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

Developed country Parties were requested by decision 2/CP.17 to submit their fourth biennial report to the secretariat by 1 January 2020. This report presents the results of the technical review of the fourth 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". The review took place from 25 to 29 January 2021 remotely.

Contents

Abbreviations and acronyms

Annex II Party	Party included in Annex II to the Convention
AR	Assessment Report of the Intergovernmental Panel on Climate Change
BR	biennial report
CER	certified emission reduction
CH_4	methane
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CTF	common tabular format
ERT	expert review team
F-gas	fluorinated gas
GHG	greenhouse gas
GWP	global warming potential
HFC	hydrofluorocarbon
IE	included elsewhere
IPCC	Intergovernmental Panel on Climate Change
LULUCF	land use, land-use change and forestry
NA	not applicable
NC	national communication
NE	not estimated
NF_3	nitrogen trifluoride
NO	not occurring
N_2O	nitrous oxide
PaMs	policies and measures
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
SF_6	sulfur hexafluoride
UNFCCC Annex I inventory reporting guidelines	"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"
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 BR4[1] 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 did not provide any comments.

3. The review was conducted together with the review of five other Parties included in Annex I to the Convention from 25 to 29 January 2021 remotely by the following team of nominated experts from the UNFCCC roster of experts: Amr Osama Abdel-Aziz (Egypt), Dirk Guenther (Germany), Karin Kindbom (Sweden), Hanna-Lii Kupri (Estonia), Yu'e Li (China), Sekai Ngarize (Zimbabwe), Stephanie Ockenden (United Kingdom of Great Britain and Northern Ireland), Erik Rasmussen (Denmark), Carmen Schmid (Austria), Lilia Taranu (Republic of Moldova), Aynur Tokel (Turkey) and Songli Zhu (China). Mr. Abdel-Aziz, Mr. Rasmussen and Ms. Zhu were the lead reviewers. The review was coordinated by Alma Jean and Nalin Srivastava (secretariat).

B. Summary

4. The ERT conducted a technical review of the information reported in the BR4 of Monaco in accordance with the UNFCCC reporting guidelines on BRs (annex I to decision 2/CP.17).

1. Timeliness

5. The BR4 was submitted on 27 December 2019, before the deadline of 1 January 2020 mandated by decision 2/CP.17. The BR4 CTF tables were also submitted on 27 December 2019. The CTF tables were resubmitted on 1 March 2021 to address issues raised during the review. The resubmission included changes to the notation keys reported for the non-estimated impacts of PaMs in CTF table 3, and to emission projections reported in CTF tables 6(a) and 6(c). Unless otherwise specified, the information and values from the latest submission are used in this report.

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

6. Issues and gaps identified by the ERT related to the reported information are presented in table 1. The information reported by Monaco in its BR4 partially adheres to the UNFCCC reporting guidelines on BRs.

7. Monaco did not submit an English translation of its BR4. The ERT encourages the Party to submit an English translation of its BR5 in accordance with paragraph 26 of the UNFCCC reporting guidelines on BRs.

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

Section of BR	*Completeness*	*Transparency*	*Reference to description of recommendation(s)*
GHG emissions and removals	Complete	Mostly transparent	Issue 1 in table 3

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

Section of BR	*Completeness*	*Transparency*	*Reference to description of recommendation(s)*
Quantified economy-wide emission reduction target and related assumptions, conditions and methodologies	Complete	Mostly transparent	Issue 1 in table 4
Progress in achievement of targets	Mostly complete	Partially transparent	Issues 1 and 3 in table 6 Issue 1 in table 8 Issues 2, 4 and 7 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 chap. III below. The assessment of completeness and transparency by the ERT in this table is based only on the "shall" reporting requirements.

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

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

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

1. Technical assessment of the reported information

8. Total GHG emissions[2] both excluding and including emissions and removals from LULUCF decreased by 14.5 per cent between 1990 and 2017. Emissions peaked in 1996 and decreased thereafter. The decrease in total emissions was driven mainly by factors such as the decrease in fuel use for road transport and the substitution of oil for gas in stationary combustion.

9. The Party did not provide information on drivers of emission trends in the BR4. During the review, Monaco explained that for each category the trends are summarized in a graph. It indicated that the increase in emissions since 2014 reported in the BR4 is due mainly to emissions from off-road vehicles and F-gases and, to a lesser degree, emissions from domestic aviation and waste incineration, and that the trends will be explained in its next BR. The ERT noted that including information on drivers of emission trends in the BR would enhance the transparency of the reporting.

10. Table 2 illustrates the emission trends by sector and by gas for Monaco. Note that information in this paragraph and table 2 is based on Monaco's 2020 annual submission, version 1.0, which has not yet been subject to review. All emission data in subsequent chapters are based on Monaco's BR4 CTF tables unless otherwise noted. The emissions reported in the 2020 annual submission differ from the data reported in CTF table 1 because recalculations were carried out after the submission of the BR4.

Table 2
Greenhouse gas emissions by sector and by gas for Monaco for 1990–2018

	GHG emissions (kt CO_2 eq)					*Change (%)*		*Share (%)*	
	1990	*2000*	*2010*	*2017*	*2018*	*1990–2018*	*2017–2018*	*1990*	*2018*
Sector									
1. Energy	101.65	103.38	80.05	75.54	77.49	–23.8	37.4	98.9	89.1
A1. Energy industries	17.78	27.13	18.06	22.29	22.73	27.8	–1.7	17.3	26.1

[2] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding LULUCF, unless otherwise specified.

	GHG emissions (kt CO_2 eq)					*Change (%)*		*Share (%)*	
	1990	*2000*	*2010*	*2017*	*2018*	*1990–2018*	*2017–2018*	*1990*	*2018*
A2. Manufacturing industries and construction	3.83	3.93	4.00	5.18	7.11	85.9	0.0	3.7	8.2
A3. Transport	35.21	38.1	27.51	24.76	24.33	–30.9	0.0	34.3	28.0
A4. and A5. Other	43.06	33.56	29.89	22.76	22.77	–47.1	–	41.9	26.2
B. Fugitive emissions from fuels	1.78	0.66	0.59	0.55	0.55	–68.9	–0.3	1.7	0.6
C. CO_2 transport and storage	NO	NO	NO	NO	NO	–	–	–	–
2. Industrial processes and product use	0.38	4.63	6.82	8.86	8.28	2 059.9	–6.5	0.4	9.5
3. Agriculture	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	–	–	–	–
4. LULUCF	0	–0.04	–0.05	0	–0.02	–1 286.2	382.2	NA	NA
5. Waste	0.71	1.06	1.01	1.13	1.15	62.8	2.2	0.7	1.3
6. Other[a]	NO	NO	NO	NO	NO	–	–	–	–
Gas[b]									
CO_2	98.23	100.31	77.69	73.05	74.76	–23.9	2.3	95.6	86.0
CH_4	2.20	1.43	1.25	1.36	1.33	–39.3	–1.6	2.1	1.5
N_2O	2.23	3.16	4.13	2.89	3.10	38.9	7.3	2.2	3.6
HFCs	NO, IE	4.08	4.70	8.11	7.61	–	–6.1	–	8.8
PFCs	NO, IE	NO, IE	0.03	0.01	NO, IE	–	–	–	–
SF_6	0.08	0.09	0.09	0.11	0.12	51.6	9.6	0.1	0.1
NF_3	NO	NO	NO	NO	NO	–	–	–	–
Total GHG emissions excluding LULUCF	**102.74**	**109.07**	**87.89**	**85.52**	**86.93**	**–15.4**	**1.6**	**100.0**	**100.0**
Total GHG emissions including LULUCF	**102.74**	**109.04**	**87.84**	**85.52**	**86.91**	**–15.4**	**1.6**	–	–

Source: GHG emission data: Monaco's 2020 annual submission, version 1.0.
[a] Emissions and removals reported under the sector other (sector 6) are not included in the total GHG emissions.
[b] Emissions by gas without LULUCF.

11. In brief, Monaco's national inventory arrangements were established in accordance with law 1308 of 28 December 2005 on ratification of the Kyoto Protocol and a new law issued on 1 January 2021.[3] The Department of the Environment of the Ministry of Public Works, the Environment and Urban Development is the entity responsible for planning, establishing and managing Monaco's national inventory.

2. Assessment of adherence to the reporting guidelines

12. The ERT assessed the information reported in the BR4 of Monaco and identified an issue relating to transparency and thus adherence to the UNFCCC reporting guidelines on BRs. The finding is described in table 3.

Table 3
Findings on greenhouse gas emissions and removals from the review of the fourth 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 3 Issue type: transparency	In its BR4 Monaco stated that the national system has been strengthened since its previous BR and NC, particularly with regard to the QA/QC plan. However, the Party did not provide details of how the QA/QC plan was strengthened. During the review, Monaco explained that since 2018 a new QA/QC plan has been in operation for the elaboration of the national inventory. The new plan outlines the national

[3] Available at https://journaldemonaco.gouv.mc/Journaux/2021/Journal-8519.

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
	Assessment: recommendation	system and specifies the roles and responsibilities of each expert and coordinator, the structure of the spreadsheets, the stages of inventory development and the QA/QC procedures that must be implemented at each stage. The Party also explained that these QA/QC procedures are defined for each category in order to fulfil the requirements of the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* and the UNFCCC Annex I inventory reporting guidelines and have been strengthened since 2018. The ERT recommends that the Party provide in its next BR summary information on the changes to the national inventory arrangements since its previous BR or NC, including details of how the QA/QC plan within the national system was strengthened.

Note: Item 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 thus adhering to the UNFCCC reporting guidelines on BRs.

B. Quantified economy-wide emission reduction target and related assumptions, conditions and methodologies

1. Technical assessment of the reported information

13. 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 UNFCCC Annex I inventory reporting guidelines, namely CO_2, CH_4, N_2O, HFCs, PFCs, SF_6 and NF_3. According to the BR4 and CTF table 2(b), the base year for CO_2, CH_4 and N_2O is 1990, and the base year for HFCs, PFCs, SF_6 and NF_3 is 1995 (see table 4 below). The target also includes all IPCC sources and sectors included in the annual GHG inventory. The GWP values used are from the AR4. Emissions and removals from the LULUCF sector are not included in the target and are accounted using a land-based approach. Monaco reported that it plans to make use of market-based mechanisms to achieve its target (see para. 42 below). In absolute terms this means that, under the Convention, Monaco has to reduce its emissions from 101.59 kt CO_2 eq (in the base year) to 71.11 kt CO_2 eq by 2020.

14. Under the Paris Agreement Monaco's ambitious commitment is to reduce its GHG emissions by 50 per cent below the 1990 level by 2030.

15. Monaco also has a long-term goal for 2050 of reducing its GHG emissions by 80 per cent compared with the 1990 level with a view to achieving carbon neutrality.

2. Assessment of adherence to the reporting guidelines

16. The ERT assessed the information reported in the BR4 of Monaco and identified an issue relating to transparency and thus adherence to the UNFCCC reporting guidelines on BRs. The finding is described in table 4.

Table 4
Findings on the assumptions, conditions and methodologies related to the quantified economy-wide emission reduction target from the review of the fourth biennial report of Monaco

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation*
1	Reporting requirement specified in paragraph 5 Issue type: transparency Assessment: recommendation	The Party reported in its BR4 that the LULUCF sector is included in the target. However, in CTF table 2(d), it is clearly stated that the LULUCF sector is excluded from the target. Furthermore, the Party reported in its BR4 (section 2.2) that the base year for SF_6 and NF_3 is 1990. However, in CTF table 2(b), the base year was reported as 1995. During the review, Monaco explained that the BR4 erroneously stated that the LULUCF sector is included in the target, and the Party confirmed that LULUCF is excluded from the target.

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation*
		Monaco further explained that the base year for SF_6 and NF_3 was incorrectly mentioned as 1990 in the BR4 and confirmed that the correct base year for SF_6 and NF_3 is 1995, as reported in CTF table 2(b). The ERT reiterates the recommendation from the previous review report for Monaco to report consistent information between the BR and CTF table 2(b) on the inclusion of LULUCF in the target and the base year for SF_6 and NF_3.

Note: Item 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 thus adhering to the UNFCCC reporting guidelines on BRs.

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

1. Mitigation actions and their effects

(a) Technical assessment of the reported information

17. Monaco provided information on its package of PaMs implemented, adopted and planned, by sector and by gas, in order to fulfil its commitments under the Convention. The BR4 contains dedicated sectoral chapters on the mitigation measures, including summary information on PaMs by sector. Monaco reported on its policy context and legal and institutional arrangements in place for implementing its commitments and monitoring and evaluating the effectiveness of its PaMs. However, no information was provided on the changes since its previous submission. During the review, Monaco provided a link to the recently published ministerial order[4] concerning the Party's institutional arrangements, according to which the Department of the Environment is responsible for setting up a system for monitoring national GHG emissions and air pollutants. The Department collects the data and prepares and disseminates information on energy and climate indicators. In addition, the Party referred the ERT to further information on its institutional, legal, administrative and procedural arrangements in chapter 1.2 of its 2019 national inventory report.

18. Monaco's set of PaMs is similar to that previously reported, with some exceptions. The package includes seven new PaMs (i.e. a ban on single-use plastic products; the National Pact for Energy Transition; the National Mobility Plan; use of 100 per cent biofuels in stationary installations, non-road vehicles and captive fleet; use of electrical installations to provide power supply for cruise ships; electrification of helicopters; and an initiative for promoting more eco-friendly restaurants), and three previous PaMs were not reported (i.e. public–private partnership for the renovation of buildings; supporting fuel switch from oil to gas; and reducing fossil fuels for the treatment of incinerator flue gas). The ERT noted that for 24 PaMs minor changes were made to their descriptions (e.g. regarding implementation status, start year or impact). During the review, the Party provided further details on the changes for some specific PaMs, explaining that they are no longer reported because they expired without being fully implemented or their implementation is complete. The ERT notes that the transparency of the reporting could be enhanced by including in the next BR information on any substantial changes in the PaMs since the previous submission.

19. In its reporting on its PaMs, Monaco provided the estimated emission reduction impacts for some of its PaMs. For two mitigation measures (the Climate and Energy Plan and electrification of helicopters), the impact was provided for 2030 but not for 2020. For the measures whose impacts were not quantified, Monaco indicated this either by providing a comment that the impact was not estimated or by reporting the impact as zero in the PaMs tables. When the impact of a measure was "IE" or "NE", Monaco did not provide any further information. The Party explained during the review that for measures concerning either a regulatory framework or public awareness, the impacts were not estimated. For the measure on renewable energy, the impact was not accounted for within the national territory of Monaco because currently most electricity is imported and therefore the effects of the

[4] Available at https://journaldemonaco.gouv.mc/Journaux/2021/Journal-8519.

measure occur in the exporting country. For electrification of helicopters, no impact was reported for 2020 because the measure is to be implemented after 2020. Regarding the Climate and Energy Plan, the Party explained that the model used to estimate its impacts does not cover 2020. After the review, the Party resubmitted CTF table 3, in which the impacts of the PaMs that were not estimated were reported as "NE".

20. Monaco estimated the impacts of 16 of its PaMs in groups; namely, for PaMs linked to the Waste Prevention and Management Plan, to the Climate and Energy Plan and to the National Mobility Plan. The Party explained during the review that the impacts were estimated for these groups of PaMs in order to calculate the mitigation impacts for waste incineration, stationary combustion and transport, as the models used cannot produce more refined results.

21. A single estimate was provided for the impact of the National Mobility Plan grouped with other transport-related PaMs. However, the PaMs in this group do not have the same implementation status: the National Mobility Plan was reported as planned, as was the improvement of the logistical centre; but other PaMs (i.e. reducing emissions from passenger cars and light-duty vehicles, promoting use of bicycles and electric bicycles, and promoting electric car sharing) were reported as implemented. During the review, Monaco explained that it had expected the National Mobility Plan and the improvement of the logistical centre to be adopted as measures before the submission of the BR4, and therefore they were taken into account in the WEM scenario. However, the political process was delayed and it was not possible to correct the impact estimates since they were calculated in relation to the emission projections. Furthermore, Monaco explained that information on the effects of individual PaMs was provided whenever possible, and the methodologies will be improved when new data become available. The ERT notes that transparency could be enhanced by presenting mitigation impacts separately for implemented or adopted and planned PaMs.

22. During the review, the Party explained that the impacts of its PaMs were calculated on the basis of the difference in emission reduction between the base year (2017) and the projection year because a WOM scenario is not available. Furthermore, Monaco explained that the estimates were revised because of changes in the methodology and data. The ERT notes that transparency could be enhanced by providing a reference to the information on methodologies in the PaMs section of the BR and more detailed information on how the impacts of individual or groups of PaMs were estimated, including the reasons for any revision of estimates.

23. Regarding the Party's self-assessment of compliance with its emission reduction targets and national rules for taking action against non-compliance, during the review Monaco explained that the Department of the Environment is in charge of the GHG inventory and projections and elaborating and monitoring the Climate and Energy Plan. In this context, the Department of the Environment reports annually to the Ministry of Public Works, the Environment and Urban Development on the GHG emission estimates and the various indicators of compliance, and they exchange such information on a regular basis. Monaco also explained that, while there is no specific procedure for action in cases of non-compliance, the Department of the Environment regularly informs the Government and Head of State of the trend in GHG emissions and proposes solutions for reducing emissions. The Party further explained that, because Monaco is a small country, there is no need for a more elaborate procedure.

24. The key overarching cross-sectoral policy reported by Monaco is the Climate and Energy Plan, which provides the framework for future climate policy and for Monaco meeting its emission reduction target for 2020. The Plan comprises three axes: improving energy efficiency and reducing energy demand; producing local energy by recovering energy from urban waste and developing renewable energy; and reducing GHG emissions. The mitigation effect of the Climate and Energy Plan is the most significant. Another important cross-cutting policy that has delivered significant emission reductions is the National Pact for Energy Transition, the aim of which is to reduce GHG emissions, increase energy efficiency and increase renewable energy production.

25. In addition, Monaco has three key sectoral PaMs with targets for up to 2030. The Waste Prevention and Management Plan includes actions for increasing waste sorting and

recycling, reducing fossil carbon emissions from incinerated plastic waste, and banning waste imports from France. The estimated mitigation impact of this measure is 2.2 kt CO_2 eq by 2020 and 10.6 kt CO_2 eq by 2030. For stationary combustion, the most important measures are the ban on fuel oil for heating by 2022, the creation of district heating and cooling networks, and measures related to improving the energy efficiency of buildings, which have a joint estimated mitigation impact of 10 kt CO_2 eq by 2030. In the transport sector, the National Mobility Plan is a key measure, which was under development at the time of the preparation of the BR4 and was therefore reported as planned. The aim is to reduce road traffic volume by 20 per cent by 2030 by improving public transportation and promoting use of sustainable transport modes. The mitigation impact of the Plan is estimated to be 4.65 kt CO_2 eq by 2020 and 5 kt CO_2 eq by 2030.

26. Monaco highlighted further mitigation actions that are under development, such as reducing F-gas emissions, which includes banning air-conditioning equipment that uses F-gases with high GWP and limiting fugitive emissions. The aim is to reduce F-gas emissions by 0.8 kt CO_2 eq by 2020 and 5.4 kt CO_2 eq by 2030. The impacts of the other planned PaMs were not reported; they were "IE" or "NE". 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

Sector	*Key PaMs*	*Estimate of mitigation impact in 2020 (kt CO_2 eq)*	*Estimate of mitigation impact in 2030 (kt CO_2 eq)*
Policy framework and cross-sectoral measures	Climate and Energy Plan	NE	10
	National Pact for Energy Transition	NE	NE
Energy	Waste Prevention and Management Plan (waste incineration)	2.2	10.6
Energy efficiency	Improvement of energy efficiency in private buildings, including ban on use of fuel oil for heating systems, and energy audits	IE	IE
	Subsidies for the renovation of windows	IE	IE
	Development of district heating and cooling system networks	IE	IE
Energy supply and renewables	Increased use of renewable energy	0.0	0.0
	Construction of waste treatment plant to use energy from waste incineration	NE	NE
Transport	National Mobility Plan	4.7	5.0
	Biofuel blending	1.9	1.6
	Measures to reduce emissions from passenger cars and light-duty vehicles	IE	IE
Industrial processes and product use	Reduction of F-gas emissions	0.8	5.4
Waste	Optimization of wastewater treatment	1.6	1.6
	Waste Prevention and Management Plan (recycling and reduction of plastic waste)	IE	IE
International aviation	Electrification of helicopters	0.0	0.8

Note: The estimates of mitigation impact are estimates of emissions of CO_2 eq avoided in a given year as a result of the implementation of mitigation actions.

27. Monaco did not report PaMs related to SF_6, although SF_6 emissions were reported in the GHG inventory. During the review, the Party explained that the emissions are not relevant to a key category and therefore not a priority focus for mitigation actions. The ERT noted that a measure related to reducing F-gas emissions was reported for the transport sector. The ERT notes that transparency could be enhanced by explaining why measures related to certain gases were not reported in the BR and ensuring that the PaMs are allocated to the correct sectors.

28. In CTF table 3, there are two cells left blank by the Party, which should contain information on the implementing entity for the measure related to the eco-responsibility of the administration and a brief description of the measure for electrification of helicopters. The ERT notes that transparency could be enhanced by entering information in these cells.

(b) Policies and measures in the energy sector

29. **Energy efficiency.** Monaco's energy efficiency target for 2020 is to reduce final energy consumption by 20 per cent compared with the 2007 level. Increasing energy efficiency and reducing energy consumption are addressed by the main cross-sectoral policies, the Climate and Energy Plan and the National Pact for Energy Transition. During the review, Monaco explained that it uses three indicators for monitoring this target: final energy consumption, final energy consumption per unit of gross domestic product and final energy consumption by floor area. More concrete requirements or key parameters, relating for example to final energy consumption, were not reported in the BR4. Energy efficiency PaMs targeting individual sectors are discussed below.

30. **Energy supply and renewables.** In Monaco, heat and electricity are produced by waste incineration. The ban on waste imports from France, which are incinerated in Monaco, is one of the key measures for reducing emissions from the energy sector. In addition, Monaco is planning the construction of a new waste incineration plant, which allows for a higher energy output and more efficient incineration. The nominal capacity of this plant will be 45,000 t waste, but the objective for 2030 is to incinerate only 30,000 t owing to the discontinuation of waste imports from France. Monaco reported on measures aimed at reducing the amount of plastic waste incinerated. The WEM scenario for energy (without transport) shows a decrease in emissions of 31 per cent by 2020 compared with the 1990 level. The WAM scenario, including all planned measures in the energy sector (without transport), shows a reduction in emissions of 40 per cent by 2020 compared with the 1990 level.

31. Further important measures relate to energy supply in the building sector. To reduce emissions, a district heating and cooling system has been constructed that will be operational from 2023 and oil heating systems will be banned from 2022.

32. Monaco reported a specific target for renewable energy of reaching a 20 per cent share of renewable energy sources in final energy consumption in the transport, building and energy sectors by 2020. Natural gas and most of Monaco's electricity are imported from France. Monaco introduced a certificate of guaranteed origin for imported energy (electricity and natural gas) in 2008 to ensure that the country is supplied with renewable energy. Accordingly, by 2019, 70 per cent of the imported electricity was certified as renewable energy. At the national level, Monaco started to produce renewable electricity in 2019, with a solar photovoltaic installation that produces 600 MWh energy per year. The Party set a target for a minimum share of renewable gas in natural gas consumed, namely 30 per cent biomethane in the total natural gas consumed in 2030.

33. **Residential and commercial sectors.** Monaco implemented a reduced rate of value added tax of 5.5 per cent to encourage consumers to improve the energy efficiency of buildings in accordance with minimum performance criteria. Intelligent energy accounts were implemented for the 100 largest energy consumers and public buildings in order to monitor the energy consumption of their buildings. Energy audits have to be carried out for all buildings in three phases until 2028. For the residential sector, the provision of subsidies for replacing single-glazed windows with at least double-glazed windows is planned.

34. **Transport sector.** Since Monaco has a high number of daily commuters coming into the country for work and, therefore, high road transport activity, the aim of the National Mobility Plan is to reduce light-vehicle transport by 20 per cent by 2030 compared with the 2018 level in order to return to the traffic density level recorded in 1990. The Plan includes the creation of parking lots at the country's border, the improvement of rail connections and the development of a public transport line from the east to the west of the country. Other implemented measures are related to the European Union policy on CO_2 standards for cars and light-duty vehicles and blending biofuel and diesel. The fuel blending is estimated to reduce emissions by 1.86 kt CO_2 eq by 2020 and 1.57 kt CO_2 by 2030. Monaco has

established a support scheme for the purchase of electric or hybrid vehicles and it provides public services for electric car and bicycle-sharing. Electrification is also foreseen for the helicopter fleet by 2030, leading to an emission reduction of 0.8 kt CO_2 eq by 2030; however, this reduction is included under the international aviation sector.

(c) Policies and measures in other sectors

35. **Industrial processes.** The key measure for this sector is related to the European Union F-gas regulation, which restricts the use of refrigeration and cooling equipment that uses F-gases with high GWP. The measure is expected to reduce emissions by 0.8 kt CO_2 eq by 2020 and 5.4 kt CO_2 by 2030, which means that emissions from the industrial processes sector will be reduced by approximately 50 per cent by 2030. Emissions from dry cleaning are to be addressed by a planned policy that will prohibit the use of perchloroethylene, which is expected to have a small effect on reducing CO_2 emissions.

36. **Agriculture.** The Party reported neither PaMs nor GHG emissions for agriculture. During the review, the Party confirmed that no emissions occur from the agriculture sector in the country and therefore no PaMs were reported.

37. **LULUCF.** No PaMs were reported for LULUCF. During the review, Monaco explained that LULUCF emissions and removals are very low in the country and currently no specific PaMs are in place.

38. **Waste management.** The waste policies in Monaco are strongly related to waste incineration in the energy sector. Apart from the more efficient incineration of waste, waste management has been improved by increasing recycling and avoiding generation of plastic waste. A ban on plastic bags and single-use plastic products is being progressively introduced. The wastewater treatment plant has been upgraded to increase capacity and improve treatment, leading to emission reductions of 1.59 kt CO_2 eq by 2020 and 1.56 kt CO_2 eq by 2030. For the waste sector as a whole, this implies that emissions will decrease by 70 per cent compared with the 2017 level by 2020.

(d) Response measures

39. Monaco did not provide detailed information on the assessment of the economic and social consequences of its response measures. The Party stated in its BR4 that, owing to the country's small size, the impact of response measures is negligible.

(e) Assessment of adherence to the reporting guidelines

40. The ERT assessed the information reported in the BR4 of Monaco and identified issues relating to completeness, transparency and thus 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 fourth 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 7 Issue type: completeness Assessment: recommendation	The Party provided a summary of its domestic institutional arrangements, including institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of progress towards its economy-wide emission reduction target, but did not include information on changes therein. During the review, Monaco referred the ERT to its 2019 national inventory report for further information on the institutional, legal, administrative and procedural arrangements. In addition, the Party provided the ERT with a link to a new legal text concerning the institutional arrangements. The ERT reiterates the recommendation from the previous review report for Monaco to provide in the BR information on changes in the domestic institutional arrangements, including references to other relevant documents, or clearly indicate that no such changes have occurred since the previous submission.

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
2	Reporting requirement specified in paragraph 8 Issue type: transparency Assessment: encouragement	Monaco did not provide detailed information on the assessment of the economic and social consequences of its response measures. The Party stated in its BR4 that, owing to the country's small size, the impact of response measures is negligible. During the review, Monaco explained that the small size of the country and its consequent low consumption means that its response measures do not have a significant impact at the international level. The ERT reiterates the encouragement from the previous review report for Monaco to provide in its BR, to the extent possible, detailed information on the assessment of the economic and social consequences of its response measures.
3	Reporting requirement specified in CTF table 3 Issue type: transparency Assessment: recommendation	In CTF table 3, Monaco reported estimated mitigation impacts for some groups of measures rather than for individual PaMs along with a comment referencing the relevant tables in the BR4. For two of its mitigation measures Monaco reported the estimated impact for 2030 but not for 2020. For other measures Monaco did not report their estimated impact at all: it noted in a comment that the impact was not estimated or reported it as zero in the PaMs tables of the BR4 without providing any further information in CTF table 3. During the review, the Party explained its approach to completing CTF table 3 (see para. 18 above). After the review, the Party resubmitted CTF table 3, in which the impacts of the PaMs that were not estimated were reported as "NE". The ERT recommends that Monaco clearly explain in CTF table 3, for example using notation keys or footnotes, why the estimated impacts of mitigation measures were not reported in CTF table 3.
4	Reporting requirement specified in paragraph 24 Issue type: completeness Assessment: encouragement	Monaco did not report on domestic arrangements for self-assessment of compliance with emission reduction commitments or the level of emission reduction required by science; or on national rules for taking action against non-compliance. During the review, Monaco explained the national procedures for self-assessment (see para. 23 above). The ERT encourages the Party to report in the BR, to the extent possible, on domestic arrangements for self-assessment of compliance with emission reduction commitments or the level of emission reduction required by science, and on progress in the establishment of national rules for taking local action against domestic non-compliance, for instance by including the information provided during the review.

Note: Item listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on BRs or to the CTF table number from the "Common tabular format for 'UNFCCC biennial reporting guidelines for developed country Parties'". The reporting on the requirements not included in this table is considered to be complete, transparent and thus adhering to the UNFCCC reporting guidelines on BRs.

2. 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

41. On its use of units from LULUCF activities, Monaco indicated that its target excludes emissions and removals from LULUCF. Monaco reported that it intends to use units from market-based mechanisms under the Kyoto Protocol. It reported in CTF table 4 that it used units accounting for 25 kt CO_2 eq from market-based mechanisms in 2017. However, it reported in CTF table 4(b) that it did not use any units from market-based mechanisms in 2017 and that it used units accounting for 25 kt CO_2 eq from market-based mechanisms in 2018 towards achieving its 2020 target. Table 7 illustrates Monaco's total GHG emissions, contribution of LULUCF and use of units from market-based mechanisms towards achieving 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 for achieving its target

Year	*Emissions excluding LULUCF (kt CO_2 eq)*	*Contribution of LULUCF (kt CO_2 eq)[a]*	*Use of units from market-based mechanisms (kt CO_2 eq)*	*Net emissions including LULUCF and market-based mechanisms (kt CO_2 eq)*
1990 (base year)		NA	0	
2010	87.69	NA	0	87.69
2011	85.76	NA	0	85.76
2012	88.56	NA	0	88.56
2013	90.31	NA	0	90.31
2014	84.13	NA	0	84.13
2015	89.06	NA	0	89.06
2016	87.89	NA	0	87.89
2017	86.85	NA	0	86.85
2018	86.93	NA	25	61.93
2020 target	NA	NA	NA	

Sources: Monaco's BR4 and BR4 CTF tables 2(a), 4, 4(a)I, 4(a)II, 4(b) and 6(a).
[a] Monaco's emission reduction target does not include emissions or removals from LULUCF.

42. In assessing the Party's progress towards achieving its 2020 target, the ERT noted that Monaco's emission reduction target under the Convention is 30 per cent below the 1990 level (see para. 13 above). In 2017 Monaco's annual total GHG emissions excluding LULUCF were 14.5 per cent (14.94 kt CO_2 eq) below the base-year level.

43. The ERT noted that Monaco is making progress towards its emission reduction target by implementing mitigation actions that are delivering some emission reductions. The Party intends to use units acquired from market-based mechanisms under the Convention if challenges are encountered in achieving its target with the implemented and planned measures.

(b) Assessment of adherence to the reporting guidelines

44. The ERT assessed the information reported in the BR4 of Monaco and identified an issue relating to transparency and thus 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 on the use of units from market-based mechanisms and land use, land-use change and forestry from the review of the fourth biennial report of Monaco

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation*
1	Reporting requirement specified in paragraph 9 Issue type: transparency Assessment: recommendation	The reporting on the use of units from market-based mechanisms is not consistent between the BR and the CTF tables. The BR4 mentions that Monaco is planning to use 41,000 CERs to achieve its target. However, in CRF table 4(b), it is stated that only 25,000 CERs were used in 2018. It is also stated in the BR4 that the purchase of 35,000 units through Gold Standard has been initiated, while customers of gas distributors are being offered the opportunity to purchase 6,000 CERs. Moreover, the Party included data on the contribution of the LULUCF sector in CTF table 4, although it explained during the previous review that the contribution of LULUCF should not be mentioned in CTF table 4 because LULUCF is not included in the target. Furthermore, Monaco reported empty cells for 2010–2015 and "NA" for 2016 in the column for quantity of units from market-based mechanisms. During the review, the Party explained that 25,000 CERs were purchased in 2018, while, in 2019, 15,000 additional CERs were transferred (10,000 at the time of preparing the BR4). The Party further explained that the gas supplier offers consumers the opportunity to offset GHG emissions by purchasing CERs, and such

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation
		offsets were estimated to be in the range of 6,000 CERs. Furthermore, the Party explained that it purchased 10,700 CERs in 2020. The ERT reiterates the recommendation from the previous review report for Monaco to report data consistently between CTF tables 4 and 4(b) and the BR. The ERT notes that transparency could be enhanced by the Party reporting "0" for years in which it did not use units from market-based mechanisms, and not reporting values for the contribution of LULUCF in CTF table 4.

Note: Item 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 thus adhering to the UNFCCC reporting guidelines on BRs.

3. Projections overview, methodology and results

(a) Technical assessment of the reported information

45. Monaco reported updated projections for 2020 and 2030 relative to actual inventory data for 2017 under the WEM scenario. The WEM scenario reported by Monaco includes PaMs implemented and adopted until 2020.

46. In addition to the WEM scenario, Monaco reported the WAM scenario. The WAM scenario includes planned PaMs. Monaco provided a definition of its scenarios, explaining that its WEM scenario includes PaMs implemented by the European Union and France that have an effect on Monaco's emissions. The WAM scenario includes PaMs in addition to those in the WEM scenario that have been planned but not yet implemented or adopted. The definitions indicate that the scenarios were prepared in accordance with the UNFCCC reporting guidelines on BRs.

47. The projections are presented on a sectoral basis, using the same sectoral categories as those used in the reporting on mitigation actions, and on a gas-by-gas basis for CO_2, CH_4, N_2O, PFCs, HFCs and SF_6 (treating PFCs and HFCs collectively in each case) for 2020–2030. The projections are reported for 2030 only in the textual part of the BR4. The projections are also provided in an aggregated format for each sector and for a Party total using GWP values from the AR4.

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

48. The methodology used for the preparation of the projections is different from that used for the preparation of the emission projections for the NC7. The changes relate mainly to the energy sector, for which models were revised and updated. Monaco provided information on the changes since the submission of its NC7 in the assumptions, methodologies, models and approaches used for the projection scenarios.

49. To prepare its projections, Monaco relied on key underlying assumptions relating to population, vehicle fleet and an extrapolation of observed trends reported in the national inventory report (2020 submission). The assumptions were not updated on the basis of the most recent economic developments known at the time of the preparation of the projections.

(c) Results of projections

50. The projected emission levels under different scenarios and information on the quantified economy-wide emission reduction target are presented in table 9 and figure 1.

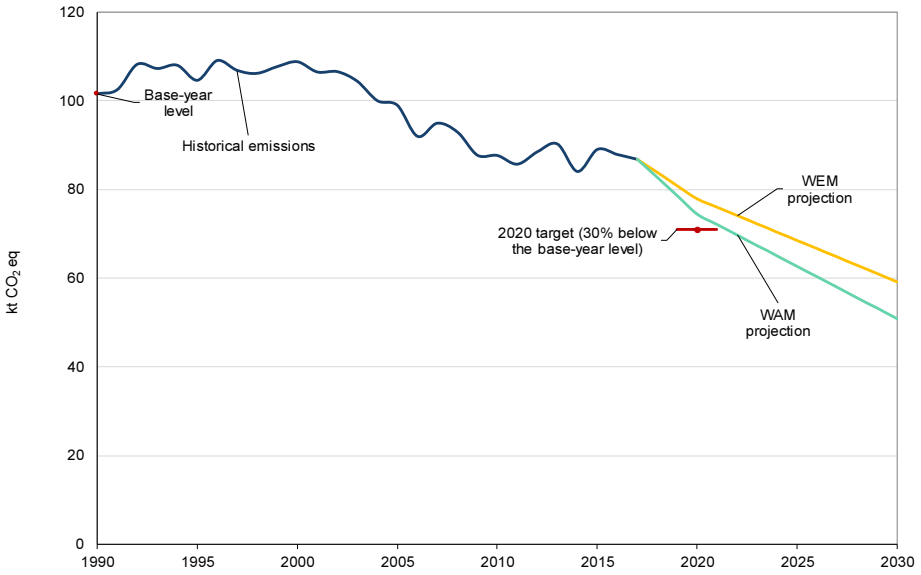
Table 9
Summary of greenhouse gas emission projections for Monaco

	GHG emissions (kt CO_2 eq/year)	*Change in relation to base-year level (%)*	*Change in relation to 1990 level (%)*
Quantified economy-wide emission reduction target under the Convention	71.11	30.0	30.0
Inventory data 1990 (base year)	101.59	NA	NA

	GHG emissions (kt CO_2 eq/year)	*Change in relation to base-year level (%)*	*Change in relation to 1990 level (%)*
Inventory data 2017	86.85	14.5	14.5
WEM projections for 2020	77.88	23.3	23.3
WAM projections for 2020	74.46	26.7	26.7
WEM projections for 2030	59.13	41.8	41.8
WAM projections for 2030	50.86	49.9	49.9

Sources: Monaco's BR4 and BR4 CTF table 6. Updated projections were provided by Monaco during the review.
Note: The projections are for GHG emissions without LULUCF and excluding indirect CO_2.

Figure 1
Greenhouse gas emission projections reported by Monaco



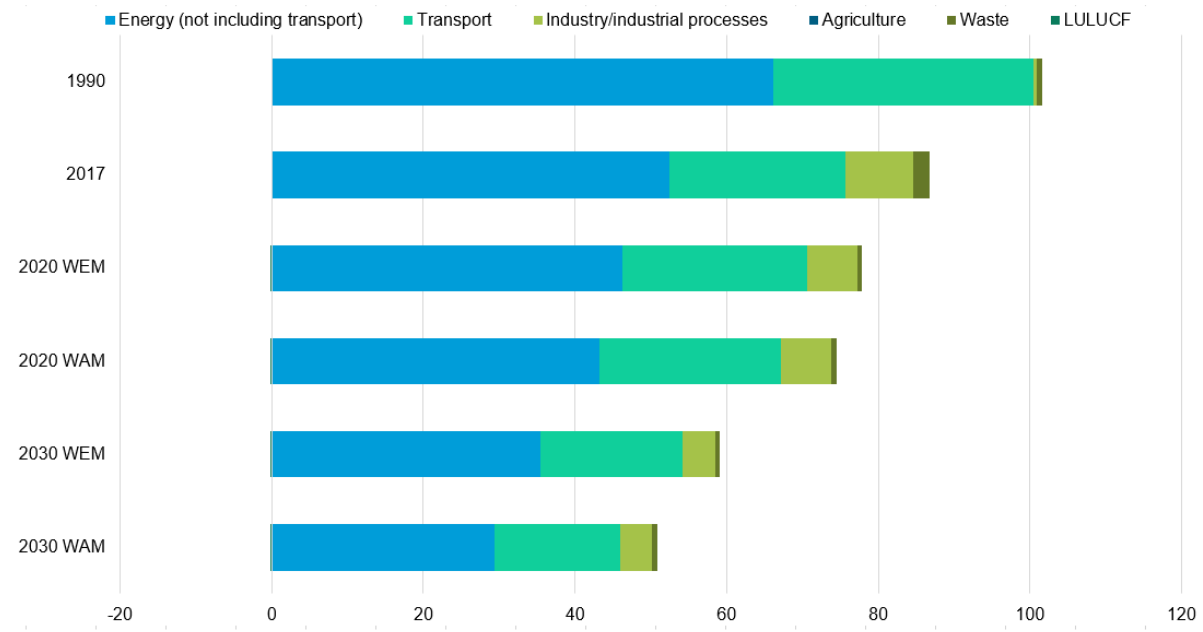
Sources: Monaco's BR4 and BR4 CTF tables 1 and 6 (total GHG emissions excluding LULUCF). Updated projections were provided by Monaco during the review.

51. Monaco's total GHG emissions excluding LULUCF in 2020 and 2030 are projected under the WEM scenario to decrease by 23.3 and 41.8 per cent, respectively, below the 1990 level. Under the WAM scenario, emissions in 2020 and 2030 are projected to be lower than those in 1990 by 26.7 and 49.9 per cent, respectively.

52. Monaco's economy-wide target under the Convention is to reduce its total emissions by 30.0 per cent below the 1990 level by 2020 (see para. 13 above). The 2020 projections suggest that Monaco may face challenges in achieving its 2020 target under the Convention without the use of flexible mechanisms.

53. Monaco presented the WEM and WAM scenarios by sector for 2020 and 2030, as summarized in figure 2 and table 10.

Figure 2
Greenhouse gas emission projections for Monaco presented by sector
(kt CO_2 eq)



Sources: Monaco's BR4 CTF table 6. Updated projections were provided by Monaco during the review.

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

	GHG emissions and removals (kt CO_2 eq)					*Change (%)*			
		2020		*2030*		*1990–2020*		*1990–2030*	
Sector	*1990*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*
Energy (not including transport)	66.20	46.22	45.22	35.42	29.32	–30.2	–34.8	–46.5	–55.7
Transport	34.30	24.36	24.36	18.73	16.59	–29.0	–30.2	–45.4	–51.6
Industry/industrial processes	0.44	6.69	6.68	4.32	4.30	1 420.5	1 418.2	881.8	877.3
Agriculture	–	–	–	–	–	–	–	–	–
LULUCF	0.00	–0.01	–0.01	–0.01	–0.01	–	–	–	–
Waste	0.65	0.62	0.62	0.66	0.66	–4.6	–4.6	1.5	1.5
Other	–	–	–	–	–	–	–	–	–
Total GHG emissions excluding LULUCF	**101.59**	**77.88**	**74.46**	**59.13**	**50.86**	**–23.3**	**–26.7**	**–41.8**	**–49.9**

Sources: Monaco's BR4 CTF table 6. Updated projections were provided by Monaco during the review.

54. According to the projections reported for 2020 under the WEM scenario, the most significant absolute emission reductions are expected to occur in the energy and transport sectors, amounting to projected reductions of 30.2 and 29.0 per cent between 1990 and 2020, respectively. The pattern of projected emissions reported for 2030 under the same scenario remains the same, amounting to projected reductions of 46.5 and 45.4 per cent between 1990 and 2030, respectively.

55. If additional measures are considered (i.e. under the WAM scenario), the patterns of emission reductions by 2020 presented by sector slightly change owing to additional planned PaMs in the energy sector. Projected reductions in the energy sector amount to 34.8 per cent between 1990 and 2020 and 55.7 per cent between 1990 and 1930, while projected reductions

for the transport sector amount to 30.2 per cent between 1990 and 2020 and 51.6 per cent between 1990 and 2030.

56. 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

	GHG emissions and removals (kt CO_2 eq)					*Change (%)*			
		2020		*2030*		*1990–2020*		*1990–2030*	
Gas	*1990*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*
CO_2[a]	96.99	68.14	64.73	51.99	43.81	–29.7	–33.3	–46.4	–53.2
CH_4	2.15	0.83	0.83	0.84	0.82	–61.4	–61.4	–60.9	– 61.9
N_2O	2.23	2.80	2.79	2.59	2.54	25.6	25.1	16.1	13.9
HFCs	0.00	5.97	5.97	3.55	3.55	–	–	–	–
PFCs	–	–	–	–	–	–	–	–	–
SF_6	0.22	0.11	0.11	0.11	0.11	–50.0	–50.0	–50.0	–50.0
NF_3	0.00	0.00	0.00	0.00	0.00	–	–	–	–
Total GHG emissions without LULUCF	**101.59**	**77.88**	**74.46**	**59.13**	**50.86**	**–23.4**	**–26.7**	**–41.8**	**–49.9**

Sources: Monaco's BR4 CTF table 6. Updated projections were provided by Monaco during the review.
[a] Monaco did not include indirect CO_2 emissions in its projections.

57. For 2020, the most significant absolute reductions are projected for CO_2 emissions: 29.7 per cent between 1990 and 2020. For 2030, the most significant absolute reductions are also projected for CO_2 emissions: 46.4 per cent between 1990 and 2030.

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

(d) Assessment of adherence to the reporting guidelines

59. The ERT assessed the information reported in the BR4 of Monaco and identified issues relating to completeness, transparency and thus 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 fourth biennial report of Monaco

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement[a] specified in paragraph 28 Issue type: transparency Assessment: encouragement	The Party reported WEM and WAM projections in its BR4 but did not report WOM projections or explain the omission. During the review, the Party explained that, in accordance with paragraph 28 of the UNFCCC reporting guidelines on NCs, it chose not to establish a WOM scenario. The ERT encourages the Party to provide a WOM scenario in its BR.
2	Reporting requirement[a] specified in paragraph 29 Issue type: transparency Assessment: recommendation	In CTF table 3 and the PaMs tables in the BR4, the Party highlighted that the inclusion or exclusion of a measure in the WEM scenario is indicated by an asterisk or "yes" or "no" in the table. However, the ERT noted that the WEM scenario includes some planned PaMs and the WAM scenario includes one implemented measure. In addition, the ERT noted that some of the values provided in CTF table 6(a) for the waste and LULUCF sectors and for SF_6 are the same as those provided in CTF table 6(c). During the review, Monaco confirmed that all PaMs indicated by an asterisk or "yes" are included in the WEM scenario and all other PaMs are included in the WAM scenario. It explained that the above-mentioned planned PaMs were assumed to be close to implementation at the time of preparation of the projections and were

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
		therefore considered in the WEM scenario. However, as the political process of implementing these PaMs was delayed unexpectedly, their status of implementation still had to be reported as planned in the BR4, but the emission projections had already been completed and could no longer be changed. Regarding the above-mentioned implemented measure, Monaco explained that its evaluation is more complex because it is not directly linked to a national policy, and that it will be evaluated for the next BR or NC. Finally, Monaco clarified that there are no additional or planned measures for the waste and LULUCF sectors, which is why the reported values for the WEM and WAM scenarios are the same. The ERT recommends that Monaco consistently include all implemented and adopted measures in the WEM scenario, and planned measures in the WAM scenario; and indicate in the projections chapter of its BR if no additional measures are planned for a certain sector or gas and hence there is no difference between the WEM and WAM projections.
3	Reporting requirement[a] specified in paragraph 30 Issue type: transparency Assessment: encouragement	The Party did not report a sensitivity analysis for any of the projections in its BR4. During the review, Monaco explained that a sensitivity analysis was not conducted owing to lack of time. The ERT reiterates the encouragement from the previous review report for the Party to provide a sensitivity analysis of the reported projections.
4	Reporting requirement[a] specified in paragraph 31 Issue type: transparency Assessment: recommendation	The Party reported emission projections relative to actual inventory data for 1990–2017 in its BR4. However, the ERT identified several differences in the total emissions reported for historical years between CTF tables 1s1–1s3, 6(a) and 6(c) and in the total emissions with and without LULUCF between CTF tables 6(a) and 6(c). For example, CTF table 1s3 included "CO_2 emissions without net CO_2 from LULUCF" for 2017 of 73.27 kt, whereas CTF tables 6(a) and 6(c) included "CO_2 emissions excluding net CO_2 from LULUCF" for 2017 of 73.25 kt. During the review, Monaco explained that there were errors in CTF tables 6(a) and 6(c) and provided updated information on historical and projected emissions in these tables, correcting the inconsistencies identified between the two tables. After the review, the Party resubmitted those CTF tables with corrected emission values. The ERT recommends that the Party ensure the consistency of the reported historical data in CTF tables 1s1–1as3 with the data in CTF tables 6(a) and 6(c), as well as the consistency of the reported historical data between CTF tables 6(a) and 6(c).
5	Reporting requirement[a] specified in paragraph 44 Issue type: transparency Assessment: encouragement	The Party did not provide specific references to more detailed information on the models and approaches used in its BR4. During the review, Monaco explained that it used the same calculation methodologies for the projections as for the latest validated national inventory report. The models are based on the expected evolution of activity data or emission factors for each of the categories. The evolution is not based on scenarios but on information in strategic documents and specific studies and expert judgment. However, the studies are not intended to be publicly available. The ERT encourages the Party to provide references to more detailed and specific information related to the models and approaches used.
6	Reporting requirement[a] specified in paragraph 47 Issue type: transparency Assessment: encouragement	The Party reported in its BR4 key underlying assumptions and information on population growth only. However, the ERT noted that the Party also mentioned additional factors affecting emission trends, such as the vehicle fleet, but did not provide historical values and future assumptions regarding these factors. During the review, Monaco provided historical values and projected trends for its vehicle fleet. The ERT reiterates the encouragement from the previous review report for Monaco to include in its next BR key assumptions and values for all the factors affecting the projections.

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
7	Reporting requirement[a] specified in paragraph 48 Issue type: completeness Assessment: recommendation	The Party did not report information on the main factors and activities affecting sectoral emission trends in its BR4. During the review, the Party provided some general descriptive information on such factors and activities on a sectoral basis, such as for energy industry, transport and industry. The ERT recommends that the Party report information on factors and activities affecting emission trends for each sector in its next BR.
8	Reporting requirement[b] specified in paragraph 12 Issue type: completeness Assessment: encouragement	The Party did not provide supporting documentation on changes in the model or methodologies used for the preparation of projections in its BR4. During the review, Monaco explained that changes since the previous NC are described in the BR4 (chap. 4.5) and provided additional information in relation to the transport sector. The ERT reiterates the encouragement from the previous review report for Monaco to provide supporting documentation on changes in the model or methodologies used for the preparation of projections in its BR. The ERT notes that this could include the key assumptions used.

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

[a] Item listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs, as per para. 11 of the UNFCCC reporting guidelines on BRs.

[b] Item 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

60. Monaco is not an Annex II Party and is therefore not obliged to adopt measures and fulfil obligations defined in Article 4, paragraphs 3–5, of the Convention. However, Monaco provided information in its BR4 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.

61. Monaco reported in the CTF tables that it provided public financial support in 2017 of EUR 520,000 through multilateral channels and EUR 2,260,000 through bilateral, regional and other channels as grants for mitigation (energy), adaptation (agriculture, health and food security) and cross-cutting projects. The recipient countries were Burkina Faso, Burundi, Madagascar, Mali, Mauritania, Mongolia, the Niger, Nigeria, Samoa and Senegal. In 2018, EUR 1,020,000 was provided through multilateral channels and EUR 2,571,000 through bilateral, regional and other channels as grants for projects in the same fields as in 2017, with addition of water and sanitation. The recipient countries and regions were the same as in 2017, with the addition of Tunisia and excluding Nigeria.

III. Conclusions and recommendations

62. The ERT conducted a technical review of the information reported in the BR4 and BR4 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 and the progress of Monaco towards achieving its target.

63. Monaco's total GHG emissions excluding and including LULUCF covered by its quantified economy-wide emission reduction target were estimated to be 14.5 per cent below its 1990 level. Emissions peaked in 1996 and decreased thereafter. The decrease after 1996 was due mainly to factors such as the decrease in fuel use for road transport and the substitution of oil for gas in stationary combustion.

64. Under the Convention Monaco committed to achieving a quantified economy-wide emission reduction target of 30 per cent below the 1990 level by 2020. The target covers CO_2, CH_4, N_2O, HFCs, PFCs, SF_6 and NF_3, expressed using GWP values from the AR4, and all sources and sectors included in the annual GHG inventory. 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 for achieving its target. In absolute terms, this means that under the Convention Monaco has to reduce its emissions from 101.59 kt CO_2 eq (in the base year) to 71.11 kt CO_2 eq by 2020.

65. In addition to its 2020 target, Monaco reported on its national longer-term targets of reducing GHG emissions, compared with the 1990 level, by 50 per cent by 2030 and 80 per cent by 2050 with a view to achieving carbon neutrality.

66. Monaco's annual total GHG emissions excluding LULUCF in 2017 were 14.5 per cent (14.94 kt CO_2 eq) below the base-year level.

67. The GHG emission projections provided by Monaco in its BR4 correspond to the WEM and WAM scenarios. Under these scenarios, emissions are projected to be 23.3 and 26.7 per cent below the 1990 level by 2020, respectively. On the basis of the reported information, the ERT concludes that Monaco may face challenges in achieving its 2020 target under the WEM and WAM scenarios without using flexible mechanisms. The ERT noted that Monaco intends to use units from market-based mechanisms if it faces challenges in achieving its target with the implemented and planned measures.

68. Monaco's main policy framework relating to energy and climate change is the Climate and Energy Plan. The Party described the mitigation actions that it has implemented to help it achieve its 2020 targets, which include PaMs in the energy, transport, industrial processes and waste sectors. These PaMs are focused on reducing emissions from road transport, for example by setting CO_2 standards for cars, providing subsidies for the purchase of electric and hybrid vehicles, and biofuel blending; and limiting the amount of waste to be incinerated by reducing plastic waste through optimized waste management.

69. The Party highlighted the mitigation actions for 2020–2030 that it has recently implemented or plans to implement to help achieve its medium- and long-term emission reduction targets. These PaMs include constructing a new and more efficient waste incineration plant and banning waste imports from France. In the transport sector, the aim of the planned measures is to reduce traffic volume by increasing public transport services, which includes construction of new infrastructure. Banning equipment that uses F-gases with high GWP is the main planned policy related to the industrial processes sector.

70. Monaco is not an Annex II Party and is therefore not obliged to adopt measures and fulfil obligations defined in Article 4, paragraphs 3–5, of the Convention. However, it provided information on its provision of support to developing country Parties. Monaco provided public financial support in 2017 of EUR 520,000 through multilateral channels and EUR 2,260,000 through bilateral, regional and other channels. In 2018, the support provided was EUR 1,020,000 through multilateral channels and EUR 2,571,000 through bilateral, regional and other channels.

71. 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:

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

(i) Providing information on changes in the domestic institutional arrangements, including references to other relevant documents, or clearly indicating that no such changes have occurred since the previous submission (see issue 1 in table 6);

(ii) Providing information on factors and activities affecting emission trends for each sector to facilitate understanding of the projected emission trends (see issue 7 in table 12);

(b) To improve the transparency of its reporting by:

(i) Providing clear information on the changes to the national inventory arrangements since its previous BR or NC, including details of how the QA/QC plan within the national system was strengthened (see issue 1 in table 3);

(ii) Providing consistent information between the BR and CTF table 2(b) on the inclusion of LULUCF in the target and the base year for SF_6 and NF_3 (see issue 1 in table 4);

(iii) Clearly explaining in CTF table 3, for example using notation keys or footnotes, why the estimated impacts of mitigation measures were not reported (see issue 3 in table 6);

(iv) When reporting on the use of market-based mechanisms, consistently reporting data in CTF tables 4 and 4(b) and in the BR, and reporting "0" for years when it did not use units from market-based mechanisms and not reporting values for the contribution of LULUCF in CTF table 4 (see issue 1 in table 8);

(v) When preparing its projections, consistently including all implemented and adopted measures in the WEM scenario, and planned measures in the WAM scenario, and clearly indicating in the projections chapter of the BR if no additional measures are planned for a certain sector or gas and hence there is no difference between the WEM and WAM projections (see issue 2 in table 12);

(vi) When reporting on its projections, ensuring the consistency of the reported historical data in CTF tables 1s1–as3 with the data in CTF tables 6(a) and 6(c), as well as the consistency of the reported historical data between CTF tables 6(a) and 6(c) (see issue 4 in table 12).

Annex

Documents and information used during the review

A. Reference documents

2019 GHG inventory submission of Monaco. Available at https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/national-inventory-submissions-2019.

2020 GHG inventory submission of Monaco. Available at https://unfccc.int/ghg-inventories-annex-i-parties/2020.

BR3 of Monaco. Available at https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/national-communications-and-biennial-reports-annex-i-parties/biennial-report-submissions/third-biennial-reports-annex-i.

BR4 of Monaco. Available at https://unfccc.int/BRs.

BR4 CTF tables of Monaco. Available at https://unfccc.int/BRs.

"Common tabular format for 'UNFCCC biennial reporting guidelines for developed country Parties'". Annex to decision 19/CP.18. Available at https://unfccc.int/resource/docs/2012/cop18/eng/08a03.pdf.

"Compilation of economy-wide emission reduction targets to be implemented by Parties included in Annex I to the Convention". FCCC/SBSTA/2014/INF.6. Available at http://unfccc.int/resource/docs/2014/sbsta/eng/inf06.pdf.

"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.

IPCC. 2006. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. S Eggleston, L Buendia, K Miwa, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at http://www.ipcc-nggip.iges.or.jp/public/2006gl.

Report on the technical review of the BR3 of Monaco. FCCC/TRR.3/MCO. Available at https://unfccc.int/review-reports-BR3_and_NC7.

"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 Jérémie Carles (Ministry of Public Works, the Environment and Urban Development of Monaco), including additional material. The following document[1] was provided by Monaco:

[1] Reference reproduced as received from the Party.

Journal de Monaco – Bulletin officel de la Principauté, 2021: Arrêté Ministériel n° 2020-916 du 24 décembre 2020 relatif à l'établissement des inventaires nationaux de gaz à effet de serre et de polluants atmosphériques. Available at https://journaldemonaco.gouv.mc/var/jdm/storage/original/application/3edb67cf048d559e83e669d87de7f3a7.pdf.