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Report on the technical review of the seventh national communication of Portugal

Parties included in Annex I to the Convention were requested by decision 9/CP.16 to submit their seventh national communication to the secretariat by 1 January 2018. According to decision 15/CMP.1, Parties included in Annex I to the Convention that are also Parties to the Kyoto Protocol are required to include in their national communications supplementary information under Article 7, paragraph 2, of the Kyoto Protocol. This report presents the results of the technical review of the seventh national communication and relevant supplementary information under the Kyoto Protocol of Portugal, 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” and the “Guidelines for review under Article 8 of the Kyoto Protocol”.

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Contents

	<i>Paragraphs</i>	<i>Page</i>
Abbreviations and acronyms		3
I. Introduction and summary	1–7	4
A. Introduction	1–3	4
B. Summary.....	4–7	4
II. Technical review of the information reported in the seventh national communication, including the supplementary information under the Kyoto Protocol	8–125	6
A. Information on national circumstances and greenhouse gas emissions and removals.....	8–26	6
B. Information on policies and measures and institutional arrangements	27–65	11
C. Projections and the total effect of policies and measures, including information on supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol	66–96	21
D. Provision of financial and technological support to developing country Parties, including information under Articles 10 and 11 of the Kyoto Protocol.....	97–109	30
E. Vulnerability assessment, climate change impacts and adaptation measures .	110–115	33
F. Research and systematic observation.....	116–121	37
G. Education, training and public awareness	122–125	39
III. Conclusions and recommendations	126–137	40
IV. Questions of implementation	138	42
Annex		
Documents and information used during the review		43

Abbreviations and acronyms

APA	Portuguese Environment Agency
BR	biennial report
CH ₄	methane
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
CTF	common tabular format
ENAAAC	National Strategy for Adaptation to Climate Change
ERT	expert review team
ESD	effort-sharing decision
EU	European Union
EU ETS	European Union Emissions Trading System
F-gas	fluorinated gas
GDP	gross domestic product
GHG	greenhouse gas
HFC	hydrofluorocarbon
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
NF ₃	nitrogen trifluoride
NGO	non-governmental organization
NIP	not in projections
NO	not occurring
non-ETS sectors	sectors not covered by the European Union Emissions Trading System
N ₂ O	nitrous oxide
ODA	official development assistance
PaMs	policies and measures
PFC	perfluorocarbon
PNAC	National Climate Change Programme
PNAEE	National Action Plan for Energy Efficiency
PNAER	National Action Plan for Renewable Energy
reporting guidelines for supplementary information	“Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol. Part II: Reporting of supplementary information under Article 7, paragraph 2”
RES	renewable energy sources
RNC 2050	Carbon Neutrality Road Map for 2050
SF ₆	sulfur hexafluoride
SNIERPA	National Inventory System of Emissions by Sources and Removals by Sinks of Air Pollutants
SPeM	National System for Policies and Measures
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 in-country technical review of the NC7 of Portugal. The review was coordinated 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 V: UNFCCC guidelines for the technical review of national communications from Parties included in Annex I to the Convention” (annex to decision 13/CP.20), and the “Guidelines for review under Article 8 of the Kyoto Protocol” (annex to decision 22/CMP.1 and annex I to decision 4/CMP.11).¹

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

3. The review was conducted from 18 to 23 February 2019 in Lisbon by the following team of nominated experts from the UNFCCC roster of experts: Ms. Souhila Bouilouta (Algeria), Mr. Felipe De León (Costa Rica), Mr. Mwangi Kinyanjui (Kenya), Ms. Carmen Schmid (Austria), Ms. Andreja Urbancic (Slovenia) and Mr. Robin White (Canada). Mr. Kinyanjui and Ms. Urbancic were the lead reviewers. The review was coordinated by Ms. Kirsten Macey (UNFCCC secretariat).

B. Summary

4. The ERT conducted a technical review of the information reported in the NC7 of Portugal in accordance with the UNFCCC reporting guidelines on NCs (decision 4/CP.5) and the reporting guidelines for supplementary information, in particular the supplementary information required under Article 7, paragraph 2, and on the minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol (annex to decision 15/CMP.1 and annex III to decision 3/CMP.11).

1. Timeliness

5. The NC7 was submitted on 29 December 2017, before the deadline of 1 January 2018 mandated by decision 9/CP.16.

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 Portugal in its NC7, including the supplementary information under the Kyoto Protocol, mostly adheres to the UNFCCC reporting guidelines on NCs.

¹ At the time of the publication of this report, Portugal had submitted its instrument of acceptance of the Doha Amendment; however, the Amendment had not yet entered into force. The implementation of the provisions of the Doha Amendment is therefore considered in this report in the context of decision 1/CMP.8, paragraph 6, pending the entry into force of the Amendment.

Table 1

Assessment of completeness and transparency of mandatory information reported by Portugal in its seventh national communication, including supplementary information under the Kyoto Protocol

<i>Section of NC</i>	<i>Completeness</i>	<i>Transparency</i>	<i>Reference to description of recommendations</i>	<i>Supplementary information under the Kyoto Protocol</i>	<i>Completeness</i>	<i>Transparency</i>	<i>Reference to description of recommendations</i>
Executive summary	Complete	Transparent	NA	National system	Complete	Transparent	NA
National circumstances	Complete	Transparent	NA	National registry	Mostly complete	Transparent	Issue 1 in table 5
GHG inventory	Complete	Transparent	NA	Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Complete	Transparent	NA
PaMs	Complete	Partially transparent	Issues 5, 6 and 10 in table 7	PaMs in accordance with Article 2	Complete	Transparent	NA
Projections and the total effect of PaMs	Mostly complete	Mostly transparent	Issues 2, 5 and 10 in table 11; issue 2 in table 13	Domestic and regional programmes and/or arrangements and procedures	Complete	Transparent	NA
Vulnerability assessment, climate change impacts and adaptation measures	Complete	Transparent	NA	Information under Article 10 ^a	Complete	Transparent	NA
Financial resources and transfer of technology	Mostly complete	Transparent	Issue 1 in table 15	Financial resources	Complete	Transparent	NA
Research and systematic observation	Complete	Transparent	NA	Minimization of adverse impacts in accordance with Article 3, paragraph 14	Complete	Transparent	NA
Education, training and public awareness	Complete	Transparent	NA				

Note: A list of recommendations pertaining to the completeness and transparency issues identified in this table is included in chapter III below. The assessment of completeness and transparency by the ERT in this table is based only on the “shall” reporting requirements.

^a The assessment refers to information provided by the Party on the provisions contained in Article 4, paragraphs 3, 5 and 7, of the Convention reported under Article 10 of the Kyoto Protocol, which is relevant to Annex II Parties only. Assessment of the information provided by the Party on the other provisions of Article 10 of the Kyoto Protocol is provided under the relevant substantive headings under the Convention, for example research and systematic observation.

3. Summary of reviewed supplementary information under the Kyoto Protocol

7. The supplementary information under Article 7, paragraph 2, of the Kyoto Protocol is incorporated in different sections of the NC7, and the supplementary information under Article 7, paragraph 1, of the Kyoto Protocol is reported in the national inventory report of the 2018 annual submission. Table 2 provides references to where the information is reported. The technical assessment of the information reported under Article 7, paragraphs 1 and 2, of the Kyoto Protocol is contained in the relevant sections of this report.

Table 2

Overview of supplementary information under the Kyoto Protocol reported by Portugal

<i>Supplementary information</i>	<i>Reference to section of NC7</i>
National registry	Chapter 3.3
National system	Chapter 3
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Chapter 10.1
PaMs in accordance with Article 2	Chapter 4
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	Chapter 10.6
Information under Article 10	Chapters 3, 4, 6.3, 7.5, 8 and 9
Financial resources	Chapter 7
Minimization of adverse impacts in accordance with Article 3, paragraph 14	Chapter 10.5

II. Technical review of the information reported in the seventh national communication, including the supplementary information under the Kyoto Protocol

A. Information on national circumstances and greenhouse gas emissions and removals

1. National circumstances relevant to greenhouse gas emissions and removals

(a) Technical assessment of the reported information

8. The national circumstances of Portugal explain the relationship between its historical and future emission trends and the climate change policy agenda. The changing nature of those circumstances defines the factors that affect the climate policy development and implementation of the Convention. The NC7 contains key data on legislation, population trends, geography and land use, climate and climate change, economic developments, energy, transport, the buildings sector, industry, trade, the services sector, agriculture, forestry, resource efficiency and wastewater.

9. Portugal is a unitary State that has two autonomous regions, with the archipelagos of the Azores and Madeira having their own political and administrative statutes and their own institution of self-government. The structure of the Portuguese Republic is based on the tripartite division of its territory between districts, municipalities and parishes. During the review, Portugal provided information on the latest governmental structure, where the Ministry of the Environment and Energy Transition is responsible for climate change policy.

10. Portugal's population slightly increased from 9.9 million in 1991 to more than 10 million in 2015. Over the last few years it has been slowly decreasing. The main demographic phenomenon in Portugal is an increase in the elderly population. Following the difficulties experienced in the economy both before and during the international financial and economic crisis, the Portuguese economy improved, mainly owing to increased exports.

11. The development of the energy sector is characterized by an increase in the share of renewable energy (mostly hydropower and wind) and a decrease in import dependency. Despite these developments, energy intensity and carbon intensity indicators have not changed significantly. In 2015, crude oil remains the main source of primary energy (43 per cent), followed by renewables (22 per cent), natural gas (19 per cent) and coal (15 per cent). However, the share of crude oil has been falling in recent years (55 per cent in 2006 compared with 43 per cent in 2015), while the share of renewable sources (16 per cent in 2006 compared with 22 per cent in 2015) and natural gas (14 per cent in 2006 compared with 19 per cent in 2015) increased significantly. Foreign energy dependency remains a major challenge for Portugal; however, investment in renewable energy and energy efficiency has enabled Portugal to reduce its dependency to below 80 per cent.

12. The transport sector is the main source of GHG emissions in Portugal, with road transport accounting for 56 per cent of the total volume of passengers in 2015. Fossil fuels (diesel, liquefied petroleum gas and natural gas) remain the main source of consumption in road transport, with only minor consumption of biofuels and electricity. The increase in energy use in transport is mainly driven by economic growth. The structure of the agriculture and land-use sectors has changed significantly since 1990. In 2015 grassland represented 49.9 per cent of the total agricultural area (compared with 29.9 per cent in 1990), which in turn is linked to an increase in livestock units. In the forest sector, forest fires are the main threat to development in the sector.

13. The ERT noted that during the period 1990–2016 Portugal's GDP per capita increased by 34.5 per cent, while GHG emissions per GDP unit decreased by 18.7 per cent. This shows a decoupling of GDP and the emission trend. Most of the progress was achieved in the period 1990–2010. GHG emissions per capita were lowest in the base year, peaking in 2010. In the period 2010–2012, GDP, GHG emissions per capita and the carbon intensity of the economy were relatively stable. Table 3 illustrates the national circumstances of Portugal by providing some indicators relevant to emissions and removals.

Table 3

Indicators relevant to greenhouse gas emissions and removals for Portugal for the period 1990–2016

Indicator	Change (%)						
	1990	2000	2010	2015	2016	1990–2016	2015–2016
GDP per capita (thousands 2011 USD using purchasing power parity)	20.17	26.00	27.24	26.61	27.12	34.5	1.9
GHG emissions without LULUCF per capita (t CO ₂ eq)	5.99	8.08	6.62	6.70	6.55	9.3	–2.3
GHG emissions without LULUCF per GDP unit (kg CO ₂ eq per 2011 USD using purchasing power parity)	0.30	0.31	0.24	0.25	0.24	–18.7	–4.1

Sources: (1) GHG emission data: Portugal's 2018 GHG inventory submission, version 1.0; (2) population and GDP: World Bank.

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

(b) Assessment of adherence to the reporting guidelines

14. The ERT assessed the information reported in the NC7 of Portugal and recognized that the reporting is complete, transparent and adhering to the UNFCCC reporting guidelines on NCs. There were no issues raised during the review relating to the topics discussed in this chapter of the review report.

2. Information on greenhouse gas inventory arrangements, emissions, removals and trends**(a) Technical assessment of the reported information**

15. Total GHG emissions² excluding emissions and removals from LULUCF increased by 13.0 per cent between 1990 and 2016, whereas total GHG emissions including net emissions or removals from LULUCF increased by 2.0 per cent over the same period. Table 4 illustrates the emission trends by sector and by gas for Portugal.

Table 4
Greenhouse gas emissions by sector and by gas for Portugal for the period 1990–2016

Sector	GHG emissions (kt CO ₂ eq)					Change (%)		Share (%)	
	1990	2000	2010	2015	2016	1990–2016	2010–2016	1990	2016
1. Energy	41 358.00	60 723.46	48 742.82	48 294.49	47 064.44	13.8	–2.5	69.1	69.6
A1. Energy industries	16 382.91	21 647.74	14 527.37	18 393.43	17 405.75	6.2	–5.4	27.4	25.7
A2. Manufacturing industries and construction	9 745.20	12 462.93	9 164.17	7 871.87	7 422.78	–23.8	–5.7	16.3	11.0
A3. Transport	10 228.83	19 585.56	18 970.17	16 350.98	16 676.66	63.0	2.0	17.1	24.7
A4. and A5. Other	4 787.96	6 529.27	5 390.99	4 438.93	4 388.03	–8.4	–1.1	8.0	6.5
B. Fugitive emissions from fuels	213.11	497.95	690.12	1 239.29	1 171.22	449.6	–5.5	0.4	1.7
C. CO ₂ transport and storage	NO	NO	NO	NO	NO	NA	NA	NA	NA
2. IPPU	5 886.88	7 622.22	7 588.51	7 838.75	7 294.60	23.9	–6.9	9.8	10.8
3. Agriculture	7 143.66	7 506.95	6 614.09	6 724.99	6 788.90	–5.0	1.0	11.9	10.0
4. LULUCF	1 155.02	–5 678.39	–10 910.43	–8 465.34	–5 394.12	–567.0	–36.3	NA	NA
5. Waste	5 436.50	7 289.20	6 997.38	6 554.31	6 473.12	19.1	–1.2	9.1	9.6
6. Other (Indirect CO ₂)	106.45	220.58	197.68	164.84	154.50	45.1	–6.3	NA	NA
Gas ^a									
CO ₂	45 585.56	66 059.94	52 897.57	52 205.22	50 285.47	10.3	–3.7	76.2	74.4
CH ₄	10 392.36	12 292.80	11 529.00	11 085.88	11 081.71	6.6	0.0	17.4	16.4
N ₂ O	3 847.12	4 347.70	3 368.57	3 175.39	3 155.29	–18.0	–0.6	6.4	4.7
HFCs	NO, NA	423.64	2 105.03	2 909.05	3 059.85	NA	5.2	NA	4.5
PFCs	NO, NA	1.13	7.93	13.89	15.29	NA	10.1	NA	0.0
SF ₆	NO, NA	16.61	34.69	23.11	23.45	NA	1.5	NA	0.0
NF ₃	NO	NO	NO	NO	NO	NA	NA	NA	NA
Total GHG emissions without LULUCF	59 825.04	83 141.82	69 942.80	69 412.54	67 621.06	13.0	–2.6	100.0	100.0
Total GHG emissions with LULUCF	60 980.06	77 463.43	59 032.37	60 947.21	62 226.95	2.0	2.1	NA	NA

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 on the basis of the 2018 annual submission, version 3.

Sector	GHG emissions (kt CO ₂ eq)					Change (%)		Share (%)	
	1990	2000	2010	2015	2016	1990–2016	2015–2016	1990	2016
	Total GHG emissions without LULUCF, including indirect CO₂	59 931.49	83 362.40	70 140.47	69 577.38	67 775.56	13.1	–2.6	NA
Total GHG emissions with LULUCF, including indirect CO₂	61 086.51	77 684.01	59 230.04	61 112.04	62 381.45	2.1	2.1	NA	NA

Source: GHG emission data: Portugal's 2018 annual submission, version 1.0.

^a Emissions by gas without LULUCF and without indirect CO₂.

16. The increase in total emissions was driven mainly by factors such as the increase in economic activity and GDP, and a reversal of the trend in transport emissions, which started to decline in 2005 but increased by 5.1 per cent between 2013 and 2016.

17. Between 1990 and 2016, GHG emissions from the energy sector increased by 13.8 per cent (5,706.45 kt CO₂ eq), owing mainly to an increase in economic activity and GDP. The trend in GHG emissions from fuel combustion showed notable increases in transport (63.0 per cent or 6,447.84 kt CO₂ eq) and fugitive emissions from fuels, which, although not especially relevant in absolute terms, have also increased substantially in the same period (449.6 per cent or 958.11 kt CO₂ eq). Crude oil remains the main source of primary energy, followed by renewables and other fossil fuels. However, the share of crude oil has been falling in recent years, while the share of renewable sources and natural gas increased significantly. Both of these trends have helped to reduce GHG emissions from the energy sector.

18. Between 1990 and 2016, GHG emissions from IPPU increased by 23.9 per cent (1,407.72 kt CO₂ eq), owing mainly to changes in the composition and output of the sector. Variations in emissions from the mineral industry are related mostly to changes in international demand for clinker and sustained growth in the production of lime and glass. The transition away from ozone-depleting substances for use in refrigeration has caused a considerable increase in consumption of F-gases, which accounted for 4.5 per cent of CO₂ eq emissions in 2016. Between 1990 and 2016, GHG emissions from the agriculture sector decreased by 5.0 per cent (354.76 kt CO₂ eq), owing mainly to a reduction of around 12 per cent in the total farm area and a significant land-use change from arable land to permanent grassland, which has increased the total livestock units under extensive production systems, particularly beef cattle. The LULUCF sector was a net sink of –5,394.12 kt CO₂ eq in 2016; net GHG removals have increased by 6,549.14 kt CO₂ eq since 1990. The trend was mainly driven by an increase in forest area, grassland, settlements and shrubland, and a decrease in cropland. The increase in forest land is due to afforestation policies, the natural evolution/succession of shrubland and investments in the forestry sector, mainly in eucalyptus and cork-oak plantations. The increase in eucalyptus is driven mostly by small private owners, who favour the short rotation period and the existence of a solid wood market for this species as a good investment. The increase in cork-oak plantations is mostly driven by public support schemes for private owners, including afforestation of former agricultural lands. The decrease in maritime pine is mostly driven by forest fires and pinewood nematode. Between 1990 and 2016, GHG emissions from the waste sector increased by 19.1 per cent (1,036.62 kt CO₂ eq), owing mainly to changes in consumption patterns and lifestyles associated with economic growth.

19. Between 1990 and 2016, CO₂ emissions increased by 10.3 per cent (4,699.91 kt CO₂) and CH₄ emissions by 6.6 per cent (689.35 kt CO₂ eq). F-gas emissions have been rising, with HFC emissions reaching 3,059.85 kt CO₂ eq in 2016, and PFC and SF₆ emissions reaching 15.29 kt CO₂ eq and 23.45 kt CO₂ eq, respectively, in 2016. Over the same period, N₂O emissions decreased by 18.0 per cent (691.83 kt CO₂ eq). The increase in CO₂ emissions over that period can be linked largely with the increase in the consumption of fossil fuels, particularly for the transport sector, while the increase in CH₄ emissions was induced by the growth in waste generation and CH₄ emissions from livestock. Growth in the consumption

of F-gases, particularly in refrigeration and air conditioning, explains the increase in the emissions of F-gases. The decrease in N₂O emissions was caused by changes in the processes used in industry, the introduction of abatement technologies and reductions in N₂O emissions from agriculture.

20. The summary information provided on GHG emissions was consistent with the information reported in the 2017 annual submission.

21. To reflect the most recently available data, version 2 of Portugal's 2018 annual inventory submission has been used as the basis for discussion in chapter II.A of this review report. The ERT noted that the 2018 inventory information had not been subjected to a technical review at the time of the review week. The ERT also noted that there are no substantive differences between the trends presented in the latest version of the GHG inventory and those reported in the BR3 and NC7. Total GHG emissions excluding LULUCF, as reported in the BR3 and NC7, increased by 15.7 per cent between 1990 and 2015, while according to the latest available annual inventory submission they increased by 13.0 per cent.

(b) Assessment of adherence to the reporting guidelines

22. The ERT assessed the information reported in the NC7 of Portugal and recognized that the reporting is complete, transparent and adhering to the UNFCCC reporting guidelines on NCs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

3. National system for the estimation of anthropogenic emissions by sources and removals by sinks

(a) Technical assessment of the reported information

23. Portugal provided in the NC7 a description of how its national system for the estimation of anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol is performing the general and specific functions defined in the annex to decision 19/CMP.1. The description includes all the elements mandated by paragraph 30 of the annex to decision 15/CMP.1. The NC7 also contains a reference to the description provided in the national inventory report of the 2017 annual submission.

(b) Assessment of adherence to the reporting guidelines

24. The ERT assessed the information reported in the NC7 of Portugal and recognized that the reporting is complete and transparent. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

4. National registry

(a) Technical assessment of the reported information

25. In the NC7 Portugal provided information on how its national registry performs the functions in accordance with the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and complies with the requirements of the technical standards for data exchange between registry systems. The ERT took note of the review of the changes to the national registry reflected in its NC and its report on the individual review of the 2017 annual submission of Portugal.

(b) Assessment of adherence to the reporting guidelines

26. The ERT assessed the information reported in the NC7 of Portugal and identified an issue relating to completeness. The finding is described in table 5.

Table 5

Findings on the national registry from the review of the seventh national communication of Portugal

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
1	Reporting requirement specified in paragraph 32 Issue type: completeness Assessment: recommendation	Portugal did not report the name and contact information of the registry administrator designated by the Party to maintain the national registry in its NC7. During the review, Portugal provided information explaining that the national registry administrator is APA, specifically the Climate Change Department/Adaptation and Monitoring Unit. There were no changes since the NC6 in this respect. The ERT recommends that Portugal provide in its next NC all information on the national registry, including the name and contact information of the registry administrator.

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

B. Information on policies and measures and institutional arrangements

1. Domestic and regional programmes and/or legislative arrangements and procedures related to the Kyoto Protocol

(a) Technical assessment of the reported information

27. For the second commitment period of the Kyoto Protocol, from 2013 to 2020, Portugal committed to contributing to the joint EU effort to reduce GHG emissions by 20 per cent below the base-year level. The majority of Portugal's strategies are anchored or linked to the EU policy regarding the EU 2020 climate and energy package. The national targets within the framework of the EU joint commitment are set out in the ESD. Binding target values, expressed as percentage changes from the 2005 level as set out in the ESD, are recalculated into absolute values based on the quantified annual target values described in European Commission decision 2013/162/EU as adjusted by European Commission implementing decision 2013/634/EU. Furthermore, in 2016 Portugal made a commitment to be carbon neutral by 2050.

28. Portugal's main instruments geared towards compliance with the national GHG emission target and, more broadly, implementation of the Kyoto Protocol, include PNAC 2020/2030, SPeM and SNIERPA, underpinned by the Framework Law on the Environment (Law 11/87 of 7 April 1987), which defines the institutions responsible for environmental policy and their main types of intervention.

29. Overall responsibility for climate change policymaking lies with APA, Portugal's public administration body under the Ministry of the Environment and Energy Transition. APA has the power to propose, develop and monitor the implementation of climate change policies. It is responsible for the following issues related to climate change: mitigation policy, adaptation policy, the EU ETS, the national GHG inventory system, registry administration, administrative management of the former Portuguese Carbon Fund (now integrated in the Portuguese Environmental Fund, along with several other former environmental funds, and managed by the General Secretariat of Ministry of Environment and Energy Transition), reporting to the UNFCCC and the EU, international negotiations, and climate change development cooperation. APA has particular responsibilities regarding coordination of climate change policies, promoting articulation with other sectoral policies within a framework of institutional cooperation.

30. A number of national institutions are involved in the development, implementation and monitoring of climate policies related to the respective areas: transport is shared between the Ministry of the Environment and Energy Transition, the Ministry of Planning and Infrastructure and the Ministry of the Sea; energy is under the responsibility of the Ministry of the Environment and Energy Transition; while agriculture and forestry is the responsibility of the Ministry of Agriculture, Forestry and Rural Development.

31. SPeM, approved by Council of Ministers resolution 45/2016, is a new instrument providing a governance, monitoring and reporting structure aimed at ensuring the fulfilment of national obligations, including sectoral targets under the EU climate and energy package and air policies for 2020, 2025 and 2030. In addition, SPeM compliments and builds on the work of SNIERPA.

32. As an EU member State, Portugal also applies EU climate policy, including EU common PaMs and policy instruments relevant to climate change. Under the ESD Portugal has a target of limiting the increase in its GHG emissions from non-ETS sectors to 1 per cent above the 2005 level by 2020. Portugal also applies European Council regulation 525/2013 on the monitoring and reporting mechanism, which ensures that EU progress towards meeting its Kyoto Protocol target is monitored and evaluated in a systematic way.

33. Portugal has legislative arrangements and administrative procedures in place to make information publicly accessible. Climate policy plans and instruments are subject to public consultation processes. The general public, as well as specific stakeholders and NGOs, are also involved in the institutional arrangements, including SpeM, SNIERPA and ENAAC.

34. Implementation of the Kyoto Protocol after 2012 is underpinned by the following policy instruments:

(a) PNAC 2020, approved by Council of Ministers resolution 56/2015, establishes PaMs and instruments with the aim of responding to the annual limitation of GHG emissions for non-ETS sectors and sets sectoral reduction targets;

(b) The National Low Carbon Road Map, prepared by APA and published in 2012, provides paths for cost-effective emission reductions (long-term targets concerning national GHG emission reductions) and the related policy options, taking into account the national contribution to the EU target for 2050;

(c) Other policy instruments specific to certain areas of climate change mitigation, especially regarding energy strategies, include PNAEE, PNAER, the Electric Mobility Programme and the Energy Efficiency Programme in Public Administration.³

35. New policies under preparation follow Portugal's political commitment to being carbon neutral by 2050. Portugal provided detailed information on new plans under development during the review. The RNC 2050 is a long-term strategy aimed at significantly increasing the level of ambition for GHG emission reduction in all sectors. The document underwent public consultation from December 2018 to the end of February 2019. In parallel, Portugal is preparing a new Integrated National Energy and Climate Plan focused on the period until 2030, following implementation of European Council regulation 2018/1999 on the governance of the energy union and climate action, which will replace PNAC, PNAEE and PNAER, among others, and integrate PaMs revised from these instruments. Both documents will be finalized in 2019.

36. Portugal has national legislative arrangements and administrative procedures in place that seek to ensure that the implementation of activities under Article 3, paragraph 3, forest management under Article 3, paragraph 4, and any elected activities under Article 3, paragraph 4, of the Kyoto Protocol also contributes to the conservation of biodiversity and the sustainable use of natural resources. The Ministry of the Environment and Energy Transition has the task of formulating, conducting and evaluating policies on the environment, urban planning, cities, housing, urban, suburban and road passenger transport, climate change and nature conservation with a view to sustainable development and social and territorial cohesion. During the review, Portugal provided additional information that the guiding principle of the Forest Management Act 1996 is that forest operators need to take into account the contribution of forests to carbon storage and biodiversity. Portugal's policy

³ Further information on the policy instruments is available online: PNAEE 2011, available at <http://www.builddup.eu/sites/default/files/content/PT%20-%20Energy%20Efficiency%20Action%20Plan%20EN.pdf>; PNAER 2013, available at <https://dre.pt/application/file/260476> (in Portuguese) and <https://rea.apambiente.pt/content/renewable-energy?language=en> (in English); and the Electric Mobility Programme, available at <http://www.inteli.pt/en/go/mobie>.

on conservation of biodiversity is integrated into its forest management programmes, which will be reviewed in 2019.

(b) Assessment of adherence to the reporting guidelines

37. The ERT assessed the information reported in the NC7 of Portugal and recognized that the reporting is complete, transparent and adhering to the reporting guidelines for supplementary information. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

2. Policies and measures, including those in accordance with Article 2 of the Kyoto Protocol

(a) Technical assessment of the reported information

38. Portugal 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 and its Kyoto Protocol. Portugal 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.

39. Following the change of government in 2015, lead responsibility for energy was transferred to the Ministry of Economy from the Ministry of the Environment and Energy Transition, while the latter was accorded responsibility for suburban and road passenger transport. Forestry protection is a shared responsibility between the Ministry of the Environment and Energy Transition and the Ministry of Agriculture, Forestry and Rural Development. APA operates under the Ministry of the Environment and Energy Transition and has powers to develop and monitor environmental policies.

40. Under the direction of the Ministry of the Environment and Energy Transition, the newly created Environment Fund seeks to foster sustainable development and replaces the Portuguese Carbon Fund, the Environmental Action Fund, the Fund for the Protection of Water Resources and the Fund for the Conservation of Nature and Biodiversity.

41. The newly named Interministerial Commission for Air, Climate Change and Circular Economy, which is composed of members of various government departments and regional representatives, oversees the monitoring of climate-related policies. SPeM was established in 2016 as a legal instrument for the reporting, monitoring and implementation of climate actions. Under SPeM a new platform for information management will be developed to replace the previous and currently inactive platform.

42. Portugal's main policy framework relating to energy and climate change is the Strategic Framework for Climate Policy, approved through a Council of Ministers resolution, which includes PNAC 2020/2030 and ENAAC 2020. Following completion of its implementation of the first cycle of climate mitigation instruments under PNAC 2020/2030 and ENAAC 2020, Portugal has embarked on developing new instruments that seek to integrate climate policy into sectoral policies. The National Low Carbon Road Map 2050 provides guidelines for shifting to a low-carbon economy, while the 2015 Commitment for Green Growth established specific targets for GHG emission reductions and renewable energy, and the 2014 green tax reform introduced carbon taxation for non-ETS sectors. During the review, Portugal outlined that it had undertaken modelling of its RNC 2050.

43. Portugal provided information on a set of PaMs similar to those previously reported. The Party also provided information on 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.

44. Portugal gave priority to implementing the PaMs that make the most significant contribution to its emission reduction efforts. Portugal provided information on how it believes its PaMs in the energy sector are modifying longer-term trends in anthropogenic GHG emissions and removals in accordance with the objective of the Convention; however,

it did not include information for the other sectors. Portugal did not report on how it periodically updates its PaMs to reduce greater levels of emissions.

45. The key overarching related cross-sectoral policy in the EU is the 2020 climate and energy package, adopted in 2009, which includes the revised EU ETS and the ESD. The package is supplemented by renewable energy and energy efficiency legislation and legislative proposals on the 2020 targets for CO₂ emissions from cars and vans, the carbon capture and storage directive, and the general programmes for environmental conservation, namely the 7th Environment Action Programme and the clean air policy package. The 2030 climate and energy package, adopted in 2014, established more stringent targets than those in the previous package for the period 2021–2030.

46. In operation since 2005, the EU ETS is a cap-and-trade system that covers all significant energy-intensive installations (mainly large point emissions sources such as power plants and industrial facilities), which produce 40–45 per cent of the GHG emissions of the EU. It is expected that the EU ETS will guarantee that the 2020 target (a 21 per cent emission reduction below the 2005 level) will be achieved for sectors under the scheme. The third phase of the EU ETS started in 2013 and the system now includes aircraft operations (since 2012) as well as N₂O emissions from chemical industries, PFC emissions from aluminium production and CO₂ emissions from some industrial processes that were not covered in the earlier phases of the EU ETS (since 2013). For the period 2021–2030 an emission reduction target of 43 per cent below the 2005 level was established.

47. The ESD became operational in 2013 and covers sectors outside the EU ETS, including transport (excluding domestic and international aviation, and international maritime transport), residential and commercial buildings, agriculture and waste, together accounting for 55–60 per cent of the GHG emissions of the EU. The aim of the ESD is to decrease GHG emissions in the EU by 10 per cent below the 2005 level by 2020 and it includes binding annual targets for each member State for 2013–2020. Member States are further subject to a 30 per cent emission reduction by 2030.

48. EU-wide mitigation actions that are under development include the pending comprehensive package of EU legislation involving changes to the fourth trading period of the EU ETS (2021–2030), further revisions to the ESD, and enhanced use of RES and energy efficiency targets for 2030. Furthermore, a 2016 European Commission legislative proposal integrates GHG emissions and removals from LULUCF into the EU 2030 emission reduction target.

49. Portugal introduced national-level policies to achieve its targets under the ESD and domestic emission reduction targets. Under PNAC 2020/2030 Portugal implemented targets for 2020 and 2030 for non-ETS sectors (services, households, transport, agriculture and waste). The key policies reported are a carbon tax on non-ETS sectors, tax incentives for efficiency and low-carbon options, as well as a programme for urban densification and revitalization. No emission estimates were provided to evaluate which PaMs have delivered the most significant mitigation effect. Table 6 provides a summary of the reported information on the PaMs of Portugal.

Table 6
Summary of information on policies and measures reported by Portugal

<i>Sector</i>	<i>Key PaMs</i>	<i>Estimate of mitigation impact by 2020 (kt CO₂ eq)</i>
Policy framework and cross-sectoral measures	EU ETS	NE
	Carbon tax	NE
	Tax incentives for low-carbon options	NE
	Urban greening and revitalization	NE
Energy		
Transport	National Strategy for Sustainable Cities 2020	NE

<i>Sector</i>	<i>Key PaMs</i>	<i>Estimate of mitigation impact by 2020 (kt CO₂ eq)</i>
	Strategic Plan for Transport and Infrastructure	NE
	Electric Mobility Programme	NE
	National Plan for the Promotion of Cycling and Other Soft Modes	NE
Renewable energy	Biomass for combustion	NE
	PNAER	NE
	Promotion of renewables in heating and cooling	NE
	Promotion of production and self-consumption of renewables	NE
Energy efficiency	PNAEE	NE
	Energy Efficiency Programme in Public Administration	NE
	System for the Management of Intensive Energy Consumption	NE
IPPU	Implementation of F-gas regulation in line with EU regulation 517/2014 on F-gases	NE
Agriculture	Livestock effluent management	NE
	Reduction in fertilizer use	NE
	Soil conservation	NE
LULUCF	Increasing forest resilience	NE
	Afforestation	NE
Waste	National Action Plan for Circular Economy	NE
	National Plan on Waste Management 2020	NE
	Strategic Plan for Industrial Waste Management	NE
	National Plan for Industrial Waste Prevention	NE
	Second National Healthcare Waste Plans	NE

50. Portugal did not provide estimates of the mitigation impact of PaMs. It is therefore not possible to assess the assumptions, methods and data used in the estimation of mitigation impacts, the plausibility of the estimates or the likelihood of a mitigation action achieving the expected impact by the date stated. During the review, Portugal clarified that efforts to finalize the package of PaMs were ongoing, as the final version of the list of PaMs to reduce GHG emissions was approved by order of the Minister of the Environment and Energy Transition on 14 September 2018. This list was jointly developed with the sectoral focal points and was subject to a formal interservices consultation process before its final approval.

(b) Policies and measures in the energy sector

51. **Energy supply.** Portugal's vision for its energy sector has three main aspects: integrated promotion of energy efficiency and the use of RES, the reduction of the degree of external dependence, and a focus on strengthening and developing European regional connections. Portugal seeks to achieve this vision by balancing environmentally sustainable energy with security of energy supply and ensuring that energy remains a promotor of economic competitiveness. EU targets for 2020 in the energy sector of a 20 per cent reduction in energy consumption, 20 per cent of RES in final energy consumption and a 20 per cent GHG emission reduction from the energy sector translate into concrete goals for Portugal of 31 per cent of RES in gross final energy consumption, 10 per cent RES in the transport sector and a 20 per cent reduction in primary energy consumption. In addition to these targets, the

Government of Portugal has adopted additional goals of a 25 per cent reduction in primary energy consumption and a 30 per cent reduction in national energy consumption. EU targets for 2030 of a 32.5 per cent reduction in energy consumption, 32 per cent of RES in final energy consumption and 14 per cent of RES in the transport sector translate into goals of a 35 per cent reduction in energy consumption, 47 per cent of RES in final energy consumption and 20 per cent of RES in the transport sector for Portugal.

52. **Renewable energy sources.** In 2015, the share of RES in gross final energy consumption in Portugal was 28.0 per cent, 1.0 per cent above the value recorded in 2014 and 2.8 per cent above the indicative path, meaning that Portugal has already reached approximately 90 per cent of its target for 2020. Portugal also highlighted the contribution of the renewable energy sector to job creation and regional development in that it generates an entirely new industrial and business strand. Portugal's PNAER 2020 sets national targets for the share of energy from renewable sources consumed in transport, electricity, and heating and cooling by 2020, as well as their penetration paths in accordance with the pace of implementation of the measures and actions envisaged for each of these sectors, bearing in mind the effects of other policies related to energy efficiency on energy consumption. Portugal also has PaMs in place to reduce or phase out the tariff for cogeneration plants using fuel oil and promotes renewable energy in the electricity sector by operationalizing origin guarantees, decentralizing the electricity network through biomass power plants and establishing offshore energy pilot zones and purchasing electricity through a 'one-stop shop'.

53. **Energy efficiency.** Portugal's main PaMs in energy efficiency are PNAEE 2020, the Energy Efficiency Programme in Public Administration and the promotion of energy performance contracting for installations. These plans and policies are supported and complemented by a variety of mandatory regulatory systems, including the System for the Management of Intensive Energy Consumption, the System for the Certification of Buildings and the Regulation of Energy Consumption in Transport.

54. **Residential and commercial sectors.** GHG emissions in the residential and commercial sectors in Portugal are substantially mitigated by PaMs implemented to reduce emissions from electricity generation as well as energy efficiency improvements resulting from the use of more efficient equipment and implementation of instruments such as the System for the Certification of Buildings. The promotion of renewable energy production for own consumption, mainly from solar photovoltaic and solar thermal energy for heating water but also from heat pumps for space heating and insulation measures, was also highlighted by Portugal.

55. **Transport sector.** Portugal is one of the European countries with lower CO₂ emissions from new vehicles placed on the market, owing in no small measure to substantial subsidies and tax incentives for electric vehicles. Measures in this sector include the establishment of national targets for the incorporation of biofuels in transport, the inclusion of CO₂ in the tax on vehicles, investment in cleaner vehicles for public transport fleets and the Electric Mobility Programme. However, although electro-mobility is an effective GHG emission reduction measure, especially when the electricity is generated from renewable resources, the impacts of the transport sector on the environment and quality of life remain significant, requiring a modal shift to low-emission public transport. To this effect, Portugal's Strategic Plan for Transport and Infrastructure (2014–2020) seeks to ensure mobility and accessibility for people and goods efficiently and according to needs, thus promoting social cohesion, including by continuing effective measures from the previous Strategic Plan for Transport and Infrastructure, including the National Plan for the Promotion of Cycling and Other Soft Modes and the National Guidelines for Mobility, which includes initiatives on transport mobility and accessibility.

56. The NC7 includes general information on Portugal's participation in efforts undertaken with the International Civil Aviation Organization and the International Maritime Organization to limit emissions from aviation and marine bunker fuels and on identifying the institutions in Portugal responsible for the implementation of related decisions. However, Portugal did not include information on what those national institutions are doing to promote and implement the relevant decisions of the International Civil Aviation Organization and the International Maritime Organization. During the review, Portugal provided information on institutional arrangements between APA and the National Civil Aviation Institute for the

implementation of the International Civil Aviation Organization Carbon Offsetting and Reduction Scheme for International Aviation and between APA and the Directorate-General for Natural Resources, Safety and Maritime Services for the implementation of arrangements for measurement, reporting and verification as a first step towards addressing international maritime GHG emissions.

57. **Industrial sector.** As is the case with most EU member States, the EU ETS is the main GHG emissions mitigation policy in Portugal for the industrial sector, including most energy- and process-related emissions from the sector. In Portugal, the EU ETS is complemented by a variety of energy efficiency policies.

(c) **Policies and measures in other sectors**

58. **Industrial processes.** The EU ETS is the main GHG emissions mitigation policy in Portugal for the industrial processes sector, including most energy- and process-related emissions from the sector. The two other policies reported by Portugal for the industrial processes sector are the System for the Management of Intensive Energy Consumption and the implementation of F-gas regulation in line with EU regulation 517/2014 on F-gases. During the review, Portugal provided information on additional measures led by the Portuguese Agency for Competitiveness and Innovation, which include the Industry Initiative 4.0, focusing on digital transformation, the National Action Plan for Circular Economy, and a framework of incentives for sustainable and competitive investments, which includes grants such as the “circular economy voucher”.

59. **Agriculture.** Under the EU Common Agricultural Policy beginning in 1992, successive reforms have progressively removed price support and aid to farmers in an effort to move agriculture to a more market-oriented economy. Later reforms have also sought to integrate rural development, climate and other environmental considerations into the sector. In the agriculture sector, the Rural Development Programme 2020 provides incentives for energy efficiency measures, particularly in irrigation, and promotes the production and use of biomass, solar and other renewable energies. In addition, under the National Strategy for Agricultural and Agroindustrial Effluents 2018–2025, policies are in place to reduce emissions from livestock effluents. Other policies that promote organic farming, conservation and precision farming aim to increase carbon stocks of soils and reduce emissions from nitrogen fertilizers. Sustainable grazing herds are also used to reduce fire risks related to forest regrowth on abandoned cropland.

60. **LULUCF.** Mitigation and adaptation have been embedded in forest policy since the establishment of the Forest Policy Act (1996). Forest PaMs are not specifically developed for addressing climate change, but most contribute to this aim. The LULUCF sector is expected to be a net sink up to 2050, although forest fires could continue to be a source of considerable inter-annual variation, as has been the case in recent years. To reduce this risk and ensure that forests contribute to CO₂ storage, the 2006 National Strategy for Forests (updated in 2015) and the Rural Development Programme 2020 set out measures to increase forest productivity and resilience to biotic and abiotic agents. These measures include improved forest management, in addition to initiatives to reduce soil erosion and clear forests of deadwood for use as fossil fuel substitutes. In recognition of the challenges of managing forest stands largely under fragmented private ownership, legislative reform in 2016–2017 led to the drawing up of forest management plans that bring together forest owners under associations of their choosing for forest fire prevention, development and marketing. The implementation of the aforementioned policies is part of a shift to a more integrated approach to reducing forest fire risk under the Integrated Fire Management System, aimed at the defence and sustainability of forest areas, and the protection of people and property, including settlements.

61. **Waste management.** Solid waste management in Portugal is structured around three main types of waste: municipal solid waste, industrial waste and health-care waste. Municipal solid waste is addressed through the National Plan on Waste Management, which was originally launched in 1996 as PERSU I (1996–2006), updated in 2007 as PERSU II (2007–2016) and updated again in 2014 as PERSU 2020 (2014–2020). Through the implementation of these plans, Portugal has gone from having 5 composting units, 13 controlled disposal sites and 341 illegal dumping sites, which meant that only 25 per cent of the population was served

with appropriate waste management, to having a municipal solid waste infrastructure that includes 32 landfills, 6 mechanical treatment sites, 16 mechanical-biological treatment sites, 5 organic recovery sites and 2 incineration (energy recovery) sites, which receive waste from 30 sorting stations and 197 ‘ecocentres’ serving more than 40,000 waste drop-off points.

62. Industrial waste management is regulated through the Strategic Plan for Industrial Waste Management 2013–2020 and the National Plan for Industrial Waste Prevention 2015. Through these plans, industrial waste recovery has increased from around 47 per cent in 1999 to around 89 per cent in 2015. Health-care waste is addressed through the First National Healthcare Waste Plans (1999) and the Second National Healthcare Waste Plans (2011). Future waste regulations will focus on waste prevention, reducing landfilling of biodegradable municipal solid waste, increasing preparation for reuse and recycling and facilitating the transition to a circular economy.

(d) Minimization of adverse impacts in accordance with Article 2 and Article 3, paragraph 14, of the Kyoto Protocol

63. In the NC7 Portugal reported information on how it strives to implement PaMs under Article 2 of the Kyoto Protocol in such a way as to minimize adverse effects, including the adverse effects of climate change and effects on international trade and social, environmental and economic impacts on other Parties, especially developing country Parties. The PaMs implemented, adopted or planned in PNAC include a broad portfolio of instruments and wide-ranging coverage of all sectors of the economy, demonstrating a significant effort by the Portuguese Government to address climate change, including the minimization of the adverse effects of such policies. For example, Portugal is using financial resources generated within the framework of the EU ETS for climate change mitigation and adaptation in developing countries. Following the inclusion of aviation in the EU ETS, additional resources are available from auctioning for these purposes. Climate mitigation measures in developing countries include support for renewable energy development, ensuring a positive environmental, economic and social effect in those countries. In addition, some climate change mitigation measures implemented in Portugal also have a positive effect on other Parties; for example, shifting to natural gas has a positive effect on some fossil fuel exporting countries.

64. Portugal provided information in the 2017 annual submission on how it strives to implement its commitments under Article 3, paragraph 14, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties.

(e) Assessment of adherence to the reporting guidelines

65. The ERT assessed the information reported in the NC7 of Portugal and identified issues relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table 7.

Table 7
Findings on policies and measures, including those in accordance with Article 2 of the Kyoto Protocol, from the review of the seventh national communication of Portugal

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
1	Reporting requirement ^a specified in paragraph 14 Issue type: completeness Assessment: encouragement	The ERT noted that Portugal did not indicate those PaMs which are innovative and/or effectively replicable by other Parties. During the review, Portugal clarified that the information provided had not been revised since the BR2 and that the RNC 2050, which includes future PaMs, was still being developed when the NC7 was due to be submitted, which made it impossible to include PaMs from the RNC 2050 in the NC. The ERT encourages Portugal to indicate in its next NC which PaMs are innovative and/or effectively replicable by other Parties.

No.	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
2	<p>Reporting requirement^a specified in paragraph 15</p> <p>Issue type: transparency</p> <p>Assessment: encouragement</p>	<p>The ERT noted that, with the exception of agriculture, Portugal did not include PaMs planned, adopted and/or implemented at the state, provincial, regional and local level.</p> <p>During the review, Portugal provided further details on PaMs at the subnational level, including collaboration with municipalities to continue to improve municipal solid waste separation in order to reduce the amount of biodegradable waste that goes to landfill and to ensure that every municipality in the country has at least one electric vehicle charging station.</p> <p>The ERT encourages Portugal to include in its next NC information on PaMs planned, adopted and/or implemented at the state, provincial, regional and local level.</p>
3	<p>Reporting requirement^a specified in paragraph 16</p> <p>Issue type: completeness</p> <p>Assessment: encouragement</p>	<p>Portugal did not report on action taken to implement commitments under Article 4, paragraph 2(e)(ii), of the Convention, which requires Parties to identify and periodically update their policies and practices that encourage activities that lead to greater levels of anthropogenic GHG emissions not controlled by the Montreal Protocol than would otherwise occur. The ERT further noted that the Party did not include a rationale for implementing these actions.</p> <p>During the review, Portugal clarified that some of these policies and practices still exist, including some influenced by the EU Common Agricultural Policy, which has caused an increase in emissions from beef livestock as the removal of price support for cereal cultivation has encouraged shifts in agricultural production.</p> <p>The ERT encourages Portugal to improve the completeness of its reporting by including information on PaMs and practices that encourage activities that lead to greater levels of anthropogenic GHG emissions not controlled by the Montreal Protocol than would otherwise occur and include a rationale for implementing such actions.</p>
4	<p>Reporting requirement^a specified in paragraph 18</p> <p>Issue type: completeness</p> <p>Assessment: encouragement</p>	<p>The ERT noted that Portugal did not reference PaMs that have been maintained and were described in previous NCs.</p> <p>During the review, Portugal clarified that efforts to finalize a new set of PaMs to be included in future projections, along with the relevant monitoring and reporting arrangements, are ongoing, which leads to changes in how PaMs are described in the NC6, making it very difficult to identify in the report which PaMs have been maintained.</p> <p>The ERT encourages Portugal, in its next NC, for PaMs that have been maintained over time and have been thoroughly described in previous NCs, to make a reference to this and provide a brief description focusing on any alterations to the policy or measure or effects achieved.</p>
5	<p>Reporting requirement^a specified in paragraph 17</p> <p>Issue type: transparency</p> <p>Assessment: recommendation</p>	<p>In the NC7 Portugal included for each sector its own textual description of the principal PaMs supplemented by CTF table 3. However, the ERT noted that the policy promoting the use of forest products as substitutes for fossil fuels is classified as a LULUCF sector policy in the NC, but as both a LULUCF and an energy sector policy in CTF table 3.</p> <p>During the review, Portugal stated that the policy applies to both the energy and the LULUCF sector.</p> <p>The ERT recommends that Portugal in its next NC organize its PaMs transparently by sector, subdivided by gas.</p>

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
6	Reporting requirement ^a specified in paragraph 22 Issue type: transparency Assessment: recommendation	<p>The ERT noted that Portugal did not identify all GHGs affected by some PaMs (e.g. CH₄ and N₂O in combustion-related policies), and that the status of implementation of some PaMs was inconsistently reported (e.g. the start date and status of implementation do not match).</p> <p>During the review, Portugal acknowledged that improvements could be made to its reporting.</p> <p>The ERT recommends that Portugal include in its next NC all GHGs affected by each policy or measure and ensure that the status of implementation of the PaMs is transparently reported, for example by ensuring consistency between the start date and the status of implementation.</p>
7	Reporting requirement ^a specified in paragraph 22 Issue type: transparency Assessment: encouragement	<p>The ERT noted that Portugal did not include objectives described in quantitative terms or report information on funds already provided, future budget allocated and the time frame for implementation for each policy or measure, although it did report information on PaMs related to education and research in the section on education, training and public awareness.</p> <p>During the review, Portugal outlined that SPeM has been established to streamline assessment of the implementation of policies which would include costs and time frames for implementing PaMs and, at the time of compiling the NC7 submission, the information was not available.</p> <p>The ERT encourages the Party in its next NC to include objectives described in quantitative terms, to the extent possible, and PaMs related to education and research and report information on funds already provided, future budget allocated and the time frame for implementation for each policy or measure.</p>
8	Reporting requirement ^a specified in paragraph 23 Issue type: transparency Assessment: encouragement	<p>The ERT noted that Portugal used the notation key “NA” for the quantitative estimate of the impacts of individual PaMs or collections of PaMs.</p> <p>During the review, Portugal clarified that efforts to finalize the package of PaMs were ongoing, as the final version of the list of PaMs to reduce GHG emissions was approved by order of the Minister of the Environment and Energy Transition on 14 September 2018. This list was jointly developed with the sectoral focal points and was subject to a formal interservice consultation process before its final approval.</p> <p>The ERT encourages Portugal to include in its next NC, as appropriate, a quantitative estimate of the impacts of individual PaMs or collections of PaMs or clearly explain why this may not be possible due to its national circumstances. The ERT notes that if a quantitative impact is not estimated, the Party could, for example, use the notation key “NE” and not “NA”.</p>
9	Reporting requirement ^a specified in paragraph 24 Issue type: completeness Assessment: encouragement	<p>The ERT noted that Portugal did not provide information for PaMs under the headings “Information about the costs of policies and measures”, “Information about non-GHG mitigation benefits of policies and measures” and “How the policy or measure interacts with other policies and measures at the national level”.</p> <p>During the review, Portugal clarified that efforts to estimate the costs of PaMs and the non-GHG mitigation benefits of PaMs and to evaluate the interactions between PaMs are ongoing as part of the work of SPeM.</p> <p>The ERT encourages Portugal to provide, in its next NC, information on the costs of PaMs, the non-GHG mitigation benefits of PaMs and the interactions between PaMs.</p>

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
10	Reporting requirement ^a specified in paragraph 25 Issue type: completeness Assessment: recommendation	<p>The ERT noted that, apart from for the energy sector, Portugal did not provide information on how it believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals consistent with the objective of the Convention.</p> <p>During the review, Portugal provided additional information related to how it believes PaMs in the agriculture and LULUCF sectors are modifying longer-term trends; for example, in the agriculture sector by reducing emissions through expansion of organic farming and conservation farming, which reduces emissions associated with fertilizer use, and in the LULUCF sector by conserving, restoring and improving forest soils to increase the role of carbon sequestration in the soils.</p> <p>The ERT recommends that Portugal provide in its next NC information on how it believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals consistent with the objective of the Convention, such as the information provided during the review.</p>
11	Reporting requirement ^a specified in paragraph 26 Issue type: completeness Assessment: encouragement	<p>The ERT noted that Portugal did not identify PaMs listed in previous NCs that are no longer in place.</p> <p>During the review, Portugal clarified that efforts in finalizing the selection of PaMs that will be included in the projections and the relevant monitoring and reporting arrangements are ongoing, which leads to changes in how they are described in the NCs, making it very difficult to identify in the NC7 which PaMs are no longer in place.</p> <p>The ERT encourages Portugal to provide an explanation when PaMs listed in previous NCs are no longer in place.</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.

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

C. Projections and the total effect of policies and measures, including information on complementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol

1. Projections overview, methodology and results

(a) Technical assessment of the reported information

66. Portugal reported projections for 2020 and 2030 relative to actual inventory data for 2015 under the WEM scenario. During the review, the Party provided information explaining that the reported WEM scenario includes implemented and adopted PaMs up to 1 September 2013.

67. In the NC, the Party used the notation key “NIP” for a projection scenario for some PaMs in table 4.2.7 but did not provide a definition of the notation key. During the review, Portugal clarified that the definition of the notation key “NIP” is “not in projections” as Portugal was still finalizing the selection of PaMs that would be included in the projections and the relevant monitoring and reporting arrangements.

68. In addition to the WEM scenario, Portugal reported the WAM scenario. During the review, the Party explained that the WAM scenario includes planned PaMs that were implemented after 1 September 2013.

69. Portugal did not provide any definitions of its WEM and WAM scenarios nor did it present the different underlying assumptions, which made it difficult for the ERT to assess compliance with the UNFCCC reporting guidelines on NCs. During the review, Portugal explained that the WAM scenario assumes a higher level of energy efficiency in buildings, industry and transport and that this is generally assuming a fuller implementation of existing policies or the deployment of new policies. The WAM scenario also integrates the effect of the EU regulation on F-gases. The difference between the WEM and the WAM scenario in

the waste sector model (modelled separately from the energy sector) is accounted for by the implementation of the objectives of the National Plan on Waste Management 2020 and the continued phasing out of landfills.

70. 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 CO₂, CH₄, N₂O, HFCs and SF₆ (treating HFCs and SF₆ collectively) for 1990–2030 (HFCs and SF₆ from 1995 onwards). During the review, Portugal explained that PFC emission projections are currently not available but will be developed under a new modelling exercise under the RNC 2050. The projections are also provided in an aggregated format for each sector as well as for a Party total using global warming potential values from the IPCC Fourth Assessment Report.

71. Portugal did not report emission projections for indirect GHGs, such as carbon monoxide, nitrogen oxides, non-methane volatile organic compounds or sulfur oxides. During the review, Portugal outlined that these are being scoped as part of the RNC 2050.

72. Portugal reported on factors and activities affecting emissions for each sector. Emission projections related to fuel sold to ships and aircraft engaged in international transport were not reported separately and were not included in the totals. During the review, the Party explained that such projections are not available for international transportation.

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

73. The methodology used for the preparation of the projections is identical to that used for the preparation of the emission projections for the BR2. Portugal reported supporting information in the NC7 further explaining some of the methodologies for the energy and industry sector, but no information was provided on the methodologies and approaches applied for the other sectors (F-gases, agriculture, waste, LULUCF). During the review, Portugal explained that projections for these sectors were based on calculations in Excel spreadsheets. Assumptions were made for both the agriculture and forest sectors regarding the main drivers for future emissions and removals based on evolution of the number of cattle and other farm animals, and land-use changes. The assumptions were made based on current trends and expectations about the impact of the EU Common Agriculture Policy on agriculture and pasture land. In addition, some changes in manure practices were considered, as well as gains in nitrogen efficiency application.

74. To prepare its projections, Portugal relied on the following key underlying assumptions: population growth; GDP growth; international oil, gas and coal prices; EU ETS carbon price; and energy demand. These variables and assumptions were reported in CTF table 5. The assumptions were not updated on the basis of the most recent economic developments known at the time of the preparation of the projections.

75. To project the emissions generated by combustion and industrial processes, Portugal applied the TIMES_PT model. For this modelling exercise, which was completed in 2014, Portugal prepared two different socioeconomic scenarios: a high-case scenario assuming an annual GDP growth of 3 per cent and positive population growth, and a low-case scenario assuming an annual GDP growth of 1 per cent and negative population growth. During the review, Portugal explained that for reporting the WEM scenario the high-case scenario was used. These scenarios were split into two periods. For the period until 2020, economic progress is modelled by using short-term economic outlook data for the Portuguese economy, while for the period 2020–2030, the economic progress follows the long-term trend described in the National Low Carbon Road Map 2050.

76. Portugal provided information in CTF table 5 on assumptions, methodologies, models and approaches used and on the key variables and assumptions used in the preparation of the projection scenarios. The ERT noted that Portugal has included in table 5 of the NC7 information on non-energy sectors, which increases the transparency of the reporting.

77. In the NC7 Portugal has also provided information on the sectoral parameters used in the projections for the energy, agriculture and waste sectors, as well as a summary of the general economic parameters for historical and projected years.

78. Sensitivity analyses were conducted for a number of important assumptions, such as technological development of electric vehicles, production potential from renewable

indigenous sources aimed at exporting, increased interconnection and maximization of photovoltaic technology in Portugal. During the review, Portugal provided additional information on the scenarios developed for the sensitivity analyses. The technological scenario on electric vehicles aimed to test the effect of increased autonomy of electric vehicles. It was assumed that an electric vehicle would be able to deliver a mobility service similar to that of a conventional internal combustion vehicle. Under this scenario, even when maintaining the cost curves for electric vehicles, the use of electric vehicles becomes competitive and induces a very significant reduction in diesel and gasoline consumption. The scenario relating to increased production from renewables was tested with the option of integrating in the system a massive amount of solar photovoltaic energy by 2030 (9 GW). The model that was run delivered full deployment of the capacity potential of solar as being the most cost-effective option for electricity generation.

79. In the NC7 Portugal mentioned that the RNC 2050 is currently being prepared, including the new modelling exercise referred to in paragraph 70 above. During the review, Portugal presented the new road map and its three narratives (“off-track”, “platoon” and “yellow jersey”), which have been designed in order to identify pathways to achieve the national target of net zero GHG emissions including LULUCF by 2050. Portugal explained that the methodologies and approaches used in the preparation of the RNC 2050 are very similar as to those used for the projections presented in the NC7.

(c) Results of projections

80. The projected emission levels under different scenarios and information on the Kyoto Protocol targets and the quantified economy-wide emission reduction target are presented in table 8 and the figure below.

Table 8

Summary of greenhouse gas emission projections for Portugal

	<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>
Kyoto Protocol base year ^b	65 028.09	NA	NA
Quantified emission limitation or reduction commitment under the Kyoto Protocol (2013–2020) ^c	53 697.75	NA	NA
Quantified economy-wide emission reduction target under the Convention ^d	NA	NA	NA
Inventory data 1990 ^e	59 403.14	NA	NA
Inventory data 2015 ^e	68 740.82	6.0	15.7
WEM projections for 2020 ^f	63 048.28	–3.0	6.1
WAM projections for 2020 ^f	63 011.05	–3.0	6.1
WEM projections for 2030 ^f	55 847.12	–14.1	–6.0
WAM projections for 2030 ^f	52 163.19	–19.8	–12.2

^a “Base year” in this column refers to the base year used for the targets under the Kyoto Protocol, while for the target under the Convention it refers to the base year used for that target.

^b The Kyoto Protocol base-year level of emissions is provided in the initial review report, contained in document FCCC/IRR/2016/PRT.

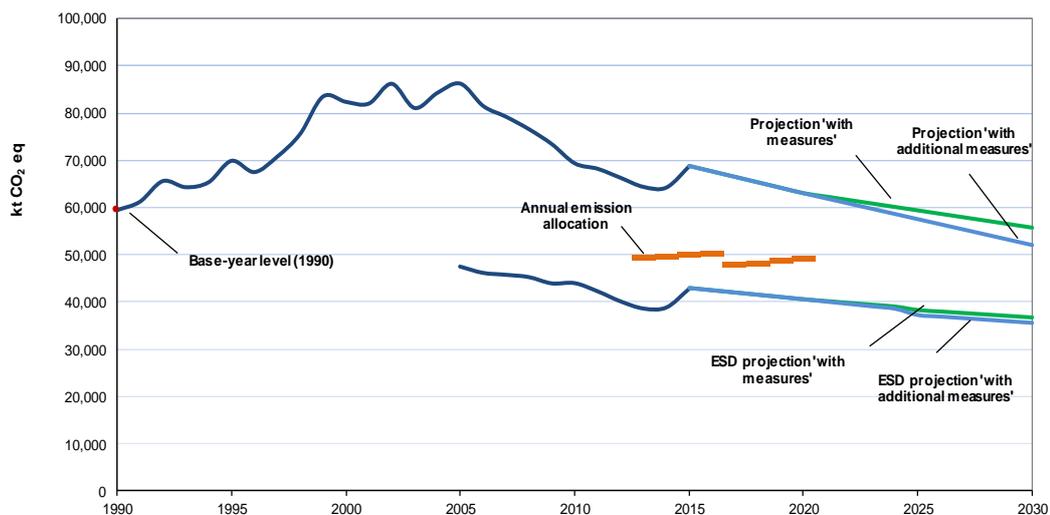
^c The Kyoto Protocol target for the second commitment period (2013–2020) is a joint target of the EU and its 28 member States and Iceland. The target is to reduce emissions by 20 per cent compared with the base-year (1990) level by 2020. The target for non-ETS sectors is 1 per cent above the 2005 level by 2020 for Portugal under the ESD. The value presented in this line is based on annex II to European Commission decision 2013/162/EU and as adjusted by Commission implementing decision 2013/634/EU that established the assigned amount for the EU member States and divided by eight (years) to calculate the annual emission level.

^d The quantified economy-wide emission reduction target under the Convention is a joint target of the EU and its 28 member States. The target is to reduce emissions by 20 per cent compared with the base-year (1990) level by 2020.

^e From Portugal’s BR3 CTF table 6.

^f From Portugal’s NC7 and BR3.

Greenhouse gas emission projections reported by Portugal



Sources: (1) data for 1990–2015: Portugal’s 2017 annual inventory submission, version 2; total GHG emissions excluding LULUCF; (2) data for 2015–2030: Portugal’s NC7 and BR3; total GHG emissions excluding LULUCF.

81. Portugal’s total GHG emissions excluding LULUCF in 2020 and 2030 are projected to be 63,048.28 and 55,847.12 kt CO₂ eq, respectively, under the WEM scenario, which represents an increase of 6.1 per cent and a decrease of –6.0 per cent, respectively, in relation to the 1990 level. Under the WAM scenario, emissions in 2020 are projected to be higher than those in 1990 by 6.1 per cent, while emissions in 2030 are projected to be lower by 12.2 per cent than those in 1990, and amount to around 63,011.05 and 52,163.19 kt CO₂ eq, respectively. The 2020 projections suggest that Portugal will continue contributing to the achievement of the EU target under the Convention.

82. Portugal’s target for sectors covered by the ESD is to limit its emission growth to 1 per cent above the 2005 level by 2020. Portugal’s annual emission allocations, which correspond to its national emission target for non-ETS sectors, change from 49,310.77 kt CO₂ eq in 2013 to 49,080.26 kt CO₂ eq for 2020. According to the projections under the WEM scenario, emissions from non-ETS sectors are estimated to reach 40,519 kt CO₂ eq by 2020. Under the WAM scenario, Portugal’s emissions from non-ETS sectors in 2020 are projected to be 40,482 kt CO₂ eq. The projected level of emissions under the WEM and WAM scenarios is 17.4 and 17.5 per cent, respectively, below the annual emission allocation for 2020. The ERT noted that this suggests that Portugal expects to meet its target under the WEM scenario.

83. In addition to the EU target for the non-ETS sectors, Portugal committed itself to achieving a domestic target of an 18–23 per cent reduction in emissions below the 2005 level by 2020 within the context of PNAC 2020/2030. The projections indicate that Portugal expects to meet its domestic target. In addition, Portugal provided information in its NC7 on national emission reduction targets for the non-ETS sectors, namely for services (–65 per cent), households (–14 per cent), transport (–14 per cent), waste including wastewater (–14 per cent) and agriculture (–8 per cent), compared with the 2005 level by 2020. The ERT could not compare the progress made to meet these targets because no ESD data were provided in the NC7 for 2005.

84. There is also a national target for 2030 under PNAC 2020/2030 which is expressed as an emission reduction of 30–40 per cent by 2030 compared with the 2005 level. The sectoral targets for the non-ETS sectors are –69 per cent for services, –15 per cent for households, –26 per cent for transport and –11 per cent for waste including wastewater within the period 2005–2030.

85. Portugal presented the WEM and WAM scenarios by sector for 2020 and 2030, as summarized in table 9.

Table 9
Summary of greenhouse gas emission projections for Portugal 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)	31 147	25 007	25 007	20 902	18 272	–19.7	–19.7	–32.9	–41.3
Transport	10 075	15 044	15 044	14 747	14 737	49.3	49.3	46.4	46.3
Industry/industrial processes	5 839	6 588	6 550	5 970	5 086	12.8	12.2	2.2	–12.9
Agriculture	6 981	8 142	8 142	7 241	7 241	16.6	16.6	3.7	3.7
LULUCF	1 842	–7 567	–7 567	–8 316	–8 316	–510.9	–510.9	–551.6	–551.6
Waste	5 361	8 267	8 267	6 987	6 827	54.2	54.2	30.3	27.4
Total GHG emissions without LULUCF	59 403	63 049	63 011	55 847	52 163	6.1	6.1	–6.0	–12.2

Source: Portugal's BR3 CTF table 6.

86. According to the projections reported for 2020 under the WEM scenario, the most significant emission reductions are expected to occur in the energy and LULUCF sectors, amounting to projected reductions of 6,140.00 kt CO₂ eq (–19.7 per cent) and 9,409.00 kt CO₂ eq (–510.9 per cent) between 1990 and 2020, respectively. The pattern of projected emissions reported for 2030 under the same scenario changes slightly for the waste, energy and LULUCF sectors. The ERT notes that it is very difficult to understand the reasons for the trends and changes in trends of the projections because the results of the projections are not described in a transparent manner in the NC7.

87. 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. For 2030 there are slight changes in the WAM scenario compared with the WEM scenario, which is owing to additional measures applied in the energy, industry and waste sectors, as explained by the Party during the review.

88. Portugal presented the WEM and WAM scenarios by gas for 2020 and 2030, as summarized in table 10.

Table 10
Summary of greenhouse gas emission projections for Portugal 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	45 371	42 243	42 243	38 332	35 801	–6.9	–6.9	–15.5	–21.1
CH ₄	10 201	13 203	13 202	11 132	10 921	29.4	29.4	9.1	7.1
N ₂ O	3 831	4 613	4 614	4 640	4 583	20.4	20.5	21.1	19.6
HFCs	0	2 876	2 837	1 515	631	NA	NA	NA	NA
PFCs	0	NA	NA	NA	NA	NA	NA	NA	NA
SF ₆	0	114	114	227	227	NA	NA	NA	NA
NF ₃	0	0	0	0	0	NA	NA	NA	NA
Total GHG emissions without LULUCF	59 403	63 048	63 011	55 847	52 163	6.1	6.1	–6.0	–12.2

Source: Portugal's BR3 CTF table 6.

89. For 2020 the most significant reductions are projected for CO₂ emissions: 3,128.00 kt CO₂ eq (–6.9 per cent) between 1990 and 2020; and 7,039.00 kt CO₂ eq (–15.5 per

cent per cent) between 1990 and 2030. On the other hand, sharp increases are projected for HFC emissions: 2,876 kt CO₂ eq between 1995 and 2020, with a reversal in the trend to a decline between 2020 and 2030.

90. 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 for 2020, but change slightly by 2030 owing to the implementation of the EU regulation on F-gases and the further promotion of renewables.

(d) Assessment of adherence to the reporting guidelines

91. The ERT assessed the information reported in the NC7 of Portugal and identified issues relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table 11.

Table 11

Findings on greenhouse gas emission projections reported in the seventh national communication of Portugal

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: completeness Assessment: encouragement	Portugal reported projections of GHG emissions under the WEM and WAM scenarios. However, the ERT noted that GHG emissions under the WOM scenario were not provided. During the review, Portugal explained that WOM projections are not available. The ERT reiterates the encouragement from the previous review report that Portugal in its next NC estimate and report GHG emission projections under a WOM scenario in addition to those under the WEM and WAM scenarios.
2	Reporting requirement ^a specified in paragraph 29 Issue type: transparency Assessment: recommendation	The ERT noted that the information in the NC7 on the definition of scenarios and the assumptions considered for each projections scenario, including information on PaMs, is not transparent; for example, some WAM scenarios include PaMs that are listed as “implemented”. During the review, Portugal explained that the cut-off date for PaMs to be considered in the WEM scenario was September 2013. All PaMs implemented after this date were considered in the WAM scenario. In addition, Portugal explained that the WAM scenarios assume a higher level of energy efficiency in buildings, industry and transport and that this is generally in line with a fuller implementation of existing policies or the deployment of new policies, including additional PaMs for F-gases and waste. The ERT reiterates the recommendation from the previous report that Portugal include planned PaMs in its reporting of WAM scenarios in accordance with the definitions of the UNFCCC reporting guidelines on NCs.
3	Reporting requirement ^a specified in paragraph 32 Issue type: transparency Assessment: encouragement	The ERT noted that Portugal reported 2017 inventory data in CTF table 6, but projections were based on inventory data from the 2013 GHG inventory submission (for 2011), while for the agriculture and LULUCF sectors the base-year data were based on the 2011 inventory submission (for 2009). The ERT noted that according to the UNFCCC reporting guidelines on NCs, the starting point should generally be the latest year for which inventory data are available in the NC. During the review, Portugal explained that at the time of the submission of the NC7 a new modelling exercise under the RNC 2050 was ongoing and therefore the projections were not updated. The ERT encourages Portugal to provide, in its next NC, projections with the starting point being the latest year for which inventory data are available in the NC.
4	Reporting requirement ^a specified in paragraph 35 Issue type: completeness	Portugal has not reported projections of the indirect GHGs carbon monoxide, nitrogen oxides, non-methane volatile organic compounds and sulfur oxides. During the review, Portugal explained that projections for indirect GHGs are not currently available. However, in the new modelling exercise, projections for

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
	Assessment: encouragement	pollutants such as nitrogen oxides, non-methane volatile organic compounds and sulfur oxides will be prepared. The ERT encourages Portugal to report in its next NC projections for the indirect GHGs carbon monoxide, nitrogen oxides, non-methane volatile organic compounds and sulfur oxides.
5	Reporting requirement ^a specified in paragraph 36 Issue type: completeness Assessment: recommendation	Portugal did not provide emission projections related to fuel sold to ships and aircraft engaged in international transport in the NC7. During the review, Portugal explained that no projections for international transportation are available. The ERT reiterates the recommendation from the previous review report that Portugal include emission projections related to fuel sold to ships and aircraft engaged in international transport separately in its next NC.
6	Reporting requirement ^a specified in paragraph 42 Issue type: transparency Assessment: encouragement	Portugal provided in its NC7 information on the models and/or approaches used to compile projections. However, this information was not considered to be sufficient as it addressed only the energy and industry sectors and not the agriculture, waste, LULUCF and IPPU sectors. During the review, Portugal provided some general information explaining that the non-energy/industry sectors are modelled based on Excel spreadsheets. In order to increase transparency and allow the reader to obtain a basic understanding of the models and/or approaches used, the ERT encourages Portugal in its next NC to provide sufficient information on those models and approaches. The ERT notes the importance of Portugal providing such information for all sectors.
7	Reporting requirement ^a specified in paragraph 43 Issue type: transparency Assessment: encouragement	In its NC7, Portugal reported on the models and approaches applied for the energy and industry sectors; however, it did not provide any information on the strengths and weaknesses of the model used or an explanation of how the model or approach used accounts for any overlap or synergies that may exist between different PaMs. During the review, Portugal provided an additional document describing the modelling exercise on which the projections reported in the NC7 are based (Agência Portuguesa do Ambiente, 2012). The ERT encourages Portugal to provide in its next NC for each model or approach used the information required by paragraph 43(a)–(e) of the UNFCCC reporting guidelines.
8	Reporting requirement ^a specified in paragraph 44 Issue type: completeness Assessment: encouragement	Portugal comprehensively explained the modelling approach for the TIMES_PT model. However, the ERT noted that no references for a more detailed explanation were provided in the NC7. During the review, Portugal provided a reference to the modelling exercises conducted within the framework of the National Low Carbon Road Map 2050, which provides additional information on the methodologies applied for the projections. The ERT encourages Portugal to provide references for more detailed information related to paragraph 43(a)–(e) of the UNFCCC reporting guidelines on NCs in its next NC.
9	Reporting requirement ^a specified in paragraph 46 Issue type: transparency Assessment: encouragement	In the NC7 Portugal provided the quantitative results of a sensitivity analysis in tabular format for total GHG emissions as well as a split between emissions under the EU ETS and under the ESD. Furthermore, Portugal explained in the NC7 that two technology scenarios were analysed for this exercise. However, it is not clear to which scenarios the results in the table are referring. During the review, Portugal clarified that the table shows the results of the low-case and the high-case socioeconomic scenarios. In addition, Portugal provided further information on the sensitivity analysis, including qualitative and quantitative information on both the assumptions of the technological scenarios and the results of the sensitivity analysis.

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
10	Reporting requirement ^a specified in paragraph 48 Issue type: transparency Assessment: recommendation	<p>The ERT encourages Portugal to transparently present the results of its sensitivity analysis by, for example, being specific as to which scenario these results apply.</p> <p>Portugal reported in CTF table 5 the key variables for most sectors. However, owing to the absence of any description related to the results of the projections of the WEM and WAM scenarios, the ERT found it difficult to understand the emission trends in the periods 1990–2020 and 2020–2030 for each sector.</p> <p>During the review, Portugal provided relevant information on factors and activity data for all sectors.</p> <p>In order to increase transparency, the ERT reiterates the recommendation from the previous review reports that Portugal include in the projections chapter a description of the underlying factors and activities to allow an understanding of the emission trends for each sector of the WEM and WAM scenarios.</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.

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

2. Assessment of the total effect of policies and measures

(a) Technical assessment of the reported information

92. In the NC7 Portugal presented the estimated and expected total effect of implemented and adopted PaMs and an estimate of the total effect of its PaMs, in accordance with the WEM scenario, compared with a situation without such PaMs. Information is presented in terms of GHG emissions avoided or sequestered, by gas (on a CO₂ eq basis), in 2020.

93. Portugal reported that the total estimated effect of its adopted and implemented PaMs is 28,564 kt CO₂ eq in 2020, with the largest effect occurring in the energy and industrial processes sectors. During the review, Portugal outlined that the WAM scenario foresees an overall higher efficiency in the energy sector across buildings, industry and transport and higher penetration of renewables for electricity production. This is generally in line with a fuller implementation of existing policies or the deployment of new policies. The difference between the WEM and the WAM scenario in the waste sector model (modelled separately from the energy sector) is accounted for by the implementation of the Strategic Plan for Municipal Solid Waste 2020 objectives and continued phasing out of landfills. Table 12 provides an overview of the total effect of PaMs.

Table 12

Projected effects of Portugal’s planned, implemented and adopted policies and measures by 2020

Sector	Effect of implemented and adopted measures (kt CO ₂ eq)	Effect of planned measures (kt CO ₂ eq)
Energy (without transport)	NA	NA
Transport	NA	NA
Industrial processes	NA	NA
Agriculture	NA	NA
Land-use change and forestry	NA	NA
Waste management	NA	NA
Total	28 564.00	NA

Source: Portugal’s NC7.

Note: The total effect of implemented and adopted PaMs is defined as the GHG emissions avoided in the WEM scenario compared with a ‘business as usual’ scenario assuming a constant specific carbon intensity of the energy/industrial processes, agriculture and waste sectors. Sectoral data have been calculated by the ERT based on the information provided in table 5.1.3 of the NC7. Inconsistencies in the figures above may be due to rounding.

(b) Assessment of adherence to the reporting guidelines

94. The ERT assessed the information reported in the NC7 of Portugal and identified issues relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table 13.

Table 13

Findings on the assessment of the total effect of policies and measures from the review of the seventh national communication of Portugal

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
1	Reporting requirement specified in paragraph 39 Issue type: completeness Assessment: encouragement	Portugal presented in the NC7 the total effect of implemented and adopted PaMs for the WEM scenario, but not for the planned PaMs. During the review, Portugal provided further information on the WAM scenario and outlined that more work was needed in finalizing its PaMs. The ERT encourages Portugal to provide the total expected effect of planned PaMs.
2	Reporting requirement specified in paragraph 40 Issue type: completeness Assessment: recommendation	Portugal provided an estimate of the total effect of PaMs in accordance with the WEM scenario definition, compared to a situation without such PaMs in its NC7. The ERT noted that no information was provided for 1995 and 2000. During the review, Portugal explained that 1995 was selected as the base year as it seemed to be more appropriate than 1990 because the economic development pattern is more representative of carbon intensity. Portugal provided the ERT with the relevant calculation table. The ERT recommends that Portugal provide an estimate of the total effect of PaMs, in accordance with the WEM scenario definition, compared to a situation without such PaMs for 1995 and 2000 in its next NC.
3	Reporting requirement specified in paragraph 41 Issue type: transparency Assessment: encouragement	Portugal explained in the NC7 that the specific carbon intensity of the agriculture and waste sectors for 2000 (based on GDP at constant 2010 prices) as well as GDP growth rates of 1.5 per cent for 2015 and 3 per cent for the projected years were used to calculate the global 'business as usual' scenario. The ERT noted that it is not transparent from the NC7 which year was used in the calculations for assuming whether or not policies are implemented. During the review, Portugal provided information on the calculation file, including additional information on the approach used. A WOM scenario was developed using an indicator-based approach (emissions per GDP), which may result in an overestimation of the total effect of PaMs because the approach also includes the effect of autonomous improvement and can therefore be understood as an upper limit of the effect of PaMs. The ERT encourages Portugal to improve the accuracy and transparency of its reporting on the total effect of implemented and adopted PaMs in its next NC, either through the preparation of a WOM scenario with underlying key assumptions that are consistent with those of the WEM scenario, or through an aggregation of the effects of each significant policy or measure.

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

3. Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol**(a) Technical assessment of the reported information**

95. In the NC7 Portugal provided information on how its use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action. The ERT

noted that Portugal does not plan to use market-based mechanisms to meet its Kyoto Protocol target.

(b) Assessment of adherence to the reporting guidelines

96. The ERT assessed the information reported in the NC7 of Portugal and recognized that the reporting is complete, transparent and adhering to the reporting guidelines for supplementary information. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

D. Provision of financial and technological support to developing country Parties, including information under Articles 10 and 11 of the Kyoto Protocol

1. Financial resources, including under Article 11 of the Kyoto Protocol

(a) Technical assessment of the reported information

97. Portugal reported information on the provision of financial support required under the Convention and its Kyoto Protocol, including on financial support provided, committed and pledged, allocation channels and annual contributions. The Party reported on its commitment to mobilize 0.15–0.20 per cent of its gross national income as ODA allocated to the least developed countries by 2030. In line with the Strategic Concept of Portuguese Cooperation for 2014–2020, the Party identified Portuguese-speaking African countries and Timor-Leste as beneficiaries for the 2015–2016 period.

98. The Party indicated that it does not use a conventional definition of what is “new and additional”; instead, it has adopted a framework on how it distributes financing in 2006. The funding aims to support the shift towards a low-carbon competitive economy through funding measures which contribute to meeting Portugal’s climate commitments. In 2010, Portugal decided that the Portuguese Carbon Fund (now restructured into the Environment Fund) would be an additional source of funding complementary to ODA to support development cooperation projects in the field of climate change. The Party clarified that most of the projects initiated in 2012 have come to completion, resulting in a declining trend in financial flows to developing countries (bilateral support) during the period 2013–2016. During the review, the Party explained the effects of the difficult national economic conditions of the reporting period which led to the decline in support to developing countries; however, Portugal indicated that there was an increasing trend in financial resources in the period post 2016.

99. Portugal described how its resources address the adaptation and mitigation needs of Parties not included in Annex I to the Convention. The Party also described how those resources assist Parties not included in Annex I to the Convention to mitigate and adapt to the adverse effects of climate change, facilitate economic and social response measures and contribute to technology development and transfer and capacity-building related to mitigation and adaptation. Portugal described the evolution of its ODA related to climate change for the period 2013–2016 assigned to each of the beneficiary developing country Parties that are particularly vulnerable to the adverse effects of climate change to help them to meet the costs of adaptation to those adverse effects.

100. As part of efforts to meet its obligations under the Kyoto Protocol, Portugal has provided information in its NC7 on amounts of financial support disbursed to developing countries for the period 2012–2016, classifying it under either mitigation (table 7.2.1) or adaptation (table 7.2.2).

101. With regard to the most recent financial contributions aimed at enhancing the implementation of the Convention by developing countries, Portugal reported that its climate finance has been allocated on the basis of supporting low-carbon competitive economies. This is outlined in the Strategic Concept of Portuguese Cooperation for 2014–2020. During the review, Portugal explained that it has demonstrated its commitment to this objective through the restructuring of the financing instrument under the current Environment Fund

and the identification of new partner developing countries in the future. Table 14 includes some of the information reported by Portugal on its provision of financial support.

102. Portugal made contributions through multilateral channels amounting to USD 9.62 million in 2013. Those contributions declined in 2014 and 2015 but increased to USD 14.29 million in 2016, illustrating Portugal's commitment to increasing financial support for climate financing. In terms of bilateral support to developing countries, the Party committed USD 21.21 million in 2013 but this amount decreased to USD 2.23 million in 2016, which Portugal explained during the review was owing to the completion of most of the projects initiated in 2012.

103. As part of its multilateral financing for climate-resilience activities, Portugal reported on its involvement, together with other EU member States, in the implementation of projects in the form of delegated cooperation (on behalf of the EU). For example, since 2013 Portugal has been implementing a programme with the EU in Timor-Leste aiming at capacity-building in rural communities that are vulnerable to climate change through the sustainable management of natural resources. Table 14 includes some of the information reported by Portugal on its provision of financial support.

Table 14

Summary of information on provision of financial support by Portugal in 2012–2016

(Millions of United States dollars)

Allocation channel of public financial support	Year of disbursement			
	2013	2014	2015	2016
Official development assistance	488.32	430.23	308.03	343.07
Climate-specific contributions through multilateral channels, including:	9.62	4.61	4.28	14.29
Global Environment Facility	0.61	0.38	0.18	0.07
Least Developed Countries Fund	0	0	0	0
Special Climate Change Fund	0	0	0	0
Adaptation Fund	0	0	0	0
Green Climate Fund	0	0	2.22	0
Trust Fund for Supplementary Activities	0	0	0	0
Financial institutions, including regional development banks	9.53	4.50	4.30	14.17
United Nations bodies	0.12	0.16	0	0.13
Other	0.04	0.06	0	0
Climate-specific contributions through bilateral, regional and other channels	21.21	12.23	4.69	2.32
Other	0	0	0	0

Sources: (1) Query Wizard for International Development Statistics, available at <http://stats.oecd.org/qwids/>; (2) BR3 CTF tables.

104. Although Portugal uses the Rio markers to track climate finance, it explained that no universal system exists for tracking financial, technological and capacity-building support to developing countries. To ensure the integration of financial, technological and capacity-building support provided in the priority projects of the supported countries, Portugal relies on local monitoring and evaluation measures to track progress. Therefore, Portugal does not use independent tracking systems. The ERT noted that, with the recent development of an integrated online system for tracking finance, the Party will be able to provide such information and compare progress among supported countries and types of support (adaptation or mitigation).

(b) Assessment of adherence to the reporting guidelines

105. The ERT assessed the information reported in the NC7 of Portugal and recognized that the reporting is complete, transparent and adhering to the UNFCCC reporting guidelines

on NCs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

2. Technology development and transfer, including information under Article 10 of the Kyoto Protocol

(a) Technical assessment of the reported information

106. Portugal provided information on steps, measures and activities related to technology transfer, access and deployment benefiting developing countries, including information on activities undertaken by the public and private sectors. Portugal provided examples of support directed towards adaptation activities (e.g. disaster reduction and prevention, and sustainable agriculture) and also for mitigation activities (e.g. energy generation, renewable energy, heating and cooling, and water and sanitation). For example, Portugal supports the installation of photovoltaic systems in 50 towns in Mozambique which will provide electricity to schools, health centres and homes. Most of this support is targeted to public institutions.

107. The ERT noted that Portugal reported on its PaMs as well as success stories in relation to technology transfer, and in particular on measures taken to promote, facilitate and finance the transfer and deployment of climate-friendly technologies. For example, the bioenergy project in Sao Tome and Principe has succeeded because it has equipped rural communities and the technical staff of the National Directorate for the Environment with the capacity to build and operate small-scale anaerobic digesters. During the review, the Party provided further information on how monitoring and evaluation reports are used to identify lessons learned for each technology transferred.

108. Portugal provided information on steps taken to promote, facilitate and finance the transfer of technology to developing countries and to build their capacity in order to facilitate implementation of Article 10 of the Kyoto Protocol. The Party has prioritized institutional capacity-building that ensures that the technologies transferred are sustainably implemented by the local institutions.

(b) Assessment of adherence to the reporting guidelines

109. The ERT assessed the information reported in the NC7 of Portugal and identified issues relating to completeness and adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table 15.

Table 15

Findings on technology development and transfer, including information under Article 10 of the Kyoto Protocol, from the review of the seventh national communication of Portugal

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
1	Reporting requirement ^a specified in paragraph 56 Issue type: completeness Assessment: recommendation	Portugal did not report information on steps taken to promote, facilitate and finance transfer of technology and to support the development and enhancement of the endogenous capacities and technologies of developing countries in its NC7. During the review, Portugal provided information on measures taken to ensure that endogenous capacities are built. This includes integrating the participation of local people in project design and implementation and using locally appropriate mechanisms to ensure success of implementation. The ERT reiterates the recommendation made in the previous review report that Portugal, in its next NC, report on the steps taken by the Party to promote, facilitate and finance the transfer of technology, and to support the development and enhancement of the endogenous capacities and technologies of developing countries.

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.

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

E. Vulnerability assessment, climate change impacts and adaptation measures

(a) Technical assessment of the reported information

110. In the NC7 Portugal provided the required information on the expected impacts of climate change in the country; the adaptation policies covering regional, sectoral and cross-sectoral vulnerabilities and considerations; and an outline of the action taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation. Portugal provided a description of climate change vulnerability and impacts in 2015 and highlighted the adaptation response actions taken and planned at different levels of government, particularly with regard to impacts on agriculture, forest, biodiversity, economy, energy and industry, water resources, human health, security of people and assets, tourism and coastal areas. Portugal faces a variety of impacts from heatwaves, droughts, floods (including flash floods), wildfires and storm surges. During the review, Portugal highlighted that it is observing an expansion of the areas that are at risk, as wildfires have been occurring on the mainland. Furthermore, the effects of Hurricane Leslie, one of the most powerful storms to ever hit the country, struck in 2018 in central and northern Portugal, leaving homes without power and causing some people to suffer injuries, with localized flooding, hundreds of trees uprooted, flight cancellations and roads temporarily blocked. The worst affected areas were around the capital, Lisbon, and in the districts of Coimbra and Leiria. Aveiro, Viseu, Porto and northern Portugal also suffered damage.

111. Adaptation measures include support in the areas of soil conservation; preventing forest fires, with interventions implemented in the agriculture and forestry sectors; implementing best practices on water management in agriculture, industry and the urban sector to prevent the impacts of drought and water scarcity; increasing the resilience of ecosystems, species and habitats to the effects of climate change; reducing vulnerability to heatwaves and to the increase in maximum temperature; preventing the installation and expansion of alien invasive species, vector-borne diseases and agricultural and forest pests and diseases; reducing or minimizing risks associated with flooding; increasing resilience and coastal protection in areas at high risk of erosion and flooding; developing decision support tools, training and awareness-raising actions for efficient use of water in agriculture; maintaining local animal breeds at risk; preventing risks; and restoring productive potential. Other measures include implementing the National Plan of Integrated Management of Fire, encompassing the implementation of primary and secondary fuel management networks; integrating climate change into the third management cycle of Hydrographic Region Management Plans by considering climate scenarios using demand- and supply-side parameters that support the characterization and assessment of each hydrographic region; inserting buffer strips in spatial planning rules; and monitoring coastal systems.

112. Impetus has been given to addressing adaptation matters with the adoption in 2015 of ENAAC 2020 within an integrated framework that also includes PNAC 2020/2030, SPeM and the political decision-making structure, the Interministerial Commission for Air, Climate Change and Circular Economy, which provided further direction to government agencies on enhancing preparedness for climate change with a focus on better articulation between the domains (particularly the cross-cutting ones) and on the implementation of adaptation measures, along with mainstreaming of adaptation actions in sectoral policies. In 2018, adaptation was also integrated in the National Programme for Spatial Planning Policy, a strategic territorial development instrument which integrates the challenges of climate change across all Portugal. All scenarios show a variety of impacts from heatwaves, droughts, floods, wildfires and storm surges, which have already been observed in recent years with more frequent and intense patterns. Since the NC6, the Party has striven to develop a website with climate scenarios,⁴ which serves as the reference source of information for Portugal's future climate adaptation policy and aims to analyse climate change patterns and assess climate risks. It is important to note that the local project ClimAdaPT (concluded in 2016) marked the start of large-scale subnational adaptation management with the development of 27 Local Adaptation Strategies and guidance manuals that support almost all Local

⁴ <http://www.portaldoclima.pt/en/>.

Adaptation Strategies that are either in place or in preparation. Table 16 summarizes the information on vulnerability and adaptation to climate change presented in the NC7 of Portugal.

Table 16

Summary of information on vulnerability and adaptation to climate change reported by Portugal

<i>Vulnerable area</i>	<i>Examples/comments/adaptation measures reported</i>
Agriculture and food security	<p><i>Vulnerability:</i> Decrease in crop production caused by drought events and lack of water availability; more frequent heavy precipitation and winds causing damage to crops and infrastructure. The impact magnitude is high, affecting in particular horticulture, fruit-growing and agricultural facilities.</p> <p><i>Adaptation:</i> The Adaptation Strategy for Agriculture and Forests (2013) addresses aspects such as desertification and soil conservation, the main systems of agricultural production, water use, extreme situations and plant health. The strategy includes climate trends, sectoral characterization, assessment of climate change impacts and adaptive capacity, and definition of adaptation measures.</p>
Biodiversity and natural ecosystems	<p><i>Vulnerability:</i> Changes in the structure and function of ecosystems affecting phenology and species interaction and leading to a reduction in biodiversity; expansion of invasive species and pests; changes in marine biogeochemical cycles; permanent aquatic ecosystems becoming seasonal or disappearing; and displacement of animal species and reduction in their distribution.</p> <p><i>Adaptation:</i> A framework to validate the climate-related aspects of plans and programmes has been adopted, which allows for an analysis of the extent to which programmes integrate biodiversity adaptation to climate change. Other measures include implementation of actions for the prevention of forest fires, such as the conservation and reforestation of forests of native vegetation as a fire management measure; development of management plans for the areas classified under the Ramsar Convention on Wetlands in order to include adaptation to climate change; development of conservation projects that address climate risks; preparation of the Programme Biodiv_ADAPT2020 and supporting and promoting its implementation in terms of vulnerabilities, impacts, options and measures; mainstreaming adaptation into sectoral policies, knowledge gaps and sectoral studies; and mapping of the projects and actions that contribute to biodiversity adaptation to climate change, which were or will be implemented in the periods 2013–2015 and 2016–2020.</p>
Coastal zones	<p><i>Vulnerability:</i> Sea level rise is likely to be in the range of 0.5–1.0 m by 2100. The increase in the average global sea level is causing more frequent extreme sea level values. These trends cause more coastal erosion and allow waves to burst closer to shore, transferring more energy to the coast. Severe impacts will increase erosion, including the rotation of the average wave direction on the west coast. In addition, there is the possibility of changes in the pattern of thunderstorms, as well as an aggravation of storm surges, flooding and coastal erosion.</p> <p><i>Adaptation:</i> The National Action Plan on Coastal Protection 2012–2015 includes implementing actions such as the insertion of buffer strips in spatial planning rules, monitoring of coastal systems and a risk and vulnerability assessment for the Portuguese coast, with a focus on prevention, including developing a cost–benefit evaluation. A coastal working group was created, with contributions from academia and governmental organizations, for a deeper analysis of ways to reduce exposure to risk in the medium term, including an analysis of sustainable development within climate change scenarios.</p>
Forests	<p><i>Vulnerability:</i> Climate change is expected to compromise the performance of the ecological and economic functions of Portuguese forests. The degradation of tree cover and forest fires will intensify the desertification and soil erosion processes.</p> <p><i>Adaptation:</i> The measures reported by the Party include implementation of the National Plan of Integrated Management of Fire; emergency restoration after large fires; regeneration of affected stands; restoration of forestry production potential in stands affected by biotic agents; installation of well-adapted forest stands and conversion of stands in inadequate ecological conditions; and promotion of the resilience of stands, adjusting the density of maritime pine stands and improving the conditions of cork oak and</p>

Vulnerable area	Examples/comments/adaptation measures reported
Human health	<p>holm oak stands. Other actions include expanding the area under management plans and improving the economic value of goods and services.</p> <p><i>Vulnerability:</i> Extreme weather events such as heatwaves, floods and forest fires affecting morbidity and mortality, mental disorders, appearance of new diseases or the resurgence of others, and an increase in respiratory disorders and deaths associated with poor air quality due to forest fires and episodes of high-level tropospheric ozone. Almost all of the environmental and socioeconomic impacts of climate change can lead to adverse effects on human health by modifying existing health risk factors and introducing new risk factors into regions that would otherwise not be affected by them.</p> <p><i>Adaptation:</i> The measures reported for the health sector include implementing plans for improved efficiency regarding water and energy use and plans on waste management for all buildings of the health sector; enforcing implementation of the Contingency Plan for Heatwaves (since 2004), with a warning system and responses to emergencies; implementing the Surveillance System for Vector-Borne Diseases (since 2007). During the review, Portugal explained that the national plan on preventive actions to address the impacts of excessive temperatures on health, adopted in 2017, defines reference thresholds and risk levels with associated prevention measures and includes the establishment of an interministerial commission to coordinate action; and public awareness campaigns.</p>
Infrastructure and economy	<p><i>Vulnerability:</i> The economy sector, which integrates the industry, services and tourism sectors, is negatively affected by the sectoral vulnerabilities reported in the NC7 that can be accurately projected for tourist areas. Regarding tourist facilities, the rising temperatures will increase demand for water and energy (space cooling) and make it difficult to maintain green areas (e.g. golf courses).</p> <p><i>Adaptation:</i> Publication of the annual reports on best environmental practices in tourist resorts based on surveys disseminated to all tourist resorts in Portugal; a revision of the National Strategic Plan for Tourism, which aims to promote sustainability and rational use of natural resources and to protect natural and cultural landscapes, focusing on the role of tourists; the Programme of Touristic Destinations, which stresses the importance of developing sustainable destinations, contributing to impact assessment activities and the identification of corrective measures, given the long-term geophysical nature concerns that interfere with the development of tourism or that are conditioned by it (e.g. bathing areas, dynamic coastlines, hydrological regime, availability of drinking water). Other measures include integrating climate change into the 2020 Tourism Action Plan, particularly the requalification of consolidated tourist areas, and adaptation to climate change in coastal areas.</p>
Water resources	<p><i>Vulnerability:</i> Significant reduction in water resource availability and increased inter-annual precipitation variability, with notable impacts on energy sources; hydroelectricity production is expected to be compromised in four hydrographic regions owing to water scarcity. The Party also reported on vulnerability related to water availability, demand and quality; flood risk; a significant reduction in the annual outflow and recharge of aquifers, especially in the south; an increase in flow variability and regional asymmetry of water availability; an increase in the risk of droughts; and an increase in water demand for agriculture and for energy production (in order to reduce dependence on fossil fuels). Water quality is also affected by the reduction of run-off, the increase in water temperature, the increase in soil erosion and diffuse contamination, the salinization of coastal aquifers and the degradation of ecosystem health. Furthermore, climate change increases the risk of floods, especially in the north of Portugal and in coastal areas.</p> <p><i>Adaptation:</i> The following measures are being carried out by Portugal: integration of climate change issues into Hydrographic Region Management Plans, Flood Risk Management Plans and the National Water Plan (2006–2021); development of water resource indicators for the climate scenarios under the Climate Portal Project; integration of climate change into the third management cycle of Hydrographic Region Management Plans (under EU directive 2000/60/EC on a framework for action in the field of water policy); and integration of climate change into the second preliminary flood risk assessment (under EU directive 2007/60/EC on the assessment and management of flood</p>

<i>Vulnerable area</i>	<i>Examples/comments/adaptation measures reported</i>
	risks). Additional measures include collaboration in the development of an adaptation plan for the water supply sector in partnership with Águas de Portugal Group.

113. Portugal provided a detailed description of international adaptation activities, including numerous initiatives through the Foundation for Science and Technology, initiatives within the framework of European Research Area Networks such as EURO-MEDITERRANEAN Cooperation through joint activities and beyond, the European Research Area Network on Sustainable Animal Production, a long-term EU–Africa research and innovation partnership on food and nutrition security and sustainable agriculture, and International Cooperation Networks with third countries.

114. Portugal also provided information on bilateral cooperation with developing countries on adaptation, including various initiatives regarding integration of climate change adaptation into development, which aims to contribute to the reduction of vulnerability to the impacts of climate change in Cabo Verde, Mozambique and Sao Tome and Principe and to build capacity in order ensure an integrated response to vulnerability to climate change through the creation of expertise in the design of policies and projects which are resilient to the impacts of climate change. During the review, the Party explained that 10 projects have been approved from 2010 to 2016, including “Coastal dune forests under scenarios of groundwater limitation: from tropics to Mediterranean (GWTropiMed)”, “Model and proxy evaluation: are the reconstructed and projected climate changes real?”, “Urban atmospheric quality, climate change and resilience”, “SHARE: Seamless High-resolution Atmosphere-ocean Research”, “Drought quantification and evolution on Iberian Peninsula: past, present and future – QSECA”, “Present and future marine climate in the Iberian coast”, “Impact of climate change on marine bivalves and gastropods: life cycle disruption by statoliths malformation” and “Impact of maritime and port emissions in the air quality of Portugal: present and future scenarios. A regional and local scale approach”.⁵

(b) Assessment of adherence to the reporting guidelines

115. The ERT assessed the information reported in the NC7 of Portugal and identified issues relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table 17.

Table 17

Findings on the vulnerability assessment, climate change impacts and adaptation measures from the review of the seventh national communication of Portugal

<i>No.</i>	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
1	<p>Reporting requirement specified in paragraph 49</p> <p>Issue type: transparency</p> <p>Assessment: encouragement</p>	<p>Portugal included information in its NC7 on the expected impacts of climate change but this was not sufficiently detailed to allow the ERT to assess whether Portugal used the IPCC <i>Technical Guidelines for Assessing Climate Change Impacts and Adaptations</i> and the United Nations Environment Programme <i>Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies</i>.</p> <p>During the review, Portugal provided the national references of climate change impact, vulnerability and risk assessment, which are carried out under the Scenarios, Impacts and Adaptation Measures projects and ENAAC, and informed the ERT that they are consistent with the IPCC <i>Technical Guidelines for Assessing Climate Change Impacts and Adaptations</i>.</p> <p>The ERT encourages Portugal to use the IPCC <i>Technical Guidelines for Assessing Climate Change Impacts and Adaptations</i> and the United Nations Environment Programme <i>Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies</i>. The ERT notes that Portugal could provide in its next NC the information provided during the review to demonstrate that its reporting is consistent with these guidelines.</p>

⁵ More information on projects under the programme AdaPT is available at <http://apambiente.wixsite.com/adapt/home>.

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
2	Reporting requirement specified in paragraph 49 Issue type: completeness Assessment: encouragement	The ERT noted that Portugal did not report on specific results of scientific research in the areas of vulnerability assessment and adaptation. The ERT encourages Portugal to report in its next NC specific results of scientific research in the field of vulnerability assessment and adaptation.

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

F. Research and systematic observation

(a) Technical assessment of the reported information

116. Portugal provided information on its general policy and funding relating to research and systematic observation and both domestic and international activities, including contributions to the World Climate Programme and the Global Climate Observing System. Portugal's surface observation network is designed to support weather monitoring and forecasting and climate monitoring and has played a key role in the study of climate variability and climate change. However, Portugal did not provide information on the identification of opportunities for and barriers to free and open international exchange of data and information on action taken to overcome such barriers. During the review, Portugal explained that its researchers participate in a number of international networks that promote data exchange in the areas of climate science, including the European Research Infrastructures, the European Plate Observing System, the Global Biodiversity Information Facility and the Long Term Ecological Research Network. Barriers include lack of funding for infrastructures that collect data; interoperability of databases; and differences in the methodologies for data collection in different countries.

117. Portugal has implemented and planned international and domestic policies and programmes on climate change research, systematic observation and climate modelling that aim to advance capabilities to predict and observe the physical, chemical, biological and human components of the Earth's system over space and time. In the period 2010–2016, the Foundation for Science and Technology funded 107 scientific research projects exclusively in the field of climate change, with a budget line of over EUR 20 million (data for 2016 are not yet available). Additionally, in the same period, 225 research grants were funded (doctoral and post-doctoral level, among others), with a total value in excess of EUR 19 million. Portugal provided information on its institutional arrangements and funding relating to research and systematic observation and both domestic and international activities. Portugal highlighted the lack of pre-established 'keywords' geared towards research subjects that could not be divided by scientific subfield, leaving it to the relevant researchers to introduce keywords that they considered most appropriate to identify each project.

118. In terms of activities related to systematic observation, Portugal reported on national plans, programmes and support for ground- and space-based climate observing systems, including satellite and non-satellite climate observation. Portugal also reported on challenges related to the maintenance of a consistent and comprehensive observation system. The Foundation for Science and Technology is the national agency responsible for public funding of science, technology and innovation, as a partially shared task with the National Innovation Agency. The Portuguese Institute for Sea and Ocean has made significant efforts to ensure the operability of the network of climatological stations, providing for its maintenance and for quality control and subsequent recording of observations. In 2017 there were 146 climatological stations operating in Portugal, of which 125 were automated and 21 conventional. All stations measure air temperature, wind speed and direction, air humidity and precipitation, among other climate elements, and almost all also measure global solar radiation, while some also measure atmospheric pressure.

119. The NC7 reflects actions taken to support capacity-building and the establishment and maintenance of observation systems and related data and monitoring systems in developing countries. Portugal provided funding for scientists from developing countries working on global climate change research. Support to developing countries is provided through the Foundation for Science and Technology, which, as the organization representing Portugal in those areas, has been promoting a wide range of programmes encouraging scientific cooperation within the field of climate change, including initiatives within the framework of ERA-NET and the ERA-NET Co-fund for Climate Services and through the Network of the European Union, Latin America and the Caribbean Countries on Joint Innovation and Research Activities project. Other initiatives include those undertaken by CAAST-Net Plus78, a network to promote cooperation between sub-Saharan Africa and Europe on research and innovation in order to address global challenges. The ERT noted the lack of specific information on the support provided by Portugal in terms of observation; however, during the review, the Party highlighted that Angolan and Mozambican technicians working in the areas of meteorology and climate have received training in Portugal. In the second half of 2019, technicians from Sao Tome and Principe will also receive training. The Portuguese partners of the Land Surface Analysis Satellite Application Facility consortium support the European Organisation for the Exploitation of Meteorological Satellites on training events for the use of Earth observation techniques and products in Africa.

120. During the review, Portugal highlighted its socioeconomic analysis outlining that the last round of queries of the European Social Survey conducted in 2016 surveyed the attitude of European citizens with regard to climate change⁶. Some of the main findings were that the overwhelming majority of the respondents (96 per cent) believe that the global climate is “surely” (76 per cent) or “likely” (20 per cent) changing and a vast majority of the respondents (more than 70 per cent) answered that a large or a very large part of the electricity consumed in Portugal should be provided by solar, wind or hydroelectrical energy sources.

(b) Assessment of adherence to the reporting guidelines

121. The ERT assessed the information reported in the NC7 of Portugal and identified issues relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table 18.

Table 18

Findings on research and systematic observation from the review of the seventh national communication of Portugal

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 62 Issue type: completeness Assessment: encouragement	In its NC7, Portugal did not identify the opportunities for and barriers to free and open international exchange of data and information and report on action taken to overcome barriers. However, during the review, the Party provided the ERT with examples of such action: the provision of weather data by the Portuguese Institute for Sea and Ocean to the Copernicus Climate Change Service, namely to the European Climate Assessment & Dataset project; and the development by the Portuguese Sea and Atmosphere Institute of the web platform MF2 to serve as an interface for users to access data resulting from numerical processing of atmospheric models and remote sensing. Access is through a computer system of visualization and download of georeferenced data. This system will allow the dissemination and sharing of data with the Portuguese Sea and Atmosphere Institute partner entities, which can then be used in their own computer systems through standard communication protocols for this data typology. The ERT encourages Portugal to include information in its next NC on the barriers to free and open international exchange of data and information and report on action taken to overcome those barriers.
2	Reporting requirement specified in paragraph 63	In its NC7 Portugal did not provide information on highlights, innovations and significant efforts made with regard to socioeconomic analysis and to research and development on mitigation and adaptation technologies.

⁶ See <https://www.europeansocialsurvey.org/>.

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
3	Reporting requirement specified in paragraph 64 Issue type: transparency Assessment: encouragement	<p data-bbox="512 255 1433 398">During the review, Portugal explained that the APA will coordinate a project under European Environment Agency Grants 2014–2021 to assess national territorial vulnerabilities and identify costs of inaction (including social and economic costs of impacts and vulnerabilities) and budget needs for implementing adaptation measures, among other aspects.</p> <p data-bbox="512 421 1433 501">The ERT encourages Portugal to include in its next NC information on highlights, innovations and significant efforts made with regard to the socioeconomic analysis and research and development on mitigation and adaptation technologies.</p> <p data-bbox="512 524 1433 600">The ERT noted that the NC7 did not provide information on the support for developing countries to establish and maintain observing systems and related data and monitoring systems.</p> <p data-bbox="512 622 1433 913">During the review, Portugal provided additional information on this issue, highlighting that the activities carried out by the Portuguese partners of Land Surface Analysis Satellite Application Facility consortium support the European Organisation for the Exploitation of Meteorological Satellites and a project on geodesic and meteorological observation that includes Portuguese and African researchers. Furthermore, since the NC6, Portugal has provided training to technicians for the installation and maintenance of automatic weather stations and the configuration and management of seismic networks in Angola and Mozambique. In the second half of 2019, technicians from Sao Tome and Principe and from Angola will also receive training in the areas of observing systems, meteorology and climate.</p> <p data-bbox="512 936 1433 1005">The ERT encourages Portugal to report information on the support provided for developing countries to establish and maintain observing systems and related data and monitoring systems.</p>

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

G. Education, training and public awareness

(a) Technical assessment of the reported information

122. In the NC7 Portugal provided information on its actions relating to education, training and public awareness at the domestic and international level. Portugal provided information on the general policy on education, training and public awareness; primary, secondary and higher education; public information campaigns; training programmes; education materials; resource or information centres; the involvement of the public and NGOs; and its participation in international activities.

123. The Framework of Environmental Education for Sustainability guiding document for teachers and a supporting document for educational actions are aimed at raising society's awareness of the importance of sustainability, consisting of subthemes and objectives and using descriptors appropriate to the education level involved. Areas addressed include causes of climate change, climate change impacts and climate change adaptation and mitigation. In addition, seminars on the issue of climate change have been organized to present the issues to the public.

124. Portugal adopted the National Strategy for Environmental Education 2020 in accordance with the fulfilment of national and international commitments undertaken by Portugal in the areas of sustainability and climate change. These include, in particular, the Paris Agreement and the Sustainable Development Goals of the United Nations. The Ministry of Education, in partnership with the Ministry of the Environment and Energy Transition, the Ministry of Agriculture, Forestry and Rural Development, various local authorities, universities, governmental institutions and NGOs, has developed several environmental education projects, both in schools and surrounding communities, with a thematic focus on sustainability and climate change, both in terms of mitigation and adaptation.

(b) Assessment of adherence to the reporting guidelines

125. The ERT assessed the information reported in the NC7 of Portugal and identified an issue relating to completeness and adherence to the UNFCCC reporting guidelines on NCs. The finding is described in table 19.

Table 19

Findings on education, training and public awareness from the review of the seventh national communication of Portugal

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
1	Reporting requirement specified in paragraph 65 Issue type: completeness Assessment: encouragement	Portugal has provided extensive information on the involvement of NGOs in climate action. However, Portugal did not report on the extent of public participation in the preparation or domestic review of the NC in its NC7. During the review, Portugal provided additional information on this issue, highlighting that NGOs are involved in the preparation of every climate policy instrument (namely through public consultation processes, where they are invited to participate) and they take part in some working groups for adaptation and mitigation. The ERT reiterates the encouragement made in the previous review report that Portugal report information in its next NC on the extent of public participation in the preparation and/or domestic review of the NC.

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

III. Conclusions and recommendations

126. The ERT conducted a technical review of the information reported in the NC7 of Portugal in accordance with the UNFCCC reporting guidelines on NCs. The ERT concludes that the reported information is mostly complete and adheres to the UNFCCC reporting guidelines on NCs and that the NC7 provides an overview of the national climate policy of Portugal.

127. The information provided in the NC7 includes most of the elements of the supplementary information under Article 7 of the Kyoto Protocol.

128. Total GHG emissions⁷ excluding emissions and removals from LULUCF increased by 13.0 per cent between 1990 and 2016, whereas total GHG emissions including net emissions or removals from LULUCF increased by 2.0 per cent over the same period. Emission increases were driven mainly by factors such as an increase in economic activity and GDP and a reversal of the trend in transport emissions, which started to decline in 2005 but increased by 5.1 per cent from 2013 to 2016, and substantial increases in F-gases used for refrigeration and air conditioning. Those factors outweighed improvements in energy efficiency, growth in RES, including in the transport sector, and important efforts in waste management.

129. Portugal's main policy framework relating to energy and climate change is the Strategic Framework for Climate Policy, approved through a Council of Ministers resolution, which includes PNAC 2020/2030 and ENAAC 2020. Portugal also set a target to be carbon neutral by 2050. The mitigation actions with the most significant mitigation impact are the EU ETS, the carbon tax, the tax incentives for low-carbon options and urban greening and revitalization at the cross-sectoral level. Portugal's key mitigation policies include the Strategic Plan for Transport and Infrastructure, PNAER and PNAEE.

130. The GHG emission projections provided by Portugal include those under the WEM and WAM scenarios. In both scenarios, emissions are projected to be 6.1 per cent above the

⁷ 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 2018 annual submission, version 3.

1990 level in 2020. On the basis of the reported information, the ERT concludes that Portugal is on track to meet its 2020 target for the non-ETS sectors under the WEM and WAM scenarios.

131. The projections indicate that Portugal is on track to meet its Kyoto Protocol target for the second commitment period (ESD contribution equivalent to a 1.0 per cent increase above the 1990 level by 2020). Similarly, Portugal is on track to meet its national target by 2020 (an 18 to 23 per cent reduction compared with the 2005 level) and by 2030 (a 30 to 40 per cent reduction compared with the 2005 level).

132. The NC7 contains information on how Portugal's use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action. Portugal is not planning to make use of the Kyoto Protocol mechanisms to meet its Kyoto Protocol target.

133. Portugal has continued to provide climate financing to developing countries in line with its climate finance programmes such as the Strategic Concept of Portuguese Cooperation for 2014–2020 and the restructuring of the Carbon Fund into the Environment Fund. Portugal has reduced the level of its financial support since the NC6, and its public financial support in 2013 and 2016 totalled USD 30.84 and 16.62 million per year, respectively; the trend was explained as being due to the completion of the project cycles for projects initiated in 2012 in developing countries. For those years, Portugal's support provided for mitigation action was higher than its support provided for adaptation. The biggest share of financial support went to projects in the energy sector in 2013 and 2014. In 2016, more finance was directed to multilateral financial institutions, including regional development banks. Portugal has clearly illustrated how it integrates its support for technology transfer into existing development programmes to ensure ownership and sustainability of implementation, which are monitored using local monitoring and evaluation procedures. Portugal provided information on its capacity-building activities classified as 'hard' and 'soft' and the opportunities to enhance the endogenous capacities and technologies of developing countries through mitigation and adaptation activities.

134. Portugal outlined its vulnerability to climate change, illustrating vulnerability in the agriculture, forest, biodiversity, economy, energy and industry, water resources, human health, security of people and assets, tourism and coastal sectors. Examples of adverse effects include recurrent and destructive wildfires occurring on the mainland and Hurricane Leslie in 2018 which caused considerable destruction in central and northern Portugal, leaving homes without power, injuring people and displacing others. To address such vulnerability, the Party highlighted adaptation measures outlined in ENAAC 2020. The Party also has an integrated website with climate scenarios that identifies vulnerable areas and helps in planning adaptation measures.

135. Portugal provided information relating to research and systematic observation at the domestic and international level. Internationally, the Party is a participant in research under the European Research Infrastructures, the European Plate Observing System, the Global Biodiversity Information Facility and the Long Term Ecological Research Network, among others. To effectively participate in research, Portugal has domestic policies that promote funding for climate-related research under the Foundation for Science and Technology. In addition, the Portuguese Institute for Sea and Ocean has intensified the work at climatological observation stations to provide more and updated data on climate. Portugal has also intensified its international climate data reporting stations in developing countries and provides training to enhance endogenous capacities to collect, analyse and interpret the collected data.

136. With regard to education, training and public awareness, Portugal, through the National Strategy for Environmental Education 2020, has integrated climate education into all its educational programmes in primary, secondary and higher education. Furthermore, the Party promotes public campaigns, training programmes, educational materials, resource information centres, the involvement of the public and NGOs and participation in international activities.

137. In the course of the review, the ERT formulated the following recommendations for Portugal to improve its adherence to the UNFCCC reporting guidelines on NCs and its reporting of supplementary information under the Kyoto Protocol:⁸

- (a) To improve the completeness of its reporting by:
 - (i) Providing information on the national registry, including the name and contact information of the registry administrator (see issue 1 in table 5);
 - (ii) Providing further information on how it believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals consistent with the objective of the Convention (see issue 10 in table 7);
 - (iii) Including emission projections related to fuel sold to ships and aircraft engaged in international transport separately (see issue 5 in table 11);
 - (iv) Providing an estimate of the total effect of PaMs, in accordance with the WEM scenario definition, compared to a situation without such PaMs for 1995 and 2000 (see issue 2 in table 13);
 - (v) Reporting on the steps taken by the Party to promote, facilitate and finance the transfer of technology, and to support the development and enhancement of the endogenous capacities and technologies of developing countries (see issue 1 in table 15);
- (b) To improve the transparency of its reporting by:
 - (i) Organizing its PaMs by sector, subdivided by gas (see issue 5 in table 7);
 - (ii) Including all GHGs affected by each policy or measure and ensuring that the status of implementation of the PaMs is transparently reported (see issue 6 in table 7);
 - (iii) Including planned PaMs in its reporting of WAM scenarios in accordance with the definitions of the UNFCCC reporting guidelines on NCs (see issue 2 in table 11);
 - (iv) Including in the projections chapter a description of the underlying factors and activities to allow an understanding of the emission trends for each sector of the WEM and WAM scenarios (see issue 10 in table 11).

IV. Questions of implementation

138. During the review, the ERT assessed the NC7, including the supplementary information provided under Article 7, paragraph 2, of the Kyoto Protocol, and the information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol with regard to timeliness, completeness and transparency. No question of implementation was raised by the ERT during the review.

⁸ The recommendations are given in full in the relevant sections of this report.

Annex

Documents and information used during the review

A. Reference documents

2017 GHG inventory submission of Portugal. Available at https://unfccc.int/files/national_reports/annex_i_ghg_inventories/national_inventories_submissions/application/zip/prt-2017-nir-26may17.zip.

2018 GHG inventory submission of Portugal. Available at <https://unfccc.int/documents/65569>.

BR3 of Portugal. Available at http://unfccc.int/files/national_reports/biennial_reports_and_iar/submitted_biennial_reports/application/pdf/5296041_portugal-br3-nc7-1-pt7cn3brfinal.pdf.

BR3 CTF tables of Portugal. Available at http://unfccc.int/files/national_reports/biennial_reports_and_iar/submitted_biennial_reports/application/vnd.openxmlformats-officedocument.spreadsheetml.sheet/5296041_portugal-br3-nc7-1-prt_2018_v1.0.xlsx.

“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 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 preparation of the information required under Article 7 of the Kyoto Protocol”. Annex to decision 15/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf>.

“Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol”. Annex III to decision 3/CMP.11. Available at <http://unfccc.int/resource/docs/2015/cmp11/eng/08a01.pdf>.

“Guidelines for review under Article 8 of the Kyoto Protocol”. Annex to decision 22/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.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. 1994. *Technical Guidelines for Assessing Climate Change Impacts and Adaptations*. TR Carter, ML Parry, H Harasawa and S Nishioka (eds.). London: Department of Geography, University College London. Available at <https://www.ipcc.ch/report/ipcc-technical-guidelines-for-assessing-climate-change-impacts-and-adaptations-2/>.

NC7 of Portugal. Available at http://unfccc.int/files/national_reports/annex_i_natcom/application/pdf/28410365_portugal-nc7-1-pt7cn3brfinal.pdf.

Report on the individual review of the annual submission of Portugal submitted in 2016. FCCC/ARR/2016/PRT. Available at <https://unfccc.int/sites/default/files/resource/docs/2017/arr/prt.pdf>.

Report on the review of the report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol of Portugal. FCCC/IRR/2016/PRT. Available at

https://unfccc.int/documentation/documents/advanced_search/items/3594.php?rec=j&preref=600009752#beg.

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

FCCC/TRR.2/PRT. Available at

https://unfccc.int/documentation/documents/advanced_search/items/3594.php?rec=j&preref=600009162#beg.

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

FCCC/IDR.6/PRT. Available at

https://unfccc.int/documentation/documents/advanced_search/items/3594.php?rec=j&preref=600008058#beg.

Revisions to the guidelines for review under Article 8 of the Kyoto Protocol. Annex I to decision 4/CMP.11. Available at

<http://unfccc.int/resource/docs/2015/cmp11/eng/08a01.pdf>.

United Nations Environment Programme. 1988. *Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies*. J Feenstra, I Burton, J Smith and R Tol (eds.). United Nations Environment Programme, Nairobi, and Institute for Environmental Studies, Free University, Amsterdam.

B. Additional information provided by Portugal

Responses to questions during the review were received from Mr. José Paulino (Climate Change Department), including additional material. The following documents¹ were provided by Portugal:

National Programme for Climate Change (PNAC – Programa Nacional para as Alterações Climáticas). Available at:

<http://www.apambiente.pt/index.php?ref=16&subref=81&sub2ref=117&sub3ref=1376>.

National Strategy for Adaptation to Climate Change (ENAAC – Estratégia Nacional de Adaptação às Alterações Climáticas). Available at:

<http://www.apambiente.pt/index.php?ref=16&subref=81&sub2ref=118&sub3ref=955>.

Agência Portuguesa do Ambiente, 2012, Roteiro Nacional de Baixo Carbono 2050 (Low Carbon Roadmap 2050): Opções de transição para uma economia de baixo carbono competitiva em 2050, available at:

https://www.apambiente.pt/_zdata/DESTAQUES/2012/RNBC_COMPLETO_2050_V04.pdf.

"Climate Change in Portugal. Scenarios, Impacts and Adaptation Measures - SIAM Project".

F. D. Santos, K. Forbes, R. Moita (editors) Gradiva, Lisbon, Portugal, 2002.

¹ Reproduced as received from the Party.