by sector, subdivided by GHG (para. 17); summary tables on PaMs by sector (para. 17 and footnote 'a' to table 1); and information on how Monaco believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals consistent with the objective of the Convention (para. 25). The ERT also noted that the following information is missing from the presentation of each policy and measure, including information on each of the following subject headings: name and the effect of the policy or measure; type or types of policy or measure; status of implementation; and implementing entity or entities (para. 22).

14. Table 3 provides a summary of the reported information on the PaMs of Monaco.

1. Policy framework and cross-sectoral measures

15. Monaco's climate change policies are implemented by the Department of External Relations and the Department of Facilities, Urban Planning and Environment. Monaco formulated its energy sector PaMs in association with the neighbouring Provence Alpes Côte d'Azur region. The key cross-sectoral policy is the Plan for Energy Economy and the activities of the 'Energy-Climate-Environment' working group.

Table 3. Summary of information on policies and measures

Major policies and measures	Examples/comments
Framework policies and cross-sectoral measures	
Regional partnership/agreement	Cooperation with Provence Alpes Côte d'Azur (PACA) region in electricity supply and energy use efficiency
Policies and measures by sector	
Energy	Cooperation with PACA region in implementation of the Plan for Energy Economy; establishment and operation of an 'Energy–Climate–Environment' working group; organization of energy audits in public buildings
Transport	Research on urban transportation; limitation of parking on streets; construction of underground parking facilities; development and promotion of the use of public transportation; planning and construction of road connections to the international highway between France and Italy; technical inspection of vehicles; promotion of electric and hybrid vehicles; dissemination of information on air pollution
Waste management	Establishment of waste sorting system; establishment of industrial and toxic waste management; upgrading the waste incineration plant

2. Policies and measures in the energy sector

16. Between 1990 and 2005, GHG emissions from the energy sector decreased by 14.2 per cent (15.2 Gg), mainly driven by GHG reductions in the energy industries and residential sectors. In 2006, GHG emissions from the energy sector accounted for 98.1 per cent of total GHG emissions, mainly generated in the building, transport and energy industries sectors.

17. **Energy efficiency.** The NC4 reports that two of the three main goals of the Plan for Energy Economy are the efficient use of electricity and the change of behaviour of energy users. Two consecutive working groups have been established to formulate policies, measures and actions under this plan. Proposed actions by the most recent working group (Energy–Climate–Environment) are focused on energy efficiency improvements in public buildings.

18. **Renewable energy.** Promotion of renewable energy sources is one of the goals of the Plan for Energy Economy. The Energy–Climate–Environment working group submitted a set of short- and medium-term actions. Within the set of actions were proposals to evaluate the feasibility of renewable energy sources such as geothermal and solar energy. Following the request for additional information by the ERT during the review, Monaco elaborated on the work of the working group and noted that an information day on geothermal energy was organized in 2005.

19. **Transport sector.** The NC4 gives detailed descriptions of some PaMs in the transport sector. They comprise structural changes in the road and parking systems to avoid congestion, periodic technical inspections of cars, trucks and buses, the development of pedestrian zones, the promotion of rail transport, and the establishment of subsidies for the purchase of electric cars (EUR 3,000 per car).

20. **Building sector.** The Energy–Climate–Environment working group identified a set of short- and medium-term actions aimed at improving energy efficiency in the building sector. Following the request of the ERT during the review, Monaco provided additional information and identified an energy audit of a public school that was conducted in 2006.

21. The ERT noted that, in its NC4, Monaco has provided limited information on its PaMs in the energy sector relating to energy efficiency, renewable energy, and the transport and building sectors. The ERT encouraged Monaco to provide detailed information on these measures, their effects and their status.

3. Policies and measures in other sectors

22. Apart from the energy sector, emissions and removals occur in, and are estimated for, the industrial processes, LULUCF and waste sectors. The NC4 presents PaMs for the waste sector only. Between 1990 and 2006, GHG emissions from waste increased by 53.9 per cent.

23. The NC4 describes the various procedures adopted by Monaco for separating, recycling and treating different kinds of waste. The measures in this sector are aimed at reducing amounts of acids and bases, solvents, laboratory products, batteries, paint, wax and cosmetics, greases, oils and photographic films waste. The ERT noted that the main PaMs adopted by Monaco in this sector aim to meet the requirements of the EU directive on the incineration of waste (directive 2000/76/EC) .

24. The ERT noted that the reported PaMs target only the reduction of GHG emissions without any indication of PaMs to protect sinks and reservoirs, as stipulated by Article 4, paragraph 2(a), of the Convention. The ERT encourages Monaco to report on PaMs for the other non-energy sectors in which GHG emissions occur.

C. Projections and the total effect of policies and measures

25. In its NC4, Monaco does not provide the required GHG emissions projections and at the time the IDR was carried out, none was available. Following the request by the ERT during the review, Monaco informed the ERT that an Energy–Climate Plan for Monaco will be established in 2008–2009. This plan will include projections of GHG emissions, as well as a scenario of the possible actions which will be adopted in order to reduce energy consumption and GHG emissions. The ERT recommended that Monaco present a separate chapter, in its next national communication, on its GHG projections, following the UNFCCC reporting guidelines.

D. Vulnerability assessment, climate change impacts and adaptation measures

26. In its NC4, Monaco indicated that it has not evaluated the vulnerability of its territory to climate change or the impacts of climate change on its environment, and as a result, it has not undertaken any studies or developed any measures with regard to adaptation to the impacts of climate change.

27. In view of Monaco's small size, its coastal location and the near-exclusive dependence of its economy on tourism, the ERT recommends that Monaco, in its next national communication, evaluate its vulnerability to climate change and elaborate upon adaptation measures to cope with the adverse effects of climate change. The ERT noted that, given the coastal location of Monaco, emphasis should be placed on the potential impacts of climate-driven sea level rise and storm surges deriving from extreme weather on its coastal infrastructure facilities.

E. Financial resources and transfer of technology

1. Financial resources

28. Although Monaco is not a Party included in Annex II to the Convention (Annex II Party), it has provided information in its NC4 on financial resources relating to the implementation of the Convention provided through bilateral, regional and other multilateral channels. Furthermore, Monaco has provided information on the assistance it has given to developing country Parties that are particularly vulnerable to the adverse effects of climate change to help them meet the costs of adaptation to those adverse effects.

29. Monaco indicated that official development assistance has increased since it began in 1993. The ERT noted that Monaco reported about 10 projects in developing countries and in countries with economies in transition, and all of them were planned to be completed by 2007. Following the ERT request during the review, Monaco provided additional information on its development cooperation projects in sub-Saharan Africa (Mali and Niger) and North Africa (Morocco and Tunisia) on desertification, environmental degradation and sustainable resource management. The ERT noted the increasing financial resources allocated for bilateral and multilateral assistance for projects on environmental protection, reforestation and desertification from 2002 to 2005.

30. The ERT commended the provision of information on the international assistance projects on the website of the Government of Monaco and noted that Monaco may wish to provide more detailed information on these projects in its next national communication.

2. Transfer of technology

31. Monaco is not an Annex II Party and so is not bound by the commitments relating to the provision of financial resources and the promotion of technology transfer to developing countries as defined in Article 4, paragraphs 3, 4 and 5, of the Convention.

32. Nevertheless, in its NC4, Monaco has provided some details of measures relating to the promotion, facilitation and financing of the transfer of, or access to, environmentally sound technologies, but has not distinguished between activities undertaken by the public sector and those undertaken by the private sector. It also reported on activities relating to technology transfer and capacity-building but has not included success or failure stories. It broadly reported on its activities for financing access by developing countries to 'hard' or 'soft' environmentally sound technologies and on clean development mechanism projects in Tunisia. The ERT commends Monaco for provision of this information.

F. Research and systematic observation

33. Monaco has provided very limited information on its actions relating to research and systematic observation. However, the ERT noted that Monaco did not provide the following reporting elements required by the UNFCCC reporting guidelines: information addressing international activities (for example, the World Climate Programme, the International Geosphere–Biosphere Programme, the Global Climate Observing System and the Intergovernmental Panel on Climate Change); and action taken to support related capacity-building in developing countries.

34. Monaco's scientific centre conducts studies on the physiology of tropical and Mediterranean corals, which are very sensitive to climate change. The Office of the Environment, Urbanization and Construction routinely undertakes observations on a number of meteorological variables including air temperature, precipitation, sunshine and humidity. It also conducts periodic measurements of sea surface temperature. The ERT noted, however, that this entity does not presently undertake studies on weather forecasts or climate change.

35. The ERT encourages Monaco to amplify its efforts in the area of research and systematic observation at the national level, to involve itself in some of these activities at the global level (see para. 33 above) and to support related capacity-building in developing countries.

36. The ERT also encourages Monaco to provide a summary of information on the current status of national plans, programmes and support for ground-based climate observing systems, including long-term continuity of data, data quality, control and availability and exchange and archiving of data in: atmospheric climate observing systems, including those measuring atmospheric constituents; ocean climate observing systems; terrestrial climate observing systems; and support for developing countries to establish and maintain observing systems, and related data and monitoring systems. Furthermore, Monaco was encouraged to provide information about general policy on, and funding of, research and systematic observation.

G. Education, training and public awareness

37. In its NC4, Monaco has provided information on its actions relating to education, training and public awareness. Environmental awareness-raising is integrated in government services and in school curricula. Brochures and stamps that highlight environmental issues have been produced for the general public.

38. Monaco has also supported education, training and awareness-raising in developing countries, in particular Tunisia, through renewable energy and energy efficiency projects, and capacity-building on climate change issues. The ERT noted the efforts by Monaco in the areas of environmental education and public awareness-raising, and commends it for its climate change initiatives in developing countries.

III. Conclusions

39. In Monaco, total GHG emissions excluding emissions and removals from LULUCF were 93,580 t CO₂ eq in 2006, a decrease of 13.1 per cent since 1990. Total GHG emissions including net emissions and removals from LULUCF also decreased by 13.1 per cent in the same period. This was mainly attributed to the decline of CO₂ emissions from the energy sector. In the NC4, no GHG emissions projections are presented and at the time the IDR was carried out, none was available.

40. In the course of the IDR, the ERT formulated a number of recommendations relating to the completeness and transparency of Monaco's reporting under the Convention and its Kyoto Protocol. The key recommendations¹ are that Monaco:

- Follow more closely the outline of the national communication indicated in the UNFCCC reporting guidelines, and present a separate chapter on projections and the total effect of PaMs;
- Assess how its national circumstances affect GHG emissions and how changes in national circumstances affect GHG emissions and removals over time;
- Provide the required information on emission trends, as well as on its PaMs and their impact on longer-term trends in anthropogenic GHG emissions and removals consistent with the objective of the Convention.

41. Being a country with low-lying coastal areas and mountainous ecosystems, Monaco is encouraged to undertake an evaluation of its vulnerability to climate change and to elaborate upon adaptation measures to cope with its adverse effects. As a Party included in Annex I to the Convention, Monaco is encouraged to amplify its efforts on research and systematic observation at the national level, and to involve itself in these activities at the global level, including supporting developing countries to improve their endogenous capacities and capabilities and contributing to international efforts to strengthen systematic observation.

¹ The recommendations are given in full in the relevant section of this report.

Annex

Documents and information used during the review

A. Reference documents

“Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications”. FCCC/CP/1999/7. Available at <<http://unfccc.int/resource/docs/cop5/07.pdf>>.

“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>>.

FCCC/SBI/2007/INF.6. Compilation and synthesis of fourth national communications. Available at <<http://unfccc.int/resource/docs/2007/sbi/eng/inf06.pdf>>.

FCCC/SBI/2007/INF.7. Compilation and synthesis of supplementary information incorporated in fourth national communications submitted in accordance with Article 7, paragraph 2, of the Kyoto Protocol. Available at <<http://unfccc.int/resource/docs/2007/sbi/eng/inf07.pdf>>.

FCCC/IRR/2007/MCO. Report of the review of the initial report of Monaco. Available at <<http://unfccc.int/resource/docs/2008/irr/mco.pdf>>.

Fourth national communication of Monaco. Available at <<http://unfccc.int/resource/docs/natc/monnc4.pdf>>.

2008 GHG inventory submission of Monaco. Available at <http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/4303.php>.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Bastien Nicaise (Office of International Cooperation) and Mr. André Veglia (Office of the Environment) including additional material on institutional arrangements for climate change policy, national greenhouse gas registry, international cooperation, policies and measures for GHG reduction and GHG projections.
