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Report on the technical review of the third biennial report of Monaco

Developed country Parties were requested by decision 2/CP.17 to submit their third biennial report to the secretariat by 1 January 2018. This report presents the results of the technical review of the third biennial report of Monaco, conducted by an expert review team in accordance with the “Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention”.

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Abbreviations and acronyms

Annex I Party	Party included in Annex I to the Convention
Annex II Party	Party included in Annex II to the Convention
AR4	Fourth Assessment Report of the Intergovernmental Panel on Climate Change
BR	biennial report
CH ₄	methane
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
CRF	common reporting format
CTF	common tabular format
ERT	expert review team
EU	European Union
F-gases	fluorinated gases
GDP	gross domestic product
GHG	greenhouse gas
HFC	hydrofluorocarbon
IE	included elsewhere
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
LULUCF	land use, land-use change and forestry
NA	not applicable
NC	national communication
NE	not estimated
NF ₃	nitrogen trifluoride
NIR	national inventory report
NO	not occurring
N ₂ O	nitrous oxide
PaMs	policies and measures
PFC	perfluorocarbon
SF ₆	sulfur hexafluoride
UNFCCC reporting guidelines on BRs	“UNFCCC biennial reporting guidelines for developed country Parties”
UNFCCC reporting guidelines on NCs	“Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications”
WAM	‘with additional measures’
WEM	‘with measures’
WOM	‘without measures’

I. Introduction and summary

A. Introduction

1. This is a report on the centralized technical review of the BR3¹ of Monaco. The review was organized by the secretariat in accordance with the “Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention”, particularly “Part IV: UNFCCC guidelines for the technical review of biennial reports from Parties included in Annex I to the Convention” (annex to decision 13/CP.20).

2. In accordance with the same decision, a draft version of this report was transmitted to the Government of Monaco, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

3. The review was conducted from 12 to 17 March 2018 in Bonn, Germany, by the following team of nominated experts from the UNFCCC roster of experts: Ms. Asia Adlan (Sudan), Mr. Menouer Boughedaoui (Algeria), Mr. Christo Christov (Bulgaria), Ms. Nancy Liliana Gamba Cabezas (Colombia), Mr. Domenico Gaudio (Italy), Mr. Liviu Gheorghe (Romania), Mr. Dirk Günther (Germany), Ms. Fui Pin Koh (Malaysia), Ms. Sangchan Limjirakan (Thailand), Mr. Juan Luis Martin Ortega (Spain), Mr. Engin Mert (Turkey), Ms. Gherghita Nicodim (Romania), Mr. Koki Okawa (Japan), Ms. Marcela Itzel Olguin-Alvarez (Mexico), Mr. Brian Quirke (Ireland), Ms. Kristina Saarinen (Finland), Ms. Marina Shvangiradze (Georgia) and Ms. Caroline Tagwireyi (Zimbabwe). Mr. Gaudio, Ms. Saarinen and Ms. Shvangiradze were the lead reviewers. The review was coordinated by Ms. Veronica Colerio, Ms. Suvi Monni and Ms. Sevdalina Todorova (UNFCCC secretariat).

B. Summary

4. The ERT conducted a technical review of the information reported in the BR3 of Monaco in accordance with the UNFCCC reporting guidelines on BRs (annex I to decision 2/CP.17).

1. Timeliness

5. The BR3 was submitted on 14 February 2018, after the deadline of 1 January 2018 mandated by decision 2/CP.17. The CTF tables were submitted on 14 February 2018.

6. The ERT noted with concern the delay in the submission and recommended that Monaco make efforts to ensure that its next submission is on time. In response to a question raised by the ERT during the review, Monaco explained that it is working to resolve the problem with the delayed submission and plans to submit the next BR on time.

2. Completeness, transparency of reporting and adherence to the reporting guidelines

7. Issues and gaps identified by the ERT related to the reported information are presented in table 1. The information reported by Monaco in its BR3 partially adheres to the UNFCCC reporting guidelines on BRs.

¹ The BR submission comprises the text of the report and the CTF tables, which are both subject to the technical review.

Table 1
Summary of completeness and transparency of mandatory information reported by Monaco in its third biennial report

<i>Section of BR</i>	<i>Completeness</i>	<i>Transparency</i>	<i>Reference to description of recommendations</i>
GHG emissions and trends	Complete	Mostly transparent	Issue 2 in table 3
Assumptions, conditions and methodologies related to the attainment of the quantified economy-wide emission reduction target	Complete	Partially transparent	Issues 1–3 in table 4
Progress in achievement of targets	Mostly complete	Partially transparent	Issues 1, 2 and 4 in table 6 Issue 1 in table 8 Issues 1, 2, 4 and 9 in table 12
Provision of support to developing country Parties ^a	NA	NA	NA

Note: A list of recommendations pertaining to the completeness and transparency issues identified in this table is included in chapter III below.

^a Monaco is not an Annex II Party and is therefore not obliged to adopt measures and fulfil obligations defined in Article 4, paragraphs 3, 4 and 5, of the Convention.

II. Technical review of the information reported in the third biennial report

A. Information on greenhouse gas emissions and removals related to the quantified economy-wide emission reduction target

Information on greenhouse gas inventory arrangements, emissions, removals and trends

(a) Technical assessment of the reported information

8. Total GHG emissions² excluding emissions and removals from LULUCF decreased by 17.7 per cent between 1990 and 2015, whereas total GHG emissions including net emissions or removals from LULUCF also decreased by 17.7 per cent over the same period. Table 2 illustrates the emission trends by sector and by gas for Monaco.

Table 2
Greenhouse gas emissions by sector and by gas for Monaco for the period 1990–2015

	<i>GHG emissions (kt CO₂ eq)</i>					<i>Change (%)</i>		<i>Share (%)</i>	
	<i>1990</i>	<i>2000</i>	<i>2010</i>	<i>2014</i>	<i>2015</i>	<i>1990–2015</i>	<i>2014–2015</i>	<i>1990</i>	<i>2015</i>
<i>Sector</i>									
1. Energy	98.50	102.03	78.20	71.46	71.61	–27.3	0.2	99.2	87.6
A1. Energy industries	18.01	28.07	18.72	20.83	21.58	19.8	3.6	18.1	26.4
A2. Manufacturing industries and construction	NO	NO	NO	NO	NO	NA	NA	NA	NA
A3. Transport	33.51	37.11	26.42	26.67	24.93	–25.6	–6.5	33.7	30.5

² 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. Values in this paragraph are calculated based on the 2017 annual submission, version 2.

	GHG emissions (kt CO ₂ eq)					Change (%)		Share (%)	
	1990	2000	2010	2014	2015	1990– 2015	2014– 2015	1990	2015
	A4. and A5. Other	45.19	36.18	32.47	23.38	24.53	-45.7	4.9	45.5
B. Fugitive emissions from fuels	1.78	0.66	0.59	0.58	0.58	-67.6	-0.6	1.8	0.7
C. CO ₂ transport and storage	NO	NO	NO	NO	NO	NA	NA	NA	NA
2. IPPU	0.27	3.76	6.15	5.80	7.09	2 550.6	22.2	0.3	8.7
3. Agriculture	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NA	NA	NA	NA
4. LULUCF	0.00	-0.04	-0.05	-0.03	0.07	4 217.1	-358.1	NA	NA
5. Waste	0.55	2.05	2.38	2.55	3.01	450.5	17.9	0.6	3.7
6. Other	NO	NO	NO	NO	NO	NA	NA	NA	NA
<i>Gas^a</i>									
CO ₂	95.30	98.32	75.46	68.52	68.72	-27.9	0.3	96.0	84.1
CH ₄	2.13	2.45	2.55	2.68	3.11	46.1	16.2	2.1	3.8
N ₂ O	1.65	3.48	4.33	4.09	3.76	128.4	-8.2	1.7	4.6
HFCs	0.02	3.47	4.28	4.40	6.01	37 964.1	36.6	0.0	7.4
PFCs	NO, IE	NO, IE	NO, IE	NO, IE	NO, IE	NA	NA	NA	NA
SF ₆	0.22	0.12	0.11	0.11	0.11	-51.5	-6.0	0.2	0.1
NF ₃	NO	NO	NO	NO	NO	NA	NA	NA	NA
Total GHG emissions without LULUCF	99.31	107.84	86.73	79.81	81.71	-17.7	2.4	100.0	100.0
Total GHG emissions with LULUCF	99.31	107.80	86.68	79.78	81.78	-17.7	2.5	NA	NA

Source: GHG emission data: Monaco's 2017 annual submission, version 2. Please note that, for the purpose of the projections, the Party reported and used different inventory data for 1990–2015, which are planned to be officially submitted in the 2018 inventory submission.

^aEmissions by gas without LULUCF and without indirect CO₂.

9. The decrease in total emissions was mainly driven by factors influencing the emissions from the energy sector, such as the decrease in fuel sales for transport (excluding international shipping) and the substitution of oil for heating in the residential sector.

10. In brief, Monaco's national inventory arrangements were established in accordance with Law No. 1308 of 28 December 2005 on ratification of the Kyoto Protocol. The Environment Department is responsible for the national inventory and management of the registry. More detailed information on the national inventory arrangements is provided in the NIR. Monaco did not report on any changes in the arrangements since the BR2.

(b) Assessment of adherence to the reporting guidelines

11. The ERT assessed the information reported in the BR3 of Monaco and identified issues relating to completeness, transparency or adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table 3.

Table 3

Findings on greenhouse gas emissions and trends from the review of the third biennial report of Monaco

No.	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
1	Reporting requirement specified in paragraph 2 Issue type: transparency Assessment: encouragement	Monaco has provided in the BR3 summary information from the national GHG inventory on emissions and emission trends prepared according to the UNFCCC reporting guidelines on BRs for the period 1990–2015. However, the ERT noted inconsistencies between the data reported in CTF tables 1(d)s1–s3 for individual gases and the data provided in CRF table 2(II) of the 2017 annual inventory submission (e.g. HFC-125 in 2015). During the review, Monaco explained that the discrepancies are due to ongoing recalculations of some categories of the inventory following a quality assessment and quality control process. The ERT encourages Monaco to improve the transparency of its reporting by providing data that are consistent with the most recent annual inventory submission or provide detailed information on any changes in the specific data and the reasons behind them within the report.
2	Reporting requirement specified in paragraph 3 Issue type: transparency Assessment: recommendation	The ERT noted that, in accordance with decision 24/CP.19, paragraph 20, Annex I Parties shall provide summary information on their national inventory arrangements, and on the changes to these national inventory arrangements since their last NC or BR. Monaco provided in the BR brief information on the organization in charge of the national inventory system but did not include any references to the NIR or NC, where more information on the national arrangements is included; nor did it provide information on any change in the arrangements compared with the last BR. Noting that information on the national arrangements was provided in the NC7, the ERT recommends that Monaco improve the transparency of its reporting by including in the next BR summary information on the national inventory arrangements and changes in them since the last NC and/or BR.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on BRs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on BRs.

B. Assumptions, conditions and methodologies related to the attainment of the quantified economy-wide emission reduction target

(a) Technical assessment of the reported information

12. For Monaco the Convention entered into force on 21 March 1994. Under the Convention, Monaco committed to reducing its GHG emissions by 30 per cent below the 1990 level by 2020. The target includes all GHGs included in the “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories”, namely CO₂, CH₄, N₂O, HFCs, PFCs, SF₆ and NF₃. According to the BR and CTF table 2(b), the base year for CO₂, CH₄, N₂O, SF₆ and NF₃ is 1990 and the base year for HFCs and PFCs is 1995 (see table 4). The global warming potential values used are from the AR4. The target includes all IPCC sources and sectors included in the annual GHG inventory, except emissions and removals from the LULUCF sector (see table 4). Monaco reported that it plans to make use of market-based mechanisms to achieve its target (see chapter II.C.1 below). In absolute terms this means that, under the Convention, Monaco has to reduce its emissions from 99.32 kt CO₂ eq in the base year³ to 69.52 kt CO₂ eq by 2020.

13. Under the Kyoto Protocol, Monaco has a quantified emission limitation or reduction commitment for the second commitment period of 78 per cent of the base-year level. The base year is 1990 for CO₂, CH₄, N₂O and NF₃ and 1995 for HFCs, PFCs and SF₆.

³ Monaco chose 1990 as the base year for its 2020 target, with 1995 as the base year for the F-gases. The emission level in the base year was calculated on the basis of CTF table 1 using the above-mentioned base years for the gases. The value for the base-year total emissions using 1995 as a base year for F-gases is not reported in the BR3.

14. Monaco's political will has been further strengthened by the ratification of the Paris Agreement, and Monaco has set ambitious targets to reduce emissions by 50 per cent compared with the base-year level by 2030 and by 80 per cent by 2050 with a view to achieving carbon neutrality thereafter.

(b) Assessment of adherence to the reporting guidelines

15. The ERT assessed the information reported in the BR3 of Monaco and identified issues relating to transparency and adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table 4.

Table 4

Findings on the quantified economy-wide emission reduction target from the review of the third biennial report of Monaco

<i>No.</i>	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation</i>
1	Reporting requirement specified in table 2/ paragraph 5 Issue type: transparency Assessment: recommendation	Monaco reported in table 2(b) of its BR3 and CTF tables 2(b) and 2(d) that its quantified economy-wide emission reduction target includes the LULUCF sector. However, the Party reported in table 2(d) of its BR3 that the target excludes the LULUCF sector. The ERT noted that this is in line with the information contained in documents FCCC/SB/2011/INF.1/Rev.1 and FCCC/SBSTA/2014/INF.6. During the review, Monaco confirmed that the LULUCF sector is excluded from the target and correct information was reported in table 2(d) of its BR3. In order to improve the transparency of the description of the quantified economy-wide emission reduction target, the ERT reiterates the recommendation made in the previous review report (FCCC/TRR.2/MCO, para. 15) that Monaco clearly state in the appropriate CTF table of its next submission that the LULUCF sector is excluded from its target for 2020, as communicated in document FCCC/SBSTA/2014/INF.6 or any updates to that document. Further, the ERT recommends that Monaco consistently report the information within the BR and CTF tables.
2	Reporting requirement specified in table 2/ paragraph 5 Issue type: transparency Assessment: recommendation	The ERT noted that Monaco continues to report in its BR3 and CTF table 2(a) the base year and the emission reduction target for 2020 using two different numbers for the target (22 per cent reduction from the base year and 30 per cent reduction from 1990). The ERT noted that the BR explains that the emission reduction target under the Convention is 30 per cent from 1990, and that the 22 per cent value relates to its target under the second commitment period of the Kyoto Protocol (2013–2020). In order to improve the transparency of the description of the quantified economy-wide emission reduction target, the ERT reiterates the recommendation made in the previous review report (FCCC/TRR.2/MCO, para. 14) that Monaco include in CTF table 2(a) and the BR tables of its next submission the information related to its target under the Convention, as contained in documents FCCC/SB/2011/INF.1/Rev.1 and FCCC/SBSTA/2014/INF.6 or further revisions to these documents, and not the target under the Kyoto Protocol. The ERT notes that Monaco may use CTF table 2(f) for reporting any additional targets the Party would like to include in the BR.
3	Reporting requirement specified in table 2/ paragraph 5 Issue type: transparency Assessment: recommendation	The ERT noted that Monaco reported in table 2(b) (both in the CTF tables and in the BR text) that the base year for HFCs and PFCs is 1995 and the base year for SF ₆ and NF ₃ is 1990. However, the ERT noted that, in the BR2, the base year for all F-gases was reported as 1995. In the initial report for the second commitment period under the Kyoto Protocol Monaco also reports 1995 as the base year for F-gases. The same information is provided in documents FCCC/AWGLCA/2012/MISC.1 and FCCC/TP/2014/8. During the review the Party confirmed that for SF ₆ and NF ₃ the base year should be 1995. In order to improve the transparency of the description of the quantified economy-wide emission reduction target, the ERT recommends that Monaco report the base year consistently with the information provided for its quantified economy-wide emission reduction target under the Convention as contained in documents FCCC/SB/2011/INF.1/Rev.1, FCCC/SBSTA/2014/INF.6, as well as documents FCCC/AWGLCA/2012/MISC.1 and FCCC/TP/2014/8, which provide additional information relating to the target of Monaco and the selected base year. The ERT also recommends that the use of the base year and the relevant estimates for the base-year emissions (taking into account the different base years for

F-gases) is made consistent throughout the BR and the relevant CTF tables where the base year should be reported.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on BRs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on BRs.

C. Progress made towards the achievement of the quantified economy-wide emission reduction target

1. Mitigation actions and their effects

(a) Technical assessment of the reported information

16. Monaco provided insufficient information on its package of PaMs implemented, adopted and planned, by sector and by gas, in order to fulfil its commitments under the Convention and its Kyoto Protocol in the BR3. During the review the Party provided additional information on the PaMs (as contained in the NC7), which was used by the ERT for the technical assessment described in paragraphs 23–33 below. The ERT noted that inclusion of such information in the next BR would improve its completeness as a stand-alone report. Monaco briefly reported on its policy context and legal and institutional arrangements put in place to implement its commitments and monitor and evaluate the effectiveness of its PaMs in its BR3 (section 3.1).

17. Monaco provided information on a set of PaMs similar to, but broader than, those previously reported (see chapter II.C.1(b) below). Monaco did not provide information on any changes made since the previous submission to its institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of the progress made towards its target.

18. Monaco did not report on its self-assessment of compliance with its emission reduction target and national rules for taking action against non-compliance.

19. The key overarching cross-sectoral policy reported by Monaco is the Climate and Energy Plan, adopted in 2013 and to be revised in 2018. The plan sets the framework for future climate policy and for Monaco to meet its emission reduction target for 2020. It aims for a reduction in emissions by 30 per cent below the 1990 level, to reduce the unit energy consumption by 20 per cent compared with the 2007 level and to achieve 20 per cent of final energy consumption from renewable sources. The PaMs undertaken in the framework of the Climate and Energy Plan can be of an organizational, technical, regulatory or incentive nature and mainly focus on the energy sector, given its large reduction potential. The impact of this policy is estimated, as the sector total, to be a reduction of 4.11 kt CO₂ eq in 2020. In addition to the Climate and Energy Plan, the Environmental Code, which was adopted in 2017, constitutes the framework law for future regulations. The second chapter of the Code, on energy, has five key elements including the general objectives, which comply with the Convention and its Kyoto Protocol and GHG emission inventories. The mitigation effect of the suppression of importing French waste is the most significant among the listed measures, with a quantified mitigation impact of 6.12 kt CO₂ eq in 2020. Other policies that may deliver significant emission reductions are the “Waste management plan towards 2030”, the development of urban heating and cooling systems in buildings, and the optimization of wastewater treatment. The ERT noted that the mitigation impact of the measures is not reported in CTF table 3.

20. Monaco highlighted the mitigation actions that are under development, such as increasing the fraction of biomethane in the total gas consumption to 30 per cent by 2030 and reducing emissions from dry cleaning.

21. Table 5 provides a summary of the reported information on the PaMs of Monaco.

Table 5
Summary of information on policies and measures reported by Monaco

<i>Sector</i>	<i>Key PaMs</i>	<i>Estimate of mitigation impact by 2020 (kt CO₂ eq)</i>	<i>Estimate of mitigation impact by 2030 (kt CO₂ eq)</i>
Policy framework and cross-sectoral measures	Climate and Energy Plan	4.11	7.4
	Environmental Code	(sector total)	(sector total)
	Committed Commerce Approach	NE	NE
Energy	Waste management plan towards 2030	NE	NE
	Transport	IE	IE
Renewable energy	Increase the number of electric and hybrid vehicles	NE	NE
	Promotion of bicycles and electric bicycles	NE	NE
	Increase of fraction of biomethane in total gas consumption	2.69	3.39
Energy efficiency	Requalification of the incineration plant from waste to energy	IE	IE
	Development of urban heating and cooling systems for buildings	0	4.15
IPPU	Energy efficiency regulations and audits for new buildings and refurbished buildings	NE	NE
	Reduction in emissions of F-gases	0.1	2.3
	Reduction in emissions from dry cleaning	0	0
LULUCF	Tree Code	NE	NE
	Preservation of green spaces	NE	NE
Waste	Suppression of import of French waste	6.12	6.12
	Waste management plan towards 2030	2.95	4.52
	Optimization of wastewater treatment	0.5	3.73

Note: The estimates of mitigation impact are estimates of emissions of CO₂ or CO₂ eq avoided in a given year as a result of the implementation of mitigation actions.

22. Monaco provided the estimation of impacts for the significant PaMs in its BR3. These are new measures that take into account the evolution of the PaMs planned (additional) and adopted in relation to the objectives of the principality and the trends observed in the last four years. However, some existing PaMs reported previously that will have large impacts on achieving the target in 2020 are not mentioned in the current submission.

(b) Policies and measures in the energy sector

23. The energy sector is the sector of greatest importance for the GHG emissions in Monaco, accounting for 87.6 per cent of national emissions in 2015 (see table 2). Between 1990 and 2015, GHG emissions from the energy sector decreased from 99.2 per cent of the national total (a decrease of 26.89 kt CO₂ eq), mainly owing to the trends in fuel sales for road transport and the substitution of oil for heating in other sectors (residential, commercial/institutional).

24. **Energy supply.** France provides most of the electricity used in Monaco. Within the principality, energy is produced by seawater heat pumps and by waste incineration plants. This energy production accounted for 26.4 per cent of total GHG emissions in 2015, nearly all of which relates to waste incineration. With the priority to reduce the quantity of waste incinerated, especially of fossil fuel waste, the waste incinerated has decreased in recent years to 50,000 t waste per year. A share of the incinerated waste is imported from France.

Thus, in 2015, the imported waste accounted for more than 16,000 t household waste. The treatment of imported waste from France will be terminated from 2019, which is expected to reduce emissions in 2020 by 6.12 kt CO₂ eq. A refurbishment of the incineration plant is planned by 2025, which will allow for the implementation of improved technologies; and priority is to be given to incineration for energy production, with the reduced incineration capacity being a maximum of 45,000 t waste per year.

25. **Renewable energy sources.** Monaco has used its coastline to install more than 60 seawater heat pumps. These plants produce about 176,000 MWh per year, or 15–20 per cent of the final energy consumption. In addition to current heat pumps under operation for individual buildings, Monaco plans to develop two loops for heating and cooling buildings in the Condamine and Larvatto districts, with the aim of bringing these into service in 2022, in order to renovate the buildings that are currently heated by fuel boilers. With regard to traditional renewable energy sources, the NC7 provided information on a subsidy implemented to promote the development of solar photovoltaic energy (30 per cent of the cost of solar installation), and on the planned increase of the biomethane fraction in natural gas consumption. The NC7 reports that the efforts to increase the use of renewables is already visible in Monaco and in 2016 125 MWh were produced by photovoltaic energy.

26. **Energy efficiency.** GHG emissions from the other energy sectors, including public, commercial and residential buildings, have been reduced significantly since 1990 (45.19 kt CO₂ eq) to 24.53 kt CO₂ eq in 2015, representing 45.5 and 30.0 per cent of total emissions in 1990 and 2015, respectively. Many of the PaMs presented in the NC7 are related to energy efficiency, especially those measures implemented in public buildings. Energy economies are ensured by the more stringent regulations set for new buildings. An example is the technical management of public buildings to control energy use. In 2018–2019, a total of 250 buildings will be equipped with remote energy management. Energy audits will cover all existing building up to 2022 with follow-up renovations to ensure their energy efficiency.

27. **Residential and commercial sectors.** Several PaMs have been implemented to control the energy consumed by residential buildings. New and additional PaMs include: the Smart+ project for the 100 largest consumers of electricity to know more precisely their electricity usage; a subsidy for the replacement of single-glazed windows by double glazing; and the generalized application of a ban on heating oil to all buildings.

28. **Transport sector.** GHG emissions from the transport sector have decrease by 25.6 per cent between 1990 and 2015 (24.93 kt CO₂ eq in 2015). Those emissions accounted for 30.5 per cent of total emissions in 2015, and more than 90 per cent of the emissions are from road transport. The Government's transport policy is to reduce the various negative impacts of road traffic, such as reduced attractiveness, noise and air pollution. The effects of other various transport policies, including French and EU measures on road transport, are difficult to quantify directly, but the impacts of these are reflected in the GHG inventory through the sale of fuels. Thus, the EU directive on biofuels in transport (EU directive 2015/1513) directly impacts Monaco via the fuel import from France. Some examples of recent policy developments in Monaco include: the improved bus service between Nice and Monaco; a car-sharing service of electric vehicles with an initial 15 vehicles in 2014 and a future goal of 50 vehicles; the subsidy to purchase electric vehicles at 30 per cent of the price up to EUR 9,000; the acquisition of additional hybrid buses; and a rental service for electric bicycles, with 17 stations and a fleet of 105 bicycles in 2018. Monaco reported that two urban goods distribution centres were established in 1989 to optimize the distribution of goods while reducing the number of trucks in circulation and the GHG emissions.

29. The NC7 states that Monaco is a member of the European Civil Aviation Conference and thereby fully supports the efforts of the International Civil Aviation Organization to address environmental concerns, including the strategic challenge of climate change for sustainable development of international air transport.

30. **Industrial sector.** Since the 1950s, the industrial sector in Monaco has largely relied on light, non-polluting industries that generate a high added value. Monaco reported that heavy chemistry, iron and steel, cement, raw materials extraction or any other heavy

industries are not occurring (NC7 section 2.10, p.51) and therefore it has not reported any PaMs targeting energy consumption by the industrial sector.

(c) Policies and measures in other sectors

31. **Industrial processes.** GHG emissions from the industrial process sector have increased sharply since 1990 (0.27 kt CO₂ eq), to 7.09 kt CO₂ eq in 2015 (8.7 per cent of total emissions), mainly owing to an increase in the use of HFCs and PFCs in refrigeration and air-conditioning devices. Monaco will indirectly benefit from regulations adopted in France and the EU (e.g. the quotas set on certain F-gases by EU regulation 517/2014) for reduction of F-gas emissions. In order to promote actions in this area, a new national regulation will be adopted in 2018 aimed at prohibiting equipment whose operation emits the highest levels of F-gases and taking measures to limit fugitive emissions (leak tests of all devices containing F-gases).

32. **LULUCF.** The LULUCF sector had been a net sink in Monaco until 2014, but it was a source of emissions of 0.07 kt CO₂ eq in 2015 (0.08 per cent of total emissions). Its historical removals were mainly driven by conservation policies and preservation of green spaces. Responding to a question from the ERT on the preservation of green spaces, Monaco explained that the new urban planning regulation sets the green/pavement space obligations. These obligations are stated in a landscape plan. Monaco also reported a Tree Code (Sovereign Order no. 3197), which defines actions to manage and conserve heritage trees in the principality.

33. **Waste management.** GHG emissions from waste increased to 3.01 kt CO₂ eq in 2015 (3.7 per cent of total emissions), mainly driven by an increase in the amount of sewage sludge produced in the principality. Monaco has reported numerous measures under the “Waste management plan towards 2030”, which aims to reduce the amount of waste and the amount of waste to be incinerated. The wastewater treatment plant in Monaco has a treatment capacity of 100,000 population equivalent, which at present does not allow for the purification of all the effluent produced. The treatment process will therefore be reinforced and restructured in 2018 to reach a capacity of 130,000 population equivalent. Although an increase of sewage sludge generation is anticipated, the amount of total waste incinerated will decrease together with the reduction of household waste.

(d) Response measures

34. Monaco reported on the assessment of the economic and social consequences of response measures. The Party presented several initiatives aimed at minimizing adverse impacts. Monaco reported that it is working with Mongolia on issues linked to agricultural production. Some of the actions undertaken in the realm of this cooperation include developing innovative concepts of agricultural production and livestock adapted to extreme climate, and introducing agricultural and livestock production methods to enable nomadic people to continue to live off their traditional livelihoods. During the review, Monaco provided the ERT with additional information on the support provided and future plans.

(e) Assessment of adherence to the reporting guidelines

35. The ERT assessed the information reported in the BR3 of Monaco and identified issues relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table 6.

Table 6
Findings on mitigation actions and their effects from the review of the third biennial report of Monaco

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
1	Reporting requirement specified in paragraph 6	The ERT noted that the information reported on PaMs in the BR3 was very limited, did not cover all sectors and was not organized entirely in line with the UNFCCC reporting guidelines on BRs. Monaco has provided a brief description of its policies only for the energy sector. The textual information in the BR3 was supplemented by a single table, table 3, covering all PaMs. In addition, table 3 of the BR3 does not specify the sector affected for

Issue type:

transparency	each of the PaMs, but indicates only the gases affected.
Assessment: recommendation	The ERT recommends that Monaco enhance the transparency of its reporting by providing further information on its PaMs in the next BR, including on the PaMs it has implemented or plans to implement since its last NC or BR, organizing to the extent possible the reporting of mitigation actions by sector (energy, IPPU, agriculture, LULUCF, waste and other sectors) and by gas. The ERT further notes that providing information on which of the PaMs are new compared with the previous BR would improve the transparency of the reporting.
2 Reporting requirement specified in paragraph 7	According to paragraph 7 of the UNFCCC reporting guidelines on BRs, each Annex I Party shall provide information on changes in its domestic institutional arrangements, including institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of the progress towards its economy-wide emission reduction target. The omission was discussed in the previous review report (FCCC/TRR.2/MCO, para. 22). In its BR3, Monaco provides brief information on its institutional arrangements, but is not specific on any changes applied since the last BR.
Issue type: transparency	In response to a question raised by the ERT during the review, Monaco explained that there have been no changes in its domestic institutional arrangements since the BR2.
Assessment: recommendation	To enhance the transparency of reporting, the ERT recommends that Monaco enhance the description of its domestic institutional arrangements, including institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of the progress made towards its target, including a clear indication of whether or not any changes in the domestic institutional arrangements have occurred since the last submission.
3 Reporting requirement specified in paragraph 8	The BR3 does not include the information required by the UNFCCC reporting guidelines on BRs on the assessment of the economic and social consequences of response measures.
Issue type: completeness	In response to a question raised by the ERT during the review, Monaco indicated that the work undertaken within the framework of the revision of the Climate and Energy Plan provides for some assessment of social and economic impact and the European Energy Award labelling scheme is evaluating the principality's actions regarding energy and climate protection policy, including assessment of the economic and social consequences of response measures.
Assessment: encouragement	The ERT reiterates the encouragement made in the previous review report (FCCC/TRR.2/MCO, para. 23) that Monaco improve the completeness of its reporting by providing in its next submission, to the extent possible, detailed information on the assessment of the economic and social consequences of its response measures.
4 Reporting requirement specified in CTF table 3	The reporting of the CTF tables is a mandatory requirement according to the UNFCCC reporting guidelines on BRs. In CTF table 3, Parties should report, inter alia, estimates of the mitigation impact of the reported measures. The ERT noted that Monaco's CTF table 3 does not include any information on the quantitative impact of the PaMs or any explanation of this omission. In the BR3 (table 3) quantitative estimates are provided for some PaMs for 2020 and 2030 and the notation key "nd" (not available) is used for other PaMs. The ERT noted that Monaco explained in the BR that the impact of measures is difficult to quantify for the transport sector.
Issue type: transparency	The ERT reiterates the recommendation made in the previous review report (FCCC/TRR.2/MCO, para. 20) that Monaco provide in its next submission estimates of the impacts of reported individual mitigation actions or clearly explain why it is unable to do so. The ERT further recommends that the Party present the information on the mitigation impact of the measures consistently between the BR and CTF tables.
Assessment: recommendation	The ERT noted that the BR3 of Monaco does not include the information required by the UNFCCC reporting guidelines on BRs on the domestic arrangements established for the process of self-assessment of compliance with emission reductions required by science, and on the progress made in the establishment of national rules for taking action against non-compliance with emission reduction targets. The issue was raised in the previous review report (FCCC/TRR.2/MCO, para. 24).
5 Reporting requirement specified in paragraph 24	
Issue type: completeness	

Assessment: encouragement	<p>During the review, Monaco explained that there are no strong national rules for taking action against non-compliance with the emission reduction target. However, the compliance against the target is evaluated by the Government and the Environment Department, using the NIRs, BRs and NCs, resulting in, for example, the decision to resort to the clean development mechanism to achieve the target. In addition, the revision of the Climate and Energy Plan from 2018 includes self-assessment of the progress achieved.</p> <p>The ERT encourages Monaco to improve the completeness of its reporting by including in its next BR information on the domestic arrangements established for the process of self-assessment of compliance and actions taken against non-compliance (e.g. using as a basis the information provided during the review).</p>
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Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on BRs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on BRs.

1. Estimates of emission reductions and removals and the use of units from market-based mechanisms and land use, land-use change and forestry

(a) Technical assessment of the reported information

36. For 2014 Monaco reported in CTF table 4, included in the BR3, annual total GHG emissions excluding LULUCF of 79.81 kt CO₂ eq, which is 19.6 per cent below the 1990 level. The ERT noted that the total emissions excluding LULUCF in 2014 are not reported in CTF table 4.

37. For 2015 Monaco reported in CTF table 4, included in the BR3, annual total GHG emissions excluding LULUCF of 81.71 kt CO₂ eq, which is 17.7 per cent below the 1990 level. The ERT noted that the total emissions excluding LULUCF in 2015 are not reported in CTF table 4.

38. On its use of units from LULUCF activities, Monaco indicated that its target excludes emissions and removals from the LULUCF sector. Monaco reported that it intends to use units from market-based mechanisms under the Kyoto Protocol. It reported in CTF tables 4 and 4(b) that it had not used any units from market-based mechanisms towards the achievement of its 2020 target and reported zeros for 2015 and 2016. Table 7 illustrates Monaco's total GHG emissions, the contribution of LULUCF and the use of units from market-based mechanisms to achieve its target.

Table 7
Summary of information on the use of units from market-based mechanisms and land use, land-use change and forestry by Monaco to achieve its target

<i>Year</i>	<i>Emissions excluding LULUCF (kt CO₂ eq)^a</i>	<i>Contribution of LULUCF (kt CO₂ eq)^b</i>	<i>Emissions including contribution of LULUCF (kt CO₂ eq)</i>	<i>Use of units from market-based mechanisms (kt CO₂ eq)^c</i>
Base year ^d	99.32	NA	NA	NA
1990	99.31	NA	NA	NA
2010	86.73	NA	NA	NA
2011	83.14	NA	NA	NA
2012	87.06	NA	NA	NA
2013	87.46	NA	NA	0.00
2014	79.81	NA	NA	0.00
2015	81.71	NA	NA	0.00
2016	NA	NA	NA	0.00

Sources: Monaco's BR3 and CTF tables 1, 4, 4(a)I, 4(a)II and 4(b).

^a The values in this column are taken from CTF table 1 and table 4 from the BR text.

^b Monaco's target does not include emissions and removals from LULUCF. Monaco has not reported emissions including LULUCF, contribution of LULUCF or emissions including the contribution of LULUCF in CTF tables 4, 4(a)I and 4(a)II. However, the values on contribution of LULUCF are mistakenly reported in table 4 of the BR.

^c Monaco reported that it retains the option to make use of market-based mechanisms to achieve its target. It has reported zeros for 2015 and 2016 in tables 4 and 4(b).

^d The base-year emissions include the values for 1990 emissions for CO₂, CH₄ and N₂O and 1995 emissions reported for the F-gases, as estimated by the ERT.

39. In assessing the progress towards the achievement of the 2020 target, the ERT noted that Monaco's emission reduction target under the Convention is 30 per cent below the 1990 level (see para. 12 above). As mentioned above, in 2015 Monaco's annual total GHG emissions excluding LULUCF were 17.7 per cent (17.61 kt CO₂ eq) below the base-year level.

40. The ERT noted that Monaco is making progress towards its emission reduction target by implementing and planning mitigation actions that are delivering emission reductions. On the basis of the results of the projections (see table 10), the ERT also noted that the Party is making progress towards achieving its target under the Convention.

41. Monaco has to reduce its emissions from 99.32 kt CO₂ eq in the base year to 69.52 kt CO₂ eq by 2020 and total emissions (which peaked at 107.84 kt CO₂ eq in 2000) have gradually declined to 81.71 kt CO₂ eq in 2015, according to CTF table 1. The ERT noted that Monaco is keeping open the option to use units from market-based mechanisms in case it faces challenges in making sufficient progress towards its target with the implemented and planned measures.

(b) Assessment of adherence to the reporting guidelines

42. The ERT assessed the information reported in the BR3 of Monaco and identified an issue relating to transparency and adherence to the UNFCCC reporting guidelines on BRs. The finding is described in table 8.

Table 8

Findings on estimates of emission reductions and removals and the use of units from market-based mechanisms and land use, land-use change and forestry from the review of the third biennial report of Monaco

No.	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation</i>
1	Reporting requirement specified in CRF table 4/ paragraph 9 Issue type: transparency Assessment: recommendation	<p>The reporting of the CTF tables is a mandatory requirement according to the UNFCCC reporting guidelines on BRs. Monaco's CTF table 4 is left almost empty and includes only zeros for quantity of units from market-based mechanisms under the Convention for 2015 and 2016. The ERT noted that the same table reported in the BR includes data on the total GHG emissions without LULUCF, on the contribution from the LULUCF sector and on the use of units from market-based mechanisms. The ERT noted that an issue regarding the erroneous inclusion of the LULUCF sector in CTF table 4 was raised in the previous review report (FCCC/TRR.2/MCO, para. 31).</p> <p>During the review, Monaco clarified that the contribution from the LULUCF sector does not need to be mentioned in CTF table 4 because LULUCF is not included in its target and confirmed the inconsistency of reporting.</p> <p>The ERT recommends that the Party transparently and consistently report the data in CTF table 4 and in the BR and reiterates the recommendation made in the previous review report (FCCC/TRR.2/MCO, para. 31) that Monaco provide correct information on the use of units from market-based mechanisms (for all relevant years, starting with 2013) and LULUCF as part of the reporting on the progress made towards the achievement of its target. The ERT notes that transparency could be improved by including the data on the total GHG emissions without LULUCF starting with the base year under the Convention (see issue 3 in table 4 above) and by using notation keys and footnotes to the table, as appropriate (e.g. the notation key "NA" could be used when a Party does not plan to use units from market-based mechanisms; and the value "0" when the Party intends to use units from market-based mechanisms but does not use units in a given year).</p>

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on BRs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on BRs.

3. Projections overview, methodology and results

(a) Technical assessment of the reported information

43. Monaco reported updated projections for 2020 and 2030 relative to actual inventory data for 2015 under the WEM scenario. Monaco indicated in its BR3 that the inventory data used for preparing the projections have been recalculated as a result of an update of emission factors, correction of errors and changes in the methodology for Monaco's next NIR, which had not been officially submitted at the time of the current review. These updated data were presented in table 6 in the NC7 and are used for this section of the review report.

44. The WEM scenario reported by Monaco includes implemented and adopted PaMs until 2030. In addition to the WEM scenario, Monaco reported the WAM and WOM scenarios. The WAM scenario includes planned PaMs, while the WOM scenario excludes all PaMs implemented, adopted or planned after 2015. The ERT noted that the WAM scenario was not provided in the BR2 and the provision of the WAM scenario in the BR3 follows an encouragement made in the previous review report.⁴ The definitions indicate that the scenarios were prepared according to the UNFCCC reporting guidelines on NCs, despite some problems with the labelling of the measures included in the WEM scenario. The BR3 does not describe the scenarios in the projections section and the specific PaMs included in them.

45. The projections are presented on a sectoral basis, using sectoral categories different from those used in the reporting on mitigation actions, and on a gas-by-gas basis for CO₂, CH₄, N₂O, PFCs, HFCs, SF₆ and NF₃ for 2015–2030 in CTF tables 6(a), 6(b) and 6(c). The

⁴ FCCC/TRR.2/MCO, paragraph 38.

projections are also provided in an aggregated format using global warming potential values from the AR4.

46. Monaco did not report emission projections for indirect GHGs such as carbon monoxide, nitrogen oxides, non-methane volatile organic compounds and sulfur oxides in the BR3.

47. Emission projections related to fuel sold to ships and aircraft engaged in international transport were not included in the totals. Information on the projections related to bunker fuels was not included in the BR3.

48. Monaco did not report on factors and activities affecting emissions for each sector in the BR3; however, a reference to the previous NC was included. During the review, Monaco provided additional information on the projection of underlying factors, which facilitated the review process.

49. The ERT considers that including more descriptive information on the projection scenarios, the approaches used for them, the PaMs considered for each of the scenarios and relevant information on factors and activities underlying projected emission trends for each sector would improve the completeness of Monaco's next BR.

(b) Methodology, assumptions and changes since the previous submission

50. The methodology used for the preparation of the projections is similar to that used for the preparation of the emission projections for the NC6 and BR2. Monaco reported in its BR that for projections it uses accounting as in the annual inventories and the only methodological difference from the previous projections is a change in the inventory methodology compared with that used for the 2017 NIR, which also affects the estimation of future emissions from the sectors using the bottom-up approaches applied by the Party. During the review, the Party indicated that further changes in the projections are due to updates to the PaMs, for instance for energy industries and other energy sectors, and updates to the assumptions used (e.g. on the trends for F-gases).

51. To prepare its projections, Monaco relied on population growth as the only underlying key variable reported in CTF table 5. Variables such as energy prices and economic development indicators were not taken into account. During the review, Monaco provided further data and explanations per sector. The reported scenarios were built on specific assumptions for each sector.

52. Sensitivity analyses were conducted for a number of assumptions. However, the BR3 includes neither information on these analyses nor a reference to the NC7 where the information is included.

(c) Results of projections

53. The projected emission levels under different scenarios, and information on the quantified economy-wide emission reduction target, are presented in table 9 and the figure below. The values in the table use the historical and projection data as contained in the NC7 (see para. 43 above) and the updated 1990 and 1995 data are not the same as in the 2017 annual inventory submission, the GHG emission section of the BR3, CTF table 1 and table 2 of this report.

Table 9
Summary of greenhouse gas emission projections for Monaco

	<i>GHG emissions (kt CO₂ eq per year)</i>	<i>Changes in relation to base-year^a level (%)</i>	<i>Changes in relation to 1990 level (%)</i>
Quantified economy-wide emission reduction target under the Convention ^b	69.96 ^c	30.0	30.0
Inventory data 1990 ^d	99.95	NA	NA
Inventory data 2015 ^d	84.11	-15.3	-15.8

	GHG emissions (kt CO ₂ eq per year)	Changes in relation to base-year ^a level (%)	Changes in relation to 1990 level (%)
WOM projections for 2020 ^e	82.04	-17.4	-17.9
WEM projections for 2020 ^e	66.16	-33.4	-33.8
WAM projections for 2020 ^e	61.82	-37.8	-38.1
WOM projections for 2030 ^e	79.90	-19.5	-20.1
WEM projections for 2030 ^e	55.77	-43.8	-44.2
WAM projections for 2030 ^e	44.89	-54.8	-55.1

Note: The projections are for GHG emissions without LULUCF.

^a “Base year” in this column refers to the base year under the Convention. For Monaco it is 1990 for CO₂, CH₄ and N₂O and 1995 for F-gases. The base-year emissions are 99.32 kt CO₂ eq according to the 2017 annual GHG inventory and 99.93 kt CO₂ eq according to the revised inventory data reported in the NC7. The values in the column “Changes in relation to base-year level” reflect the change compared with the base year calculated on the basis of the 2017 annual inventory and the values in the column “Changes in relation to 1990 level” give the difference compared with the updated inventory data.

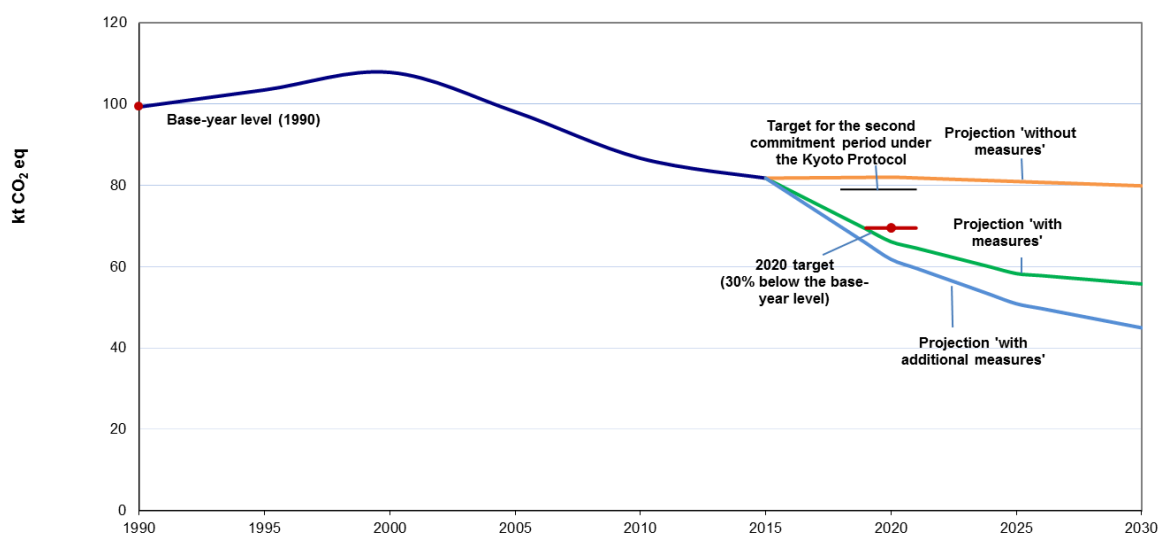
^b The quantified economy-wide emission reduction target under the Convention for Monaco is to reduce emissions by 30 per cent compared with the base-year level by 2020.

^c The value reported is the value calculated using the updated inventory data reported in the projection section of the NC7 (as reported on p.163 of the NC7).

^d From Monaco’s projection table as contained in Monaco’s NC7. The value differs from the values in BR3 CTF tables 1 and 6.

^e From Monaco’s NC7 and BR3.

Greenhouse gas emission projections reported by Monaco



Sources: Data for the years 1990–2015 and 2020 and 2030: Monaco’s NC7 and BR3 CTF table 6; total GHG emissions excluding LULUCF.

54. Monaco’s total GHG emissions excluding LULUCF are projected to be 66.16 and 55.77 kt CO₂ eq in 2020 and 2030, respectively, under the WEM scenario, which represents a decrease of 33.8 and 44.2 per cent, respectively, below the 1990 level. Under the WAM

scenario, emissions in 2020 and 2030, amounting to around 61.82 and 44.89 kt CO₂ eq, respectively, are projected to be lower than those in 1990 by 38.1 and 55.1 per cent, respectively.

55. Monaco committed itself to reducing its total GHG emissions by 30 per cent by 2020 compared with the base year (or to reach an emission level of 69.96 kt CO₂ eq using the recalculated inventory data for 1990). The 2020 projections suggest that Monaco can be expected to achieve its 2020 target under the Convention. Under the WEM scenario, Monaco appears to be in a position to reach its emission reduction target for the second commitment period by domestic PaMs alone because the total GHG emissions in 2020 are expected to amount to 66.16 kt CO₂ eq or a 33.8 per cent reduction under the WEM scenario.

56. Monaco presented the WEM and WAM scenarios by sector for 2020 and 2030, as summarized in table 10.

Table 10
Summary of greenhouse gas emission projections for Monaco presented by sector

Sector	GHG emissions and removals (kt CO ₂ eq)					Change (%)			
	1990	2020		2030		1990–2020		1990–2030	
		WEM	WAM	WEM	WAM	WEM	WAM	WEM	WAM
Energy (not including transport)	64.98	31.93	28.48	26.00	12.16	–50.9	–56.2	–60.0	–81.3
Transport	33.94	27.63	26.73	24.28	19.27	–18.6	–21.2	–28.5	–43.2
Industry/industrial processes	0.48	5.70	5.70	4.83	3.99	1087.5	1087.5	906.3	731.3
Agriculture	0.00	NO	NO	NO	NO	–	–	–	–
LULUCF	0.00	–0.01	–0.01	–0.01	–0.01	–	–	–	–
Waste	0.55	0.90	0.90	0.66	0.66	63.6	63.6	20.0	20.0
Other (specify)									
Total GHG emissions without LULUCF	99.95	66.16	61.82	55.77	44.89	–33.8	–38.1	–44.2	–55.1

Source: GHG emission data: Monaco's table on projections as contained in its NC7.

57. According to the projections reported for 2020 under the WEM scenario, the most significant emission reductions are expected to occur in the energy sector (excluding transport) followed by the transport sector, amounting to projected reductions of 33.05 kt CO₂ eq (50.9 per cent) and 6.31 kt CO₂ eq (18.6 per cent) between 1990 and 2020, respectively. The pattern of projected emissions reported for 2030 under the same scenario slightly changes in the energy sector (without transport) because the measures with the strongest impact on the WEM scenario are expected to be implemented around 2020.

58. The projections reported for 2030 under the WEM scenario show that the most significant reduction will continue to occur in the energy sector (without transport) and in the transport sector, with 39.04 kt CO₂ eq (60.0 per cent) and 9.66 kt CO₂ eq (28.5 per cent) between 1990 and 2030, respectively. Monaco expects an increase of 5.22 kt CO₂ eq (1,087.5 per cent) and of 4.83 kt CO₂ eq (906.3 per cent) in the emissions from the IPPU sector for 2020 and 2030, respectively, compared with the emission levels in 1990. The ERT notes that the projections show a decreasing trend for the IPPU sector after 2015, in contrast to the increasing emission trend observed from 1990 to 2015 (see table 2).

59. If additional measures are considered (i.e. under the WAM scenario), the patterns of emission reductions by 2020 presented by sector and by gas remain the same.

60. Monaco presented the WEM and WAM scenarios by gas for 2020 and 2030, as summarized in table 11.

Table 11
Summary of greenhouse gas emission projections for Monaco presented by gas

Gas	GHG emissions and removals (kt CO ₂ eq)					Change (%)			
	1990	2020		2030		1990–2020		1990–2030	
		WEM	WAM	WEM	WAM	WEM	WAM	WEM	WAM
CO ₂	95.53	57.56	53.23	48.40	38.46	–39.7	–44.3	–49.3	–59.7
CH ₄	2.14	1.02	1.02	0.75	0.72	–52.3	–52.3	–65.0	–66.4
N ₂ O	2.06	2.36	2.35	2.31	2.24	14.6	14.1	12.1	8.7
HFCs	0.00	5.11	5.11	4.21	3.37	–	–	–	–
PFCs	NO, IE	NO	NO	NO	NO	–	–	–	–
SF ₆	0.22	0.11	0.11	0.11	0.11	–50.0	–50.0	–50.0	–50.0
NF ₃	NO	NO	NO	NO	NO	–	–	–	–
Total GHG emissions without LULUCF	99.95	66.16	61.82	55.77	44.89	–33.8	–38.1	–44.2	–55.1

Source: GHG emission data: Monaco's table on projections as contained in its NC7.

61. For 2020 the most significant reductions under the WEM scenario are projected for CO₂ and CH₄ emissions: 37.98 kt CO₂ eq (39.7 per cent) and 1.12 kt CO₂ eq (52.3 per cent) between 1990 and 2020, respectively. The projections show an increase in N₂O emissions in the same period. However, the contribution of N₂O to the overall emissions remains very low. Monaco expects a significant increase in the HFC/PFC emissions, from negligible emissions in 1990 to 5.11 kt CO₂ eq in 2020. The ERT notes that the projections show a decreasing trend for F-gases compared with 2015 for the projections, in contrast to the increasing emission trend observed from 1990 to 2015 (see table 2).

62. The pattern of projected emissions reported for 2030 under the same scenario remains the same for CO₂ and HFCs/PFCs but differs for CH₄ and N₂O. After a strong decrease between 2015 and 2020, CH₄ and N₂O emissions slightly decrease from 2020 to 2030. The most significant reductions are projected for CO₂ and CH₄ emissions: 47.13 kt CO₂ eq (49.3 per cent) and 1.39 kt CO₂ eq (65.0 per cent) between 1990 and 2030, respectively. The contribution of both CH₄ and N₂O to the total emissions in the WEM scenario remains very low (below 5 per cent).

63. If additional measures are considered (i.e. in the WAM scenario), the patterns of emission reductions by 2020 and by 2030 presented by gas remain the same.

64. The ERT noted that there are differences in the results of the projections between Monaco's NC7 and BR3 and its BR2 under the WEM scenario (Monaco did not include a WAM scenario in its BR2). Although Monaco reports in its NC7 and BR3 a total emission reduction excluding LULUCF of 33.79 kt CO₂ eq (33.8 per cent) between 1990 and 2020, the emission reduction for the same period was reported as 27.01 kt CO₂ eq (27.3 per cent)⁵ in the BR2. The BR2 does not provided details on the assumptions underlying the projections. Monaco did not discuss any differences in the assumptions or results of the projections in its BR3.

⁵ Calculated by the ERT based on Monaco's BR2 CTF table 6(a) in MCO-BR2-2016-v1.0, available at http://unfccc.int/files/national_reports/biennial_reports_and_iar/submitted_biennial_reports/application/pdf/mco-br2-2016-v1.0.pdf.

(d) Assessment of adherence to the reporting guidelines

65. The ERT assessed the information reported in the BR3 of Monaco and identified issues relating to transparency, completeness and adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table 12.

Table 12

Findings on greenhouse gas emission projections reported in the third biennial report of Monaco

No.	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
1	Reporting requirement ⁴⁹ specified in paragraph 29 Issue type: transparency Assessment: recommendation	<p>Monaco included in its BR3 projections for the WEM, WAM and WOM scenarios. In an overview of the PaMs that are taken into account in the WEM scenario, the ERT noted that Monaco indicates that in the WEM projections one planned measure regarding the modernization of the waste energy recovery plant was included.</p> <p>During the review, Monaco explained that the modernization of the waste energy recovery plant is no longer considered as planned but as adopted because the budget and human resources have already been allocated to it and the corresponding studies are being conducted.</p> <p>The ERT recommends that Monaco improve the transparency of its reporting by ensuring that in its next BR all PaMs are correctly labelled as “planned”, “implemented” and “adopted” and included in the projection scenarios consistently with the definition for each scenario.</p>
2	Reporting requirement ⁴⁹ specified in paragraph 31 Issue type: transparency Assessment: recommendation	<p>Monaco included in its BR projections on a sectoral basis and on a gas-by-gas basis for 2020–2030 in a tabular format using tables 6(a), 6(b) and 6(c). Together with the projections, actual inventory data for the period 1990–2015 were provided as requested by the UNFCCC reporting guidelines on NCs. However, the ERT noted inconsistencies between the updated inventory data included in the projections section of the BR and the CRF data and the data in CTF table 1. Further, there were differences with the data reported in the projections tables in the NC7, which the Party confirmed during the review as being the most up-to-date data.</p> <p>The BR3 notes that the data used for the projections are different from the data in the 2017 annual submission. However, the information provided in the BR is not sufficiently detailed to indicate the specific differences at sector/category level and the BR3 provides no numerical information on the differences.</p> <p>The ERT recommends that Monaco improve the transparency of its next BR by presenting emission projections relative to actual inventory data for the preceding years reported in the inventory section of the BR, or clearly specify any changes in the inventory data and explain the rationale for using different inventory data for the projections. The ERT further notes the need for consistency between data provided in NCs and BRs submitted simultaneously.</p>
3	Reporting requirement ⁴⁹ specified in paragraph 35 Issue type: completeness Assessment: encouragement	<p>The ERT noted that Monaco reported emissions of CO₂, CH₄, N₂O, PFCs, HFCs and SF₆ (treating PFCs and HFCs collectively in each case) and provided projections of the indirect GHGs carbon monoxide, nitrogen oxides and non-methane volatile organic compounds, as well as sulfur oxides, in the NC7, but the information on indirect gases is not included in the BR3.</p> <p>Noting the complete reporting of direct GHG emissions and the provision of projections for indirect GHGs in the NC7, the ERT encourages Monaco to include in its next BR projections of the indirect GHGs carbon monoxide, nitrogen oxides, non-methane volatile organic compounds and sulfur oxides.</p>
4	Reporting requirement ⁴⁹ specified in paragraph 36 Issue: completeness Assessment: recommendation	<p>The ERT noted that in its BR3 Monaco neither reported emission projections related to fuel sold to ships and aircraft engaged in international transport, nor made a reference to the NC where such information was included. The omission of the information was discussed in the previous review report (FCCC/TRR.2/MCO, para. 36).</p> <p>The ERT recommends that Monaco provide in its next BR information on the emission projections related to fuel sold to ships and aircraft engaged in international transport separately and not included in the totals, to the extent possible, as provided in the NC7. The Party could make a relevant cross reference in the BR to the NC,</p>

		whenever appropriate.
5	Reporting requirement ⁴ specified in paragraph 38 Issue type: completeness Assessment: encouragement	<p>The ERT noted that Monaco has not provided any diagrams showing the WEM projections from the base year to 2020 in the BR3. Such information was presented in the NC7 without a cross reference in the BR3.</p> <p>Monaco provided updated diagrams during the review week.</p> <p>The ERT encourages Monaco to improve the completeness of its reporting in the next BR by including diagrams illustrating the progress towards the target based on the projection scenarios reported by the Party.</p>
6	Reporting requirement ⁴ specified in paragraph 43 Issue type: completeness Assessment: encouragement	<p>Monaco provided a brief reference for the accounting approach used for the projections. However, the ERT noted that not all aspects included in paragraph 43 of the UNFCCC reporting guidelines on NCs are covered, as follows:</p> <ul style="list-style-type: none"> (a) A brief description by sector; (b) The type of the model; (c) The original purpose of the model (e.g. waste generation and fuel sales); (d) The strengths and weaknesses of the model or approach used; (e) How the model or approach accounts for any overlap or synergies that may exist between different PaMs. <p>The ERT encourages Monaco to improve the completeness of its reporting by including in its next BR a description of the models and approaches used according to the aspects indicated in paragraph 43 of the UNFCCC reporting guidelines on NCs. The ERT notes that a cross reference to sections of the NC where more details on the above-mentioned information could be found could improve the transparency of the reporting in the BR.</p>
7	Reporting requirement ⁴ specified in paragraph 46 Issue type: completeness Assessment: encouragement	<p>The ERT noted that sensitivity analyses were conducted for some of the assumptions used in the projections. However, the BR did not include relevant information or a reference to the NC7 where information on the sensitivity analysis was included.</p> <p>The ERT reiterates the encouragement made in the previous review report (FCCC/TRR.2/MCO, para. 43) that Monaco report on sensitivity analysis related to its projections in its next submission. The ERT notes that inclusion of a reference to the sensitivity analysis provided in the NC, whenever relevant, would further improve the transparency of the reporting in the BR.</p>
8	Reporting requirement ⁴ specified in paragraph 47 Issue type: transparency Assessment: encouragement	<p>To prepare its projections, Monaco relied on population growth, which is the only key variable listed in CTF table 5 and the BR3. However, it is not explicitly described how this variable was used in the projections. Variables such as energy prices and economic development indicators were not taken into account (FCCC/TRR.2/MCO, para. 42). Monaco did not explore the influence of GDP on the factors underlying the emissions. The ERT noted that other variables and parameters are described in the projections and PaMs section of the NC referenced in the BR, but values, assumptions and the rationale behind them are mostly not provided.</p> <p>During the review, Monaco explained that, owing to national circumstances, it has difficulties using an economic indicator (GDP) as a basis for the projections. Moreover, Monaco has no GDP projections. The Party also indicated that it is working within the framework of its Climate and Energy Plan to analyse the correlation between energy and socioeconomic variables. During the review, Monaco further provided additional information on the underlying factors used in the projections, which facilitated the review process.</p> <p>The ERT encourages Monaco to improve the transparency of its reporting by including in its next BR information on the factors underlying the projections (variables, parameters), assumptions, the rationale behind them and associated values used to generate the GHG emission projections. As stated in the previous review report, the ERT noted that reporting of information on key underlying assumptions and values of variables such as GDP growth, tax levels and international fuel prices would improve transparency of reporting.</p>
9	Reporting requirement ⁴ specified in paragraph 48	<p>The BR does not include any information on factors and activities that are relevant to understanding the emission trends in the context of preparing the projections. The ERT noted that the issue was raised in the previous review report</p>

Issue type: completeness	(FCCC/TRR.2/MCO, para. 41). The ERT noted that Monaco has provided information on factors and activities underlying emission trends for some of the sectors in the projections section of its NC7, which is referenced in the BR. However, the information was missing for energy generation, transport and the waste sector, as well as for international bunkers.
Assessment: recommendation	<p>During the review, Monaco provided relevant information, in tabular format, on the factors and activities underlying the emission trends for these sectors.</p> <p>The ERT recommends that Monaco improve the completeness of its reporting by including in its next BR relevant information on factors and activities underlying projected emission trends for each sector, such as the information provided during the review, to enable the reader to understand the emission trends in the years 1990–2030. This information on factors and activities may be presented in tabular format.</p>
10 Reporting requirement ^b specified in paragraph 12	<p>Monaco provided information on the changes since the 2017 annual submission regarding the methodology used to develop the GHG emission projections. However, the BR provides no information on the main differences in the assumptions, methods employed and results between the projections submitted in the NC7 and BR3 and those in the NC6 and/or BR2 (see para. 64 above).</p>
Issue type: transparency	<p>During the review, Monaco confirmed that the changes mentioned focused on the methodology for the inventory and not the projections.</p>
Assessment: encouragement	<p>The ERT encourages Monaco to improve the transparency of its reporting by including in its next BR information on the changes since its most recent NC and/or BR in the model or methodologies used for the preparation of projections, changes in the results of the projections and supporting documentation on changes in the key assumptions used.</p>

Note: The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs and on BRs.

^a Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs.

^b Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on BRs.

D. Provision of financial, technological and capacity-building support to developing country Parties

66. Monaco is not an Annex II Party and is therefore not obliged to adopt measures and fulfil obligations defined in Article 4, paragraphs 3, 4 and 5, of the Convention. However, Monaco provided information in the BR3 on its provision of support to developing country Parties. The ERT commends Monaco for reporting this information and suggests that it continue to do so in future BRs.

67. Monaco reports in the CTF tables that it has provided public financial support through bilateral, regional and other channels in 2015 of EUR 822,000 and USD 25,000 as grants for adaptation in the fields of agriculture, water and sanitation and cross-cutting sectors. The recipient countries were Burkina Faso, Madagascar, Mali, Mongolia and Samoa. In 2016, the amount was EUR 792,000 as grants for adaptation in the fields of agriculture, forestry and cross-cutting sectors through official development assistance. The receiving countries and regions were the same as in 2015. Between 2014 and 2017, more than half of Monegasque official development assistance was devoted to the least developed countries considered particularly vulnerable to climate change. In these countries, the actions supported are mainly in the health and education sectors, in line with the priority needs.

III. Conclusions and recommendations

68. The ERT conducted a technical review of the information reported in the BR3 and CTF tables of Monaco in accordance with the UNFCCC reporting guidelines on BRs. The ERT concludes that the reported information partially adheres to the UNFCCC reporting guidelines on BRs and provides an overview of emissions and removals related to the

Party's quantified economy-wide emission reduction target; assumptions, conditions and methodologies related to the attainment of the target; progress made by Monaco in achieving its target; and the Party's provision of support to developing country Parties.

69. Monaco's total GHG emissions excluding LULUCF covered by its quantified economy-wide emission reduction target were estimated to be 17.7 per cent below its 1990 level, whereas total GHG emissions including LULUCF were also 17.7 per cent below its 1990 level, in 2015. Emission decreases were driven by policies and several external factors influencing the consumption of fossil fuels for road transport and the implementation of the prohibition of using heating oil in the residential, commercial and public sectors. The increase in the amount of waste incinerated owing to the import of waste from France outweighed those improvements.

70. Under the Convention, Monaco committed itself to achieving a quantified economy-wide emission reduction target of 30 per cent below the base-year (1990 for CO₂, CH₄ and N₂O and 1995 for F-gases) level by 2020. The target covers CO₂, CH₄, N₂O, HFCs, PFCs, SF₆ and NF₃, expressed using global warming potential values from the AR4. Emissions and removals from the LULUCF sector are not included in the target. Monaco reported that it plans to make use of market-based mechanisms to achieve its target. In absolute terms, this means that under the Convention Monaco has to reduce its emissions from 99.32 kt CO₂ eq (in the base year) to 69.52 kt CO₂ eq by 2020, when using the inventory data from the 2017 annual submission.

71. Monaco's main policy framework relating to energy and climate change is the Climate and Energy Plan, which aims for a reduction in emissions by 30 per cent below the 1990 level, to reduce the energy consumption by 20 per cent compared with the 2007 level and to achieve 20 per cent of final energy consumption from renewable sources. Key legislation supporting Monaco's climate change goals includes the Environmental Code, which creates the regulation framework for climate change policy in the country, and the "Waste management plan towards 2030", which plans for the reduction of the amount of waste generated and incinerated. The mitigation actions with the most significant mitigation impact are the suppression of importing French waste and the development of urban heating and cooling system in buildings.

72. For 2015 Monaco reported in CTF table 4 total GHG emissions excluding LULUCF of 81.71 kt CO₂ eq, or 17.7 per cent below the 1990 level. Monaco did not report on its use of units from the market-based mechanisms towards achieving its target; however, the Party is keeping open the possibility to use them in case it faces difficulties in reaching the target with the implemented and planned measures. The ERT noted that Monaco is making progress towards its emission reduction target by implementing mitigation actions that deliver emission reductions.

73. The GHG emission projections provided by Monaco in the BR3 correspond to the WOM, WEM and WAM scenarios. In the three scenarios, emissions are projected to be 17.9, 33.8 and 38.1 per cent below the updated 1990 level in 2020, respectively. On the basis of the reported information, the ERT concludes that Monaco expects to meet its 2020 target under the Convention under the WEM and WAM scenarios with domestic measures. However, Monaco indicated in the BR3 that it plans to use units from market-based mechanisms in order to achieve its emission reduction target, if necessary.

74. Monaco is not an Annex II Party and is therefore not obliged to adopt measures and fulfil obligations defined in Article 4, paragraphs 3, 4 and 5, of the Convention. However, Monaco provided information in the BR3 on its provision of support to developing country Parties.

75. In the course of the review, the ERT formulated the following recommendations for Monaco to improve its adherence to the UNFCCC reporting guidelines on BRs in its next BR:⁶

- (a) To improve the completeness of its reporting by:

⁶ The recommendations are given in full in the relevant chapters of this report.

- (i) Providing information on the emission projections related to fuel sold to ships and aircraft engaged in international transport separately and not included in the totals, to the extent possible (issue 4 in table 12);
- (ii) Including relevant information on factors and activities underlying projected emission trends for each sector to enable the reader to understand the emission trends in the years 1990–2030 (issue 9 in table 12);
- (b) To improve the transparency of its reporting by:
 - (i) Including summary information on the national inventory arrangements and changes in them since the last NC and/or BR (issue 2 in table 3);
 - (ii) Reporting consistently the exclusion of LULUCF from the quantified economy-wide emission reduction target for 2020 in the CTF tables and between the BR and the CTF tables (issue 1 in table 4);
 - (iii) Improving the description of the quantified economy-wide emission reduction target by including in the BR and CTF table 2(a) the information related to its target under the Convention as contained in documents FCCC/SB/2011/INF.1/Rev.1 and FCCC/SBSTA/2014/INF.6 or further revisions to these and not the target under the Kyoto Protocol (issue 2 in table 4);
 - (iv) Reporting the base year for all gases consistently with the information provided for its quantified economy-wide emission reduction target under the Convention as contained in, for example, documents FCCC/AWGLCA/2012/MISC.1 and FCCC/TP/2014/8, and reporting the base year and base year related estimates consistently throughout the BR and the relevant CTF tables where the base year should be reported (issue 3 in table 4);
 - (v) Providing further information on PaMs it has implemented or plans to implement since its last NC or BR, organizing to the extent possible the reporting of mitigation actions by sector (energy, IPPU, agriculture, LULUCF, waste and other sectors) and by gas (issue 1 in table 6);
 - (vi) Enhancing the description of its domestic institutional arrangements, including institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of the progress made towards its target, including a clear indication of whether or not any changes in the domestic institutional arrangements have occurred since the last submission (issue 2 in table 6);
 - (vii) Including quantitative estimates of the impacts of all individual mitigation actions (or clearly explaining why it is unable to do so) and consistently presenting the information between the BR text and CTF tables (issue 4 in table 6);
 - (viii) Transparently and consistently reporting on progress in CTF table 4 and in the BR and providing correct information on the use of units from market-based mechanisms (for all relevant years, starting with 2013) and LULUCF as part of the reporting on the progress made towards the achievement of its target (issue 1 in table 8);
 - (ix) Ensuring that in its next BR all PaMs are correctly labelled as “planned”, “implemented” and “adopted” and included in the projection scenarios consistently with the definition for each scenario (issue 1 in table 12);
 - (x) Presenting emission projections relative to actual inventory data for the preceding years reported in the inventory section of the BR, or clearly specifying any changes in the inventory data and explaining the rationale for using different inventory data for the projections, while ensuring consistency of data between NCs and BRs submitted simultaneously (issue 2 in table 12);
- (c) To improve the timeliness of its reporting by submitting its next BR on time (see para. 6 above).

Annex

Documents and information used during the review

A. Reference documents

2017 GHG inventory submission of Monaco. Available at

http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/10116.php.

“Additional information relating to the quantified economy-wide emission reduction targets contained in document FCCC/SB/2011/INF.1/Rev.1”. FCCC/AWGLCA/2012/MISC.1.

Available at <http://unfccc.int/resource/docs/2012/awglca15/eng/misc01.pdf>.

BR3 of Monaco. Available at

http://unfccc.int/files/national_reports/biennial_reports_and_iar/submitted_biennial_reports/application/pdf/5937801_monaco-br3-1-mco-br3-2018-v1.pdf.

BR3 CTF tables of Monaco. Available at

http://unfccc.int/national_reports/biennial_reports_and_iar/biennial_reports_data_interface/items/10132.php.

“Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories”. Annex I to decision 24/CP.19. Available at

<http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf>.

“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 technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention”. Annex to decision 13/CP.20. Available at

<http://unfccc.int/resource/docs/2014/cop20/eng/10a03.pdf>.

NC7 of Monaco. Available at

http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/4295138_monaco-nc7-1-nc7_mc_v1.pdf.

Report on the individual review of the annual submission of Monaco submitted in 2015.

FCCC/ARR/2015/MCO. Available at <http://unfccc.int/resource/docs/2016/arr/mco.pdf>.

Report on the individual review of the annual submission of Monaco submitted in 2017.

FCCC/ARR/2017/MCO. Available at <http://unfccc.int/resource/docs/2018/arr/mco.pdf>.

Report of the technical review of the second biennial report of Monaco.

FCCC/TRR.2/MCO. Available at <http://unfccc.int/resource/docs/2016/trr/mco.pdf>.

Report on the technical review of the sixth national communication of Monaco.

FCCC/IDR.6/MCO. Available at <http://unfccc.int/resource/docs/2015/idr/mco06r01.pdf>.

“Quantified economy-wide emission reduction targets by developed country Parties to the Convention: assumptions, conditions, commonalities and differences in approaches and comparison of the level of emission reduction efforts. Technical paper.” FCCC/TR/2014/8. Available at <https://unfccc.int/sites/default/files/resource/docs/2014/tp/08.pdf>.

“UNFCCC biennial reporting guidelines for developed country Parties”. Annex I to

decision 2/CP.17. Available at <http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf>.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Jérémie Carles (Direction de l'Environnement), including additional material.
