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

Parties included in Annex I to the Convention are requested, in accordance with decision 9/CP.16, to submit a sixth national communication to the secretariat by 1 January 2014. In accordance with decision 7/CMP.8, Parties included in Annex I to the Convention that are also Parties to the Kyoto Protocol shall include in their sixth national communication supplementary information under Article 7, paragraph 2, of the Kyoto Protocol. In accordance with decision 15/CMP.1, these Parties shall start reporting the information under Article 7, paragraph 1, of the Kyoto Protocol with the inventory submission due under the Convention for the first year of the commitment period. This includes supplementary information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol.

This report presents the results of the technical review of the sixth national communication and 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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I. Introduction and summary

A. Introduction

1. For Portugal the Convention entered into force on 21 March 1994 and the Kyoto Protocol on 16 February 2005. Under the Convention, Portugal made a commitment to contribute to the joint European Union (EU) economy-wide emission reduction target of reducing its greenhouse gas (GHG) emissions by 20 per cent by 2020 below the 1990 level. Under the Kyoto Protocol, Portugal committed itself to reducing its GHG emissions by 8 per cent compared with the base year¹ level during the first commitment period, from 2008 to 2012. Within the burden-sharing agreement of the EU for meeting commitments under the Kyoto Protocol, Portugal committed itself to limiting the growth in its GHG emissions to 27 per cent in relation to the base year level during the first commitment period, from 2008 to 2012. For the second commitment period of the Kyoto Protocol, from 2013 to 2020,² Portugal committed to reduce its GHG emissions by 20 per cent below the base year level.

2. This report covers the in-country technical review of the sixth national communication (NC6) of Portugal, 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” (decision 23/CP.19) and the “Guidelines for review under Article 8 of the Kyoto Protocol” (decision 22/CMP.1).

3. The review took place from 7 to 12 April 2014 in Lisbon, Portugal, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: Ms. Gabriela Fischerova (Slovakia), Mr. Naoki Matsuo (Japan), Mr. Walter Oyhantcabal (Uruguay) and Mr. Newton Paciornik (Brazil). Mr. Matsuo and Mr. Paciornik were the lead reviewers. The review was coordinated by Mr. Javier Hanna Figueroa (secretariat).

4. During the review, the expert review team (ERT) reviewed each section of the NC6. The ERT also reviewed the supplementary information provided by Portugal as a part of the NC6 in accordance with Article 7, paragraph 2, of the Kyoto Protocol. In addition, the ERT reviewed the information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, which was provided by Portugal in its 2013 annual submission and previous submissions under Article 7, paragraph 1, of the Kyoto Protocol.

5. In accordance with decisions 23/CP.19 and 22/CMP.1, a draft version of this report was communicated to the Government of Portugal, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

¹ “Base year” refers to the base year under the Kyoto Protocol, which is 1990 for carbon dioxide, methane and nitrous oxide, and 1995 for perfluorocarbons, hydrofluorocarbons and sulphur hexafluoride. The base year emissions include emissions from sectors/source categories listed in Annex A to the Kyoto Protocol.

² The quantified emission limitation or reduction commitments (QELRCs) for the EU and its member States for the second commitment period under the Kyoto Protocol are based on the understanding that these will be fulfilled jointly by the EU and its member States, in accordance with Article 4 of the Kyoto Protocol. The QELRCs are without prejudice to the subsequent notification by the EU and its member States of an agreement to fulfil their commitments jointly in accordance with the provisions of the Kyoto Protocol.

B. Summary

6. The ERT conducted a technical review of the information reported in the NC6 of Portugal in accordance with the “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications” (hereinafter referred to as the UNFCCC reporting guidelines on NCs). As required by decision 15/CMP.1, supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol³ is provided in the NC6 (see paras. 136 and 137 below). The supplementary information on the minimization of adverse impacts referred to in paragraph 4 above, taking into account the information reported in the national inventory report (NIR) of the 2013 annual submission, is complete and mostly transparent.

7. Portugal considered most recommendations provided in the report of the in-depth review of the fifth national communication (NC5) of Portugal.⁴ The ERT commended Portugal for its improved reporting. During the review, Portugal provided further relevant information; for example, a detailed explanation of policies and measures (PaMs), especially for the land use, land-use change and forestry (LULUCF) sector; updated projections; detailed data on financial resources and technology transfer; and additional information on vulnerability, adaptation, research, compliance with the quantified commitment of the Kyoto Protocol and minimization of adverse impacts.

1. Completeness and transparency of reporting

8. Gaps and issues related to the reported information identified by the ERT are presented in table 1 below.

2. Timeliness

9. The NC6 was submitted on 31 December 2013, before the deadline of 1 January 2014 mandated by decision 9/CP.16. Portugal submitted revised versions of its NC6 on 7 February 2014 and 20 March 2014 as well as an addendum to its NC6 on 11 April 2014.

3. Adherence to the reporting guidelines

10. The information reported by Portugal in its NC6 is mostly in adherence with the UNFCCC reporting guidelines on NCs as per decision 4/CP.5 (see table 1).

³ Decision 15/CMP.1, annex, chapter II.

⁴ FCCC/IDR.5/PRT.

Table 1

Assessment of completeness and transparency issues of reported information in the sixth national communication of Portugal^a

<i>Sections of national communication</i>	<i>Completeness</i>	<i>Transparency</i>	<i>Reference to paragraphs</i>	<i>Supplementary information under the Kyoto Protocol</i>	<i>Completeness</i>	<i>Transparency</i>	<i>Reference to paragraphs</i>
Executive summary	Complete	Transparent		National system	Complete	Transparent	
National circumstances	Complete	Mostly transparent	12	National registry	Complete	Transparent	
Greenhouse gas inventory	Complete	Transparent		Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Partially complete	Transparent	108
Policies and measures (PaMs)	Mostly complete	Mostly transparent	44, 45, 76	PaMs in accordance with Article 2	Mostly complete	Transparent	80, 83
Projections and total effect of PaMs	Complete	Partially transparent	86, 106	Domestic and regional programmes and/or arrangements and procedures	Mostly complete	Transparent	39
Vulnerability assessment, climate change impacts and adaptation measures	Partially complete	Transparent	121, 126	Information under Article 10	Complete	Transparent	
Financial resources and transfer of technology	Mostly complete	Partially transparent	111–113	Financial resources	Mostly complete	Partially transparent	111–113
Research and systematic observation	Complete	Transparent		Minimization of adverse impacts in accordance with Article 3, paragraph 14	Complete	Transparent	138
Education, training and public awareness	Complete	Transparent					

^a A list of recommendations pertaining to the completeness and transparency issues identified in this table is included in the chapter on conclusions and recommendations.

II. Technical review of the reported information in the national communication and supplementary information under the Kyoto Protocol

A. Information on greenhouse gas emissions and national circumstances relevant to greenhouse gas emissions and removals, including other elements related to the Kyoto Protocol

1. Information on relevant national circumstances

11. In its NC6, Portugal has provided a description of the national circumstances, including the main sectors and relevant variables and indicators (e.g. climate, population, gross domestic product (GDP)). The ERT noted that Portugal did not elaborate on the framework legislation and key policy documents on climate change in this section of the NC6. Information on the review of the institutional and legislative arrangements for the coordination and implementation of PaMs is provided in chapter II.B below. The ERT noted that not all variables and indicators that define the national circumstances are reported in the NC6 within the same time frame (e.g. energy consumption is analysed for the period 2007–2011, transport considers the period 1991–2010, and variables relating to land use and livestock are analysed for the period 1989–2009). The ERT encourages Portugal, to the extent possible, to include information on relevant variables and indicators for the same time frame as is used for GHG analysis trends in order to improve the understanding of the relation between national circumstances and GHG trends in its next national communication (NC).

12. The NC6 does not include in the relevant section the information required by the UNFCCC reporting guidelines on NCs on how the national circumstances and changes in national circumstances affect GHG emissions and removals. The ERT noted that some of this information is included in the section providing information on the national system, but no cross reference from one section to the other is provided. As this information is key in order to understand the trends in GHG emissions and removals, and to allow for GHG emission projections, the ERT recommends that Portugal report in its next NC a thorough analysis on how relevant national circumstances and their changes have affected GHG emission trends over time, explaining the relation between national circumstances and main sector emissions and carbon dioxide (CO₂) removals in the LULUCF sector, which were not analysed in the NC6. This will increase transparency and will also improve the comparability among submissions by Parties.

13. The ERT noted that during the period 1990–2011, Portugal's GDP and population increased by 41.2 and 6.5 per cent, respectively, while GHG emissions per GDP decreased by 18.4 per cent and GHG emissions per capita increased by 7.7 per cent. Table 2 illustrates the national circumstances of Portugal by providing some indicators relevant to GHG emissions and removals.

Table 2
Indicators relevant to greenhouse gas emissions and removals for Portugal

	1990	2000	2005	2010	2011	Change 1990– 2011 (%)	Change 2010– 2011 (%)
Population (million)	10.00	10.23	10.55	10.64	10.65	6.5	0.1
GDP (2005 USD billion using PPP)	161.50	216.33	225.43	231.68	228.08	41.2	–1.6
TPES (Mtoe)	16.74	24.67	26.47	23.54	23.08	37.9	–2.0
GHG emissions without LULUCF (kt CO ₂ eq)	60 952.39	84 303.27	88 037.23	71 382.42	69 986.45	14.8	–2.0
GHG emissions with LULUCF (kt CO ₂ eq)	69 448.57	86 564.11	92 558.67	67 897.16	64 666.69	–6.9	–4.8
GDP per capita (2005 USD thousand using PPP)	16.15	21.15	21.37	21.77	21.42	32.6	–1.6
TPES per capita (toe)	1.67	2.41	2.51	2.21	2.17	29.9	–1.8
GHG emissions per capita (t CO ₂ eq)	6.10	8.24	8.34	6.71	6.57	7.7	–2.1
GHG emissions per GDP unit (kg CO ₂ eq per 2005 USD using PPP)	0.38	0.39	0.39	0.31	0.31	–18.4	0.0

Sources: (1) GHG emissions data: Portugal's 2013 GHG inventory submission; (2) Population, GDP and TPES data: International Energy Agency.

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.

Abbreviations: GDP = gross domestic product, GHG = greenhouse gas, LULUCF = land use, land-use change and forestry, PPP = purchasing power parity, TPES = total primary energy supply.

2. Information on the greenhouse gas inventory, emissions and trends

14. Portugal has provided a summary of information on GHG emission trends for the period 1990–2011. This information is fully consistent with the 2013 national GHG inventory submission. Summary tables, including trend tables for emissions in carbon dioxide equivalent (CO₂ eq) (given in the common reporting format tables), are provided in an annex to the NC6. During the review, the ERT took note of the recently submitted 2014 annual submission. The relevant information therein is partially reflected in this report.

15. Total GHG emissions⁵ excluding emissions and removals from LULUCF increased by 14.8 per cent between 1990 and 2011, whereas total GHG emissions including net emissions or removals from LULUCF decreased by 6.9 per cent over the same period.

16. In terms of contribution to the total GHG emissions and trend, CO₂ was the dominant GHG, contributing 73.6 per cent in 2011, of which 92.4 per cent came from the energy sector, followed by methane (CH₄) (17.8 per cent) and nitrous oxide (N₂O) (6.4 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) collectively accounted for 2.2 per cent of the overall GHG emissions. In terms of average annual change, CO₂ increased by 0.6 per cent per year and CH₄ by 0.9 per cent per year, while N₂O decreased by 1.0 per cent per year for the period 1990–2011. In absolute

⁵ 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.

terms, CO₂ increased by 14.1 per cent and CH₄ by 21.3 per cent, while N₂O decreased by 19.2 per cent for this period. HFCs, PFCs and SF₆ were reported as not occurring in 1990.

17. Total GHG emissions in Portugal were dominated in 2011 by emissions from the energy sector (69.5 per cent), for which the major contributions came from transport (25.1 per cent) and energy industries (23.6 per cent), followed by manufacturing industries and construction (12.3 per cent). The residential and commercial sectors and other minor activities together contributed 6.8 per cent. Among the non-energy sector emissions, the waste sector contributed 11.8 per cent, followed by agriculture (10.7 per cent) and industrial processes (7.6 per cent). Therefore it can be concluded that the overall trend in GHG emissions in Portugal is mainly determined by two subsectors: transport and energy industries (mainly electricity generation).

18. Portugal has two notably different phases in its GHG emission trends: 1990–2005 and 2005–2011. The former phase is characterized by a strong increase in GHG emissions (44.4 per cent) driven by CO₂ emissions from the energy sector (3.0 per cent per year). In contrast, the latter phase shows a decrease in GHG emissions (25.8 per cent) with a sharp decline on average in energy-related CO₂ emissions (–4.7 per cent per year). After 2005, all GHG emissions decreased except for HFCs (especially HFC-134a) and SF₆, which contributed 2.1 per cent and 0.1 per cent, respectively, to total GHG emissions in 2011. In terms of average annual change, CO₂ decreased by 4.8 per cent per year, CH₄ by 0.3 per cent per year and N₂O by 2.6 per cent per year for 2005–2011.

19. These trends can be analysed through three factors: GDP growth, energy saving (shown by final energy consumption per unit of GDP) and fuel switching (shown by CO₂ emissions per final energy consumption). For 1990–2005, Portugal's GDP grew by 2.3 per cent per year on average, while final energy consumption grew by 3.2 per cent per year and energy-related CO₂ emissions grew by 3.7 per cent per year. This implies a negative energy saving trend and little fuel switching in this phase. In contrast, for 2005–2011, GDP stagnated with a growth of 0.2 per cent per year, while final energy consumption decreased by 2.1 per cent per year and energy-related CO₂ emissions dropped by 4.7 per cent per year. This implies that both energy saving and fuel switching rose strongly with rates of 2.3 and 2.6 per cent per year, respectively.

20. The inter-annual change in the major contributors of GHG emissions in the energy sector shifted remarkably between these two periods as follows: transport from 4.5 per cent per year to –2.0 per cent per year; energy industries from 3.0 per cent per year to –7.0 per cent per year; and manufacturing industries and construction from 0.5 per cent per year to –3.6 per cent per year. Therefore, a drastic phase transition in the largest two subsectors can be identified. The NC6 and the presentation shown during the review explained that the key drivers of changes after 2005 are the shift of energy sources due to the introduction of natural gas and renewable energy sources (RES) (wind for power generation and biodiesel for transportation fuel) causing a shift away from oil and coal; energy efficiency improvements in the European Union Emissions Trading System (EU ETS) sectors; 'green' car tax reform and the financial and economic crisis (2009–2012).

21. Energy intensity per unit of GDP decreased by around 25 per cent since 2005 until 2011 both for primary and final energy consumption (132 and 97 toe per EUR million (year 2000), respectively), but it still remains above the EU average. Between 2005 and 2011, Portugal recorded a decline in primary energy consumption from 2.56 toe per capita in 2005 to 2.14 toe per capita in 2011 (a decrease of 16.4 per cent in six years).

22. An analysis of the drivers of GHG emissions trends in each sector is provided in chapter II.B below. Table 3 provides an overview of GHG emissions by sector from 1990 to 2011.

Table 3
Greenhouse gas emissions by sector in Portugal, 1990–2011

Sector	GHG emissions (kt CO ₂ eq)				Change (%)		Share ^a by sector (%)	
	1990	2000	2010	2011	1990–2011	2010–2011	1990	2011
1. Energy	41 634.94	61 245.85	49 667.35	48 610.50	16.8	–2.1	68.3	69.5
A1. Energy industries	16 326.05	21 619.23	14 550.19	16 525.10	1.2	13.6	26.8	23.6
A2. Manufacturing industries and construction	9 854.29	12 768.59	9 265.64	8 607.22	–12.7	–7.1	16.2	12.3
A3. Transport	10 308.87	19 459.53	18 929.58	17 550.21	70.2	–7.3	16.9	25.1
A4.–A5. Other	4 763.17	6 504.03	5 315.51	4 774.48	0.2	–10.2	7.8	6.8
B. Fugitive emissions	382.56	894.46	1 606.43	1 153.48	201.5	–28.2	0.6	1.6
2. Industrial processes	4 833.70	6 494.44	6 064.82	5 323.95	10.1	–12.2	7.9	7.6
3. Solvent and other product use	329.62	297.78	225.76	266.69	–19.1	18.1	0.5	0.4
4. Agriculture	8 159.50	8 693.36	7 517.39	7 504.88	–8.0	–0.2	13.4	10.7
5. LULUCF	8 496.18	2 260.84	–3 485.26	–5 319.75	–162.6	52.6	13.9	–7.6
6. Waste	5 994.63	7 571.83	7 907.10	8 280.43	38.1	4.7	9.8	11.8
7. Other	NA	NA	NA	NA	NA	NA	NA	NA
GHG total with LULUCF	69 448.57	86 564.11	67 897.16	64 666.69	–6.9	–4.8	NA	NA
GHG total without LULUCF	60 952.39	84 303.27	71 382.42	69 986.45	14.8	–2.0	NA	NA

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

Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry, NA = not applicable.

^a The shares of sectors are calculated relative to GHG emissions without LULUCF; for the LULUCF sector, the negative values indicate the share of GHG emissions that was offset by GHG removals through LULUCF and the positive values indicate the share of GHG emissions that would represent the sector in the total GHG emissions.

3. National system

23. Portugal provided in its NC6 a description of how its national system is performing the general and specific functions defined in the guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol (decision 19/CMP.1). The description includes all the elements mandated by decision 15/CMP.1. The ERT noted that since submission of the NC5, and to implement a recommendation of the previous review report, Portugal created a working group for the identification of areas of land of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol and to account for emissions and removals of these activities. The ERT acknowledges that the national system is now able to report emissions and removals from these activities, as reflected in the report of the individual review of the GHG inventory of Portugal submitted in 2012 (section 10 of the NIR).

4. National registry

24. In its NC6, Portugal has not provided information on the national registry in accordance with the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1. During the review, on 11 April 2014, Portugal officially submitted the required information on the national registry as an addendum to its NC6.

25. Portugal described the changes, specifically due to the centralization of EU ETS operations into a single EU registry operated by the European Commission and called the Consolidated System of European Union registries (CSEUR). The CSEUR is a consolidated platform which implements the national registries, including the Portuguese national registry, in a consolidated manner and was developed together with the new EU registry.

26. The ERT considered that this addendum provides the necessary information on the national registry, including the changes implemented since submission of the NC5. The ERT recommends that Portugal continue including in its next NC the required information on the national registry in accordance with the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and/or any other relevant CMP decisions.

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

27. Portugal has reported in its NC6 comprehensive and well-organized information on domestic and regional programmes and/or legislative arrangements and procedures related to the Kyoto Protocol.

28. The Ministry of Environment, Spatial Planning and Energy (MAOTE) is responsible for implementing climate policy with the purpose of achieving a competitive, resilient and low-carbon economy.

29. Under rationalization and restructuring of the system of public administration (Reduction Plan and Improving Central Administration), which aims to increase efficiency and reduce costs, a profound change in the central public administration was made between 2011 and 2012. In this context, operations of the Climate Change Commission and its executive committee were discharged and their assignments and competences were integrated into the new Portuguese Environment Agency (APA), established by decree-law 17/2012 as a public entity of indirect dependency from MAOTE.

30. The overall responsibility for climate change policymaking lies within APA; it assumes a decisive role in the proposal, development and implementation of related policies. APA was established in 2012 as a new organizational structure that develops its activities based on transparency and effectiveness of operation, and effective coordination and participation in various sectors (such as air quality protection, water management, waste management). Its activities are based on positive collaboration with other governmental entities, businesses, non-governmental organizations (NGOs) and the public in general.

31. APA is the designated national authority of Portugal and is responsible for all issues related to climate change: mitigation policy, adaptation policy, the EU ETS, the national GHG inventory system, registry administration, 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. Several working groups with representatives of different ministries have been established for this purpose; namely, the National Climate Change Programme (PNAC), the National Adaptation Strategy (EN AAC), and the National Inventory System of Emissions by

Sources of Removals by Sinks of Air Pollutants (SNIERPA). Particularly in climate change development cooperation, APA provides finance for cooperation projects to address climate change.

32. As a Party to the Kyoto Protocol, Portugal had an emission reduction target for the first commitment period of the Kyoto Protocol, during 2008–2012 (8 per cent below the base year level). The EU also agreed under the Kyoto Protocol upon a common GHG reduction target of 8 per cent for the EU as a whole. This was subsequently divided among the EU member States and reflected in the burden-sharing agreement of the EU for meeting commitments under the Kyoto Protocol (decision 2002/358/EC). For Portugal, this resulted in an emission limitation target of 27 per cent above the emissions at the base year level for the period 2008–2012. For the second commitment period of the Kyoto Protocol, from 2013 to 2020, Portugal committed to contributing to the joint EU commitment to reduce GHG emissions by 20 per cent compared with the base year level.

33. As an EU member State, Portugal also applies EU climate policy, including EU common PaMs and policy instruments relevant to climate change. These latter include, among others, the EU burden-sharing agreement and the European Parliament and European Council regulation 523/2013 on the so-called monitoring mechanism, which ensures that EU progress towards meeting its Kyoto Protocol target is monitored and evaluated in a systematic way.

34. The EU directive 2003/87/EC introduced the European system for CO₂ emissions trading. With the introduction of the EU ETS, a large part of European emissions were restricted under an EU-wide cap. As a result, national targets under EU legislation take into account only those emissions not included in the EU ETS (EU effort-sharing decision (ESD), decision 406/2009/EC). The main strategic documents on climate change in Portugal – the National Climate Change Strategy and its implementation document, the PNAC – were adopted in 2001. PNAC, updated in 2004 and revised in 2006 and 2008, is the main strategic instrument towards meeting the targets under the Kyoto Protocol and the EU burden-sharing agreement.

35. Implementation of the Kyoto Protocol after 2012 is underpinned by two main essential policy instruments:

(a) National Low Carbon Roadmap (RNBC): Paths for cost-effective emission reductions (for long-term targets concerning national GHG emission reductions) and their subsequent policy options, taking into account the national contribution to the EU target for 2050 (work completed in 2012);

(b) National Climate Change Programme for the period 2013–2020 (PNAC 2020): Establishes policies, measures and instruments with the aim of responding to the annual limitation of GHG emissions for sectors not covered by the EU ETS, and predicts sectoral responsibilities, funding, and monitoring and control mechanisms.⁶

36. Other policy instruments specific to some areas of climate change mitigation, especially regarding energy strategies, are the National Action Plan for Energy Efficiency (PNAEE), the National Action Plan for Renewable Energy (PNAER), the Electric Mobility Programme in Portugal, and the Energy Efficiency Programme in Public Administration (ECO.AP), among others.

⁶ During 2013 and 2014, new projections were developed in the context of the work under PNAC 2020 that updates the emission projection scenarios, considering all adopted and implemented policies until 1 September 2013. The projections presented in this review report are based on this latest exercise under PNAC 2020. The projection exercise continued until the second quarter of 2014.

37. For systematic monitoring and evaluation of the progress of PNAC 2004 and for compliance with the Kyoto Protocol, Portugal has been operating a publicly available web-based measure-oriented database (CumprirQuioto.pt).⁷ This database produces a progress report on the implementation status of each individual measure every six months and can trigger contingency plans in case of major deviations from defined targets.

38. All legislation and strategic documents related to climate change policies are publicly available on governmental websites. During the review, as previously informed by Portugal, the ERT confirmed that APA works closely with both environmental and business NGOs on preparing strategic and legislative documents and PaMs relevant to climate change.

39. The ERT noted that the NC6 does not contain information on national legislative arrangements and administrative procedures that seek to ensure that the implementation of activities under Article 3, paragraph 3, and elected activities under Article 3, paragraph 4, of the Kyoto Protocol also contribute to the conservation of biodiversity and the sustainable use of natural resources. During the review, this information was provided, and indicates that Portugal is a signatory state of the resolutions of the Ministerial Conference on the Protection of Forests in Europe and is therefore committed to the general principles of sustainable forest management (Helsinki resolution H1) and to the criteria and indicators for sustainable forest management (Lisbon resolution L2), which take into due consideration the carbon balance as well as biodiversity enhancement and the protective functions, from a multifunctional perspective, of forests. The Regional Forestry Management Plans (PROFs) serve as the basic planning instrument for forests that guide afforestation and, in general, forest management activities, which must take into account the multifunctional role of forests and must be in line with the National Forest Strategy as well as indicators for sustainable forest management, including biodiversity and carbon balance. The ERT recommends that Portugal include this detailed information in its next NC.

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

40. Portugal has provided in its NC6 comprehensive and well-organized information on its package of PaMs implemented, adopted and planned in order to fulfil its commitments under the Convention and its Kyoto Protocol. The ERT acknowledged the efforts made by Portugal to develop and bring forward policies, measures and instruments to deliver on its commitment to limit its GHG emissions.

1. Policies and measures related to implementation of commitments under the Convention

41. In its NC6, Portugal reported on its PaMs adopted, implemented and planned in achieving its commitments under the Convention. Portugal provided information on PaMs by sector and by gas. The NC6 provides descriptions of the principal PaMs, presented in summary tables on PaMs by sector. The tables also provide information on GHGs affected by a respective policy or measure as required by the UNFCCC reporting guidelines on NCs. Portugal has also provided information on how it believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals in accordance with the objective of the Convention.

⁷ <<http://www.cumprirquioto.pt>>.

42. The NC6 contains a set of PaMs identical to those in the NC5. A total of 44 PaMs, based on economic and regulatory instruments, as included in PNAC 2006, were proposed in different sectors (energy, transport, agriculture, forestry and waste management) to reduce GHG emissions.

43. As noted before (see para. 37 above) Portugal has a database, *CumprirQuioto.pt*, for monitoring progress of the implementation of each policy or measure by sector. Each measure has its specific target every year and the performance indicator is shown as a percentage annual deviation from the target. Performance is monitored by responsible institutions through regular compilation of relevant data and after verification, these data are made public.

44. The ERT noted that in the NC6, while tables on PaMs present specific measures for all sectors, the textual description of the forestry sector is missing (see paras. 75 and 76 below). During the review, updated and comprehensive information on forestry sector PaMs was exhaustively presented and provided in a document to the ERT. Therefore, the ERT recommends that Portugal include the textual description of forestry sector PaMs in its next NC.

45. The NC6 does not include information required by the UNFCCC reporting guidelines on NCs on PaMs targeting fluorinated gases (F-gases), nor does it explain whether these policies exist or are planned to be implemented in the future. During the review, Portugal explained to the ERT that F-gases are regulated directly by EU legislation (e.g. the new regulation 517/2014) and that Portugal is committed to implement all related measures accordingly. The ERT noted that the 'with measures' projection shows a significant increasing trend of emissions (in particular for dominant HFCs) until 2020 (66 per cent increase for 2011–2020), while a noticeable declining trend (78 per cent) is expected for 2020–2030. The ERT recommends that Portugal include detailed information on PaMs targeting F-gases in its next NC.

46. The tables on PaMs in the NC6 do not indicate whether the primary goal of the respective policy or measure is GHG emission reductions. They list the PaMs for different sectors, including transport, agriculture and energy, where the primary goals are often supporting priorities in the sector but which nevertheless also result in GHG emission reductions. The ERT encourages Portugal to distinguish the main objectives of individual measures in its next NC.

47. From the information provided in the NC6, it is not always possible to identify which PaMs have been implemented since the NC5 was submitted. The status of implementation is not substantiated with dates (i.e. dates on which PaMs enter the implementation phase), nor similarly, in many cases, with the national legislative provisions supporting implementation, the estimated costs of implementation or the non-greenhouse gas benefits. Therefore, the ERT encourages Portugal to provide more structured information on PaMs in its next NC.

48. In the NC6, the estimates of the effects of PaMs were provided in most cases. However, the ERT noted that information on the financial implications associated with the implementation of PaMs was not included. During the review, Portugal informed the ERT that in some cases this information is available. The ERT encourages Portugal to include information on the cost of implementation of PaMs, especially key ones, in its next NC.

49. The institutional arrangements in Portugal have changed since the NC5 was submitted (see paras. 28–31 and 37 above). The NC6 briefly mentions the change; however, it does not elaborate on the current cooperative mechanism between different institutions, and on compliance, monitoring and reporting of PaMs to the UNFCCC. During the review, Portugal provided additional information and an explanation on this matter. According to the information, cooperation is ensured through creating ad hoc working

groups and the procedures established for legislative proposals to be adopted by the government. The ERT encourages Portugal to provide in its next NC more factual information on the institutional arrangements and administrative structure in place for monitoring GHG mitigation policies at the time of preparation of the NC as well as information on the practical aspects of how energy policy and environment policy are designed and implemented in a single ministry in comparison with the arrangement in the past, when different ministries were responsible for these policies.

50. Some of the recommendations made in the previous review report were taken into consideration in order to improve reporting in the NC6, including those on marine and aviation bunker fuels and the mitigation of emissions from such fuels. The NC6 now provides information on inclusion of international aviation in the EU ETS. Portugal's Port and Sea Transport Institute (IPTM) has been directly involved in work with the International Maritime Organization (IMO) through meetings of the Marine Environment Protection Committee on air pollution, GHG emissions and energy efficiency. Portugal has also ratified Annex VI of the International Convention for the Prevention of Pollution from Ships (MARPOL), through the approving decree-law 1/2008, which sets among other things limits on sulphur oxide and nitrogen oxide emissions from ship exhausts and prohibits deliberate emissions of ozone-depleting substances. It also introduces mandatory technical and operational energy efficiency measures, which should reduce significantly GHG emissions from ships.

51. The NC6 did not provide complete and sufficient information on the division of responsibilities in climate change management, on forestry policy and on energy sector policies, including transport. During the review, Portugal provided additional information, elaborating on detailed arrangements of climate change management structure, on preparation of additional strategic documents, on forestry policy and on energy sector policies, including transport. Information provided during the review was concise and presented in transparent way. The ERT considers that Portugal may include this information in its next NC in order to enhance transparency.

2. Policy framework and cross-sectoral measures

52. The climate change policy of Portugal was established through the Council of Ministers resolution 93/2010 and is based on two principal framework strategic documents: RNBC 2050 and PNAC 2020. The adaptation policy is framed by the Council of Ministers resolution 24/2010, which establishes ENAAC. ENAAC is currently under revision with the aim of implementation of actions for the period 2014–2020. The implementation of PaMs in strategic documents and action plans is supported by the Portuguese Carbon Fund, a governmental financial instrument to ensure compliance with national targets on climate change issues, the use of Kyoto Protocol mechanisms and supporting projects to reduce emissions.

53. Due to the macroeconomic environment in the past few years, particularly the reduction in energy consumption, the increase in energy supply and strict funding constraints, Portugal redefined its priorities in terms of energy efficiency and renewable energy targets through revisions of PNAEE and PNAER. The new Energy Efficiency Strategy – PNAEE 2016 – defined by Cabinet resolution 20/2013 gives continuity to the measures in PNAEE 2008 and includes measures established under the EU Energy Efficiency Directive. While in PNAEE 2008 the target was a 10 per cent reduction of final energy consumption by 2015 from the average level in 2001–2005, the revised PNAEE 2016 sets the target at 8 per cent, to be fulfilled by 2016. The same cabinet resolution also approved a new National Action Plan for Renewable Energy – PNAER 2020. PNAER 2020 aims to achieve a 59.6 per cent share of electricity produced from renewable energy.

54. PNAER was revised according to the current scenario (2013) of oversupply due to reduction in energy demand, in order to mitigate costs. The plan sets a national target for Portugal of 31 per cent of RES in gross energy consumption and 10 per cent of RES in transport in 2020, as well as the respective paths of penetration according to the pace of the implementation of measures and actions planned in each of these sectors, taking into account the effects of other policies related to energy efficiency in energy consumption. The plan is expected to be revised every two years.

55. The ERT noted that even though Portugal redefined its priorities in terms of energy efficiency and renewable energy targets, the specific implications of these revisions are not indicated in the table of PaMs for the energy sector nor are they described in the textual part of the NC6. Therefore, the ERT encourages Portugal to include the updated status of individual PaMs consistent with the latest targets for the energy sector in its next NC.

56. The ERT also noted with interest that Portugal prepared its draft Green Growth Action Plan to be submitted to the State Secretary of MAOTE and for public discussion in April 2014, with expected adoption by the end of 2014 at the latest. The ERT encourages Portugal to include information on the adopted Green Growth Action Plan in its next NC.

57. As indicated in paragraph 33 above, in general, as a member State of the EU, Portugal's climate and related policies are coordinated with the EU-wide PaMs. EU policy divides emission sources into EU ETS covered sectors and non-EU ETS covered sectors. In the case of Portugal, EU ETS and non-EU ETS covered sectors comprised 37 and 63 per cent, respectively, of emissions for 2008–2012. When setting the target for the second commitment period of the Kyoto Protocol, the EU ETS covered sectors target is set for the EU as a whole (21 per cent decrease in 2020 from the 2005 level), while a non-EU ETS covered sectors target is set for Portugal specifically (1 per cent increase in 2020 above the 2005 level) and for the EU as a whole (10 per cent decrease in 2020 below the 2005 level). Currently the EU has the so-called 20-20-20 policy (EU 2020 climate and energy package) with the key targets related to climate change mitigation in 2020 of a 20 per cent reduction of energy consumption, 20 per cent of final energy consumption supplied by RES, and a 20 per cent reduction in GHG emissions. Based on and consistent with this EU policy, Portugal has set its own targets and legislative measures, such as 31 per cent RES in gross final energy consumption, 10 per cent renewable transportation fuels, and a 20 per cent reduction of primary energy consumption in 2020. The NC6 lists 36 EU directives and regulations that are transposed to 47 of Portugal's domestic measures under PNAC 2020 as common and coordinated PaMs.

58. Some of the PaMs are deferred to the regional level, namely in the forest management sector. Portugal provided limited information on PaMs at the regional level. Table 4 provides a summary of the reported information on the PaMs of Portugal.

Table 4

Summary of information on policies and measures reported by Portugal

<i>Sectors affected</i>	<i>List of key policies and measures</i>	<i>Estimate of mitigation impact (kt CO₂ eq)</i>
<i>Policy framework and cross-sectoral measures</i>		
<i>Energy</i>	EU ETS	NE
Energy supply	EU ETS	NE
Renewable energy	Renewable Energy Strategy – PNAER 2020	NE
Energy efficiency ^a	Energy Efficiency Strategy – PNAEE 2016	443

<i>Sectors affected</i>	<i>List of key policies and measures</i>	<i>Estimate of mitigation impact (kt CO₂ eq)</i>
Residential and commercial sectors	Home and Office Renewal	331
	Energy Efficiency System in Buildings	
	Thermal Solar Energy	312
Transport	Eco-car	NE
	Urban Mobility	NE
	Energy Efficiency System in Transport	323
Industrial sectors	Energy Efficiency System in Industry	343
Agriculture	Energy Efficiency in the Agrarian Sector	362
Forestry	Forest Policy Act (law 33/96)	NA
	Sustainable Development Plan for Portuguese Forests (resolution 27/99)	NA
	National Forest Strategy (resolution 144/2006)	NA
Waste management	National Waste Management Plan	74.7
	Strategic Plan for Municipal Solid Waste	NE

Note: The greenhouse gas reduction estimates given for some measures are reductions in carbon dioxide or carbon dioxide equivalent for 2020.

Abbreviations: EU ETS = European Union Emissions Trading System, NA = not applicable, NE = not estimated, PNAEE = National Action Plan for Energy Efficiency, PNAER = National Action Plan for Renewable Energy.

^a Primary energy savings that allow a reduction of 25 per cent in energy consumption by 2020 compared with the base year (2007) of the PRIMES model of the European Commission.

3. Policies and measures in the energy sector

59. The energy sector was responsible for 69.5 per cent of GHG emissions in 2011 in Portugal. Between 1990 and 2011, GHG emissions from the energy sector increased by 16.8 per cent (6,975.56 kt CO₂ eq), mainly owing to an increase in transport activities. As such, the trend in GHG emissions from fuel combustion showed a notable increase in transport (70.2 per cent or 7,241.34 kt CO₂ eq) during the period 1990–2011. Energy use in other subsectors in 2011 was the same or lower than the 1990 level (e.g. energy industry, 0.8 per cent; manufacturing industry, –13.1 per cent; residential/commercial sector 8.3 per cent).

60. However, compared with 2005 (the peak year for Portugal’s GHG emissions), emissions from the energy sector decreased by 24.9 per cent (15,751 kt CO₂) in 2011, mainly due to a decrease in emissions from energy industries (35.3 per cent), which primarily resulted from a shift to the use of natural gas to replace oil and coal. The unprecedented penetration of renewable energy (especially wind) and biofuels in transport; the increased energy efficiency in the sectors covered by the EU ETS (e.g. the ceramic industry); the ‘green’ tax reform on vehicles; and the economic crisis (especially in the period 2009–2011) also contributed to this decrease in GHG emissions.

61. **Energy supply.** In 1990–2011, primary energy consumption increased by 27.6 per cent; however, compared with 2005 (the peak year in primary energy consumption), it decreased in 2011 by 11.3 per cent, mainly owing to a decrease in the use of oil. The

energy-related CO₂ emissions from the energy industry increased by 3.0 per cent per year in 1990–2005, while they decreased by 7.0 per cent per year in 2005–2011. The introduction of natural gas in Portugal in 1997 and its further enhanced use in 2004, 2009 and 2010 contributed to this decreasing trend of CO₂ emissions from energy supply. The use of natural gas was focused mainly by decommissioning oil power plants and replacing these plants with new natural gas-fired plants and replacing final oil consumption in other sectors, which enabled diversification of the structure of the energy supply mix and reduced Portugal's dependency on external oil. In 2011, natural gas combined cycle power plants reached 5.36 GW installed capacity (26.0 per cent of total capacity). However, plans for future natural gas power plants have been abandoned because, considering the decrease in electricity consumption in the country, expansion of RES and low competitiveness of natural gas in the power market, these plants are not deemed necessary.

62. Despite these efforts, oil continues to be the essential energy source to satisfy Portugal's energy demand mainly for transport and industry, representing 45.9 per cent of the total primary energy consumption in 2011 (11,117 ktoe). In addition to the increase in natural gas use (4,462 ktoe in 2011), the reduction of energy losses in the national grid (8.2 per cent loss in 2012) and increase of cogeneration (15.5 per cent of electricity generation in 2011) are important measures in the energy supply sector as part of PNAER 2020. Because the electricity supply of Portugal relies heavily on hydropower (992 ktoe in 2011; typically around 30 per cent), its CO₂ emissions fluctuate depending on the year's rainfall (e.g. 2010 had high precipitation levels and around twice as much energy was generated as in 2012, which had low rainfall). The ERT noted that the CO₂ emissions are also heavily dependent on the net amount of imported electricity, which depends on the liberalized power market in the Iberian peninsula.

63. **Renewable energy sources.** Renewable energy expansion is a key policy for energy supply in Portugal and is coordinated with the related EU policy. The key PaMs implemented in this sector are supported by PNAER, including its previous versions. In 2011, 22.1 per cent of total primary energy supply in Portugal came from domestic RES, while in 1990 this share was 19.6 per cent. During the past few years, Portugal has dedicated a significant effort to increasing its use of RES not only for climate mitigation but also to address energy security issues. The total installed capacity of RES increased from 6.4 GW in 2005 to 10.6 GW in 2011: this capacity is sufficient for supplying close to 50 per cent of the country's electricity demand. Most of this generating capacity came from hydropower plants (50 per cent) and wind generators (41 per cent) in 2011. Biomass and solar energy represent more than 8 per cent together. Portugal is also implementing an innovative pilot project of electricity production from offshore wind energy with an installed capacity of around 25 MW.

64. The massive deployment of RES is supported primarily through PNAER 2020. PNAER 2020 foresees the reduction of 18 per cent of the total installed capacity of fossil fuelled power plants, and the target for production of electricity from RES is higher in PNAER 2020 (59.6 per cent) compared with PNAER 2010 (55.0 per cent). The overall target for RES used in sectors other than electricity production (heat production and transport) was increased in PNAER 2020 (34.5 per cent) compared with PNAER 2010 (31.0 per cent), and this target is a part of the EU's target for 20 per cent renewables in the gross final energy consumption, shared by Portugal. Portugal estimates that it will have a total installed capacity of RES of 15,824 MW by 2020, with hydropower and wind power as the main contributors (56.5 and 33.5 per cent, respectively). In 2012, Portugal fulfilled 79 per cent of its goal on the share of final energy consumption for 2020 because of the favourable trend in the consumption of RES. However, the trend stagnated in 2009–2012 owing to the economic preference of other sources of energy. In order to meet its target, Portugal would have to increase its current RES share by 3 per cent per year on average. On the other hand, RES support measures, such as a feed-in tariff (subsidy on renewables), are

supposed to take into account the maturity of expansion of renewables, reflecting the relative costs of each technology.

65. **Energy efficiency.** The updated PNAEE 2016 was approved by cabinet ministers in 2013. It provides continuity to the majority of measures established in PNAEE 2008, as reported in the NC5. The objectives of PNAEE 2016 are: to reach final energy savings of 1,501 ktoe by 2016, corresponding to a reduction of energy consumption of 8.2 per cent compared with the average of 2001–2005; and to reach primary energy savings by 2020 representing a 25 per cent reduction in primary energy consumption compared with the base year (2007) of the PRIMES model of the European Commission. PNAEE 2016 provides a set of PaMs for the following areas: transport, residential and services, industry, government, people’s behavioural change, and agriculture. The estimated contributions to energy savings are: residential and commercial sectors, 42 per cent; industry, 25 per cent; transport, 23 per cent; government, 7 per cent; and agriculture, 2 per cent. In addition, behavioural change will contribute 1 per cent towards savings. By 2010, 49 per cent of the target was achieved, being demand-side measures to reduce electricity consumption one of the PaMs that contributed most to this achievement. The ERT noted that while Portugal revised PNAEE 2016 in 2013, the NC6 reports the same set of measures as in the NC5 without indicating the impact of the revision to individual measures and their indicators. The ERT encourages Portugal to report detailed information on the updated PNAEE in its next NC in addition to the sector-wise targets and current achievements, as well as relevant analyses of whether and how PNAEE can ensure the meeting of targets.

66. **Residential and commercial sectors.** Portugal has experienced a steady decline in the construction sector since 2002 (about 63 per cent for 2002–2011); the number of completed buildings dropped by 57 per cent in 2011. In 2011, residential and commercial sectors used 17.0 and 11.5 per cent, respectively, of final energy consumption. Since 1990, the emissions from residential and commercial sectors increased until 2005 (3.6 per cent per year) and decreased after that to reach almost the same level as 1990 in 2011 (a marginal increase of 0.8 per cent or 7.2 per cent per year decrease for 2005–2011). In 1990–2005, emissions increased by 3.6 per cent per year, while in 2005–2011, they decreased by 7.2 per cent per year. The key drivers explaining the reduction in emissions since 2005 are, among others: the ‘cruise speed’ use of natural gas; the unprecedented deployment of renewable energy; and the current economic crisis (especially in the period 2009–2012). The key PaMs implemented in these sectors are: a tax on using oil for heating; Home and Office Renewal (improving energy efficiency in lighting, windows, insulation, and ‘green heat’ (‘green heat’ promotes the installation of more efficient energy systems in buildings and better environmental performance)); Energy Efficiency System in Buildings (EE Certification); and Thermal Solar Energy.

67. As mentioned in paragraph 65 above, the residential and commercial sectors are expected to greatly contribute to the reduction of emissions in accordance with PNAEE 2016. ECO.AP has been implemented in government offices since 2011 with the target of reducing overall energy consumption by 30 per cent in 2020. While the NC6 provides some estimates of emission reductions from the implementation of several PaMs, these are not specified in the projections chapter and it is unclear which PaMs were taken into consideration in the construction of different scenarios. According to the ‘with measures’ scenario (for more information see para. 96 below), Portugal expects to reduce emissions from these sectors by 6.7 per cent in the period 2011–2020, followed by increasing emissions from these sectors by 5.6 per cent in 2020–2030 (according to the ‘with measures’ high scenario). The ERT encourages Portugal to clarify the relationship between the PNAEE estimation of emission reductions of each measure and of the overall impact and the ‘with measures’ projections in its next NC.

68. **Transport sector.** Transport is the sector in Portugal in which emissions are growing most rapidly (70.2 per cent increase in emissions between 1990 and 2011). The sector showed a rapid increasing trend until 2005 and a declining trend afterwards: 4.5 per cent per year for 1990–2005 and –2.0 per cent per year for 2005–2011. Transport is also the largest sector in final energy consumption in the country (36.4 per cent in 2011) owing to an increase in the driving demand of passenger cars. One of the reasons the energy demand peaked in 2005 was the saturation of the number of passenger cars and the number of kilometres travelled per vehicle. Since 2006, Portugal has introduced a wider use of biofuels, liquefied petroleum gas and compressed natural gas in road transportation. By 2020, the share of renewable energy in transport should reach 10 per cent according to PNAER 2020.

69. There are several strategic documents and PaMs targeting the transport sector, including those for which GHG emissions reduction is not the primary objective: the Strategic Transport Plan, Sustainable Mobility, Horizon 2011–2015, Major Planning Options from 2012 to 2015, Eco-car, Urban Mobility and Efficiency in the Transport System, the Electric Mobility Programme in Portugal, PNAEE and PNAER. During the review, Portugal informed the ERT that plans for development of the railway sector are envisaged in the near future, which would also contribute to the decrease in transport emissions. Portugal also informed the ERT that some of the mitigation measures for transport emissions, such as the extension of the metro lines and the introduction of electric cars, were temporarily suspended due to lack of funding; however, the NC6 does not provide details on these changes. The ERT encourages Portugal to provide such or similar information in its next NC.

70. **Industrial sector.** In 2011, the industrial sector accounted for 32.0 per cent of the demand of final energy consumption in Portugal. Emissions from manufacturing industries and construction decreased by 13.1 per cent in 2011 since 1990, while showing a gradual increasing trend until 2005 and a declining trend afterwards: 0.5 per cent per year for 1990–2005 and –3.6 per cent per year for 2005–2011. Industrial processes (oil refineries, steel works and the production of iron, aluminium, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids and bulk organic chemicals) are partly included in the EU ETS (under the EU ETS classification, emissions from fuel combustion and emissions from industrial processes are included together). The EU ETS in Portugal currently includes 21 installations, most of which are in the ceramic production subsector. PNAEE also covers this sector and defines the ‘energy efficiency system in the industry’ as a measure, which includes the revision of the Management System of Intensive Energy Consumption in Industries, which is expected to contribute 25 per cent to the total mitigation effect by PNAEE 2016.

4. Policies and measures in other sectors

71. Emissions from non-energy sectors represented 30.5 per cent of the total GHG emissions of Portugal in 2011. Between 1990 and 2011, GHG emissions from the industrial processes (including solvent and other product use), the agriculture and the waste sectors increased by 10.7 per cent (2,059 kt CO₂ eq), mainly owing to an increase in waste sector emissions (38.1 per cent) resulting from higher amounts of waste landfilled in this period. The increase in emissions in the industrial processes sector was almost compensated for by the decrease in emissions in the agriculture sector (8.0 per cent).

72. **Industrial processes.** The trend seen in the industrial processes sector through 1990–2011 is similar to the trend in the energy sector, peaking in 2005 and decreasing afterwards, with an overall increase of 8.5 per cent in this period. The key drivers of the rise in emissions in the industrial processes sector are increases in production of mineral products (cement, lime and glass production), the consumption of HFCs and SF₆ (in refrigeration and

air-conditioning equipment) and the chemical industry (nitric acid production). The ERT noted that the ‘with measures’ projection shows a significant increasing trend of emissions (in particular for dominant HFCs) until 2020 (66 per cent increase for 2011–2020), while a noticeable declining trend (78 per cent) is expected for 2020–2030. The ERT also noted that the NC6 does not include information on PaMs targeting F-gases nor does it explain whether these policies exist or are planned to be implemented in the future. However, as indicated in paragraph 70 above, emissions from industrial processes are partly included under the EU ETS, which addresses their reduction.

73. **Agriculture.** Between 1990 and 2011, GHG emissions from the agriculture sector decreased by 8.0 per cent, mainly owing to changes in the use of agricultural land from cropland to pastures and grassland. In addition to the energy efficiency measures (Energy Efficiency in the Agrarian Sector) defined in PNAEE 2016, there are several sector-specific PaMs: the directive on integrated pollution prevention and control (2008/1/EC⁸), the directive on nitrates (91/676/EEC), the evaluation and promotion of carbon sequestration in agricultural soil, treatment of and energy recovery from livestock waste and, principally, the European Union Common Agricultural Policy (EU CAP) rural development programme 2014–2020, according to which 30 per cent of the support under EU CAP must be devoted to the environment and climate.

74. **LULUCF.** The LULUCF sector was a net source of 8,496.2 kt CO₂ eq in Portugal in 1990. Since 2006, it became a net sink, reaching a net removal of 5,319.8 kt CO₂ eq in 2011. Net GHG emissions decreased by 162.6 per cent since 1990. The trend was mainly driven by an increase in removals in forest land and in other land and reductions in emissions in cropland and grassland. Other drivers of this change have been changes in land-use patterns over time; the introduction of policies for increasing afforestation; improvement in the system for the prevention and combat of forest fires (introduced after the big fire seasons of 2003 and 2005); and the introduction of carbon sequestration incentives in agricultural and grassland soils.

75. The NC6 does not provide detailed information on PaMs in the forestry sector, apart from listing two measures in the PaMs table. During the review, Portugal gave an exhaustive presentation of its policies and strategies for the forestry sector. According to this information, the National Forest Strategy and the National Plan for Forest Fire Protection (PNDFCI) were approved in 2006, together with the 21 PROFs. The regional forest management plans provide the basic planning instrument for forest development, which is based on afforestation and, in general, on forest management activities, taking into account the multifunctional role of Portugal’s forests and in accordance with the National Forest Strategy.

76. The NC6 provides information on specific measures for LULUCF or the forestry sector in the summary table of all PaMs without providing a detailed description of the character of the PaMs. The table expects significant emission reductions, comparable with the total aggregated effects of the energy sector (around 4,500 kt CO₂ eq in 2010). During the review, Portugal provided the ERT with additional information and a good overview of PaMs for forestry and land-use management activities. The main driver of forest management in Portugal seems to be fire protection (PNDFCI 2006) along with the National Forest Strategy 2006. The ERT recommends that Portugal include this information in its next NC.

77. **Waste management.** Between 1990 and 2011, GHG emissions from the waste sector increased by 38.1 per cent (4.77 kt CO₂ eq), mainly owing to the increase in generation of

⁸ The integrated pollution prevention and control directive (2008/1/EC) replaced the directive 96/61/EC. Since 2010, the integrated pollution prevention and control directive has been fully incorporated into directive 2010/75/EC on industrial emissions.

landfilled municipal waste. In 2011, the share of emissions from the waste sector represented 11.8 per cent of total GHG emissions. The waste sector is the main contributor to Portugal's CH₄ emissions. PaMs focused on mitigating emissions from the waste sector are defined both in PNAEE and PNAER, and in sector-specific plans such as the National Waste Management Plan and the Strategic Plan for Municipal Solid Waste 2020.

5. Policies and measures related to implementation of commitments under the Kyoto Protocol

78. Portugal reported on its package of PaMs adopted, implemented and elaborated in achieving its commitment under the Kyoto Protocol. The ERT noted that, in general, PaMs elaborated and implemented for commitments under the Convention are also applicable for those required under Article 2 of the Kyoto Protocol.

79. As indicated in paragraphs 37 and 43 above, Portugal has implemented a database specific to compliance with the Kyoto Protocol, *CumprirQuioto.pt*, aimed at periodically checking the progress of each implemented measure. This database includes detailed information on each PaM such as a description of the PaM, its sector, focal points of individual institutions responsible for the implementation of specific PaMs, the overall target and annual target specifying the potential emission reductions, input data, the annual performance indicator, the deviation from the annual target and the impact of this deviation on the emission reduction potential. The ERT noted that this systematic checking process of the implementation of PaMs is an innovative tool. The ERT encourages Portugal to include information on *CumprirQuioto.pt* and describe lessons learned from how the scheme has contributed to the continuous improvement of performance in its next NC.

80. The NC6 does not include a description of national legislative arrangements and administrative procedures that seek to ensure that the implementation of activities under Article 3, paragraph 3, and elected activities under Article 3, paragraph 4, of the Kyoto Protocol also contribute to the conservation of biodiversity and the sustainable use of natural resources (see para. 39 above). During the review, Portugal provided this information to the ERT. According to this information, the development of the forestry sector is an integral component of sustainable development and forests contribute to the mitigation of climate change, as expressed in the Forest Policy Act (law 33/96) and in the Sustainable Development Plan for Portuguese Forests (Council of Ministers resolution 27/99). Furthermore, the National Forest Strategy (Council of Ministers resolution 144/2006) took into consideration the need to adapt forests to the possible impacts of climate change scenarios, such as the increasing risk of forest fires or of pests and diseases. The ERT recommends that Portugal include this information in its next NC.

81. The NC6 includes information on how Portugal promotes and implements the International Civil Aviation Organization and IMO decisions to limit emissions from aviation and marine bunker fuels. In addition, the NC6 provides information on the inclusion of international aviation in the EU ETS as a measure to contribute to the decrease in emissions from international bunker fuels. The IPTM of Portugal has been directly involved in work with the IMO through meetings of the Marine Environment Protection Committee on air pollution, GHG emissions and energy efficiency. Portugal has also ratified Annex VI of MARPOL, through the approving decree-law 1/2008, which sets among other things limits on sulphur oxide and nitrogen oxide emissions from ship exhausts and prohibits deliberate emissions of ozone-depleting substances. It also introduces mandatory technical and operational energy efficiency measures, which should reduce significantly the amount of GHG emissions from ships.

82. In its NC6, 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. Further information on how Portugal strives to implement its commitments under Article 3, paragraph 1, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, as reported in the 2013 annual submission, is presented in chapter III.B below.

83. The NC6 underlines the strong commitment of Portugal to implement its commitments under the Convention and its Kyoto Protocol through supporting adaptation in developing countries, mainly least developed countries, with a focus on the Community of Portuguese-speaking Countries (CPLP); namely, Angola, Cabo Verde, Guinea-Bissau, Mozambique, and Sao Tome and Principe, as well as other countries such as Cuba and El Salvador. Portugal also supports the governments and NGOs of these countries in integrating adaptation with development programmes. However, the NC6 provides limited information on these activities, making the report not sufficiently transparent in relation to how Portugal strives to implement PaMs in such a way as to minimize adverse effects. The ERT noted that the NIR of the 2013 annual submission does include mostly transparent information on these issues, and assessed the NC6 together with the NIR of the 2013 annual submission. Therefore, the ERT recommends that Portugal include such information in its next NC.

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

84. Portugal undertook a modelling exercise of emission projections with two scenarios (high and low) up to 2050 under the RNBC finalized in 2012. This exercise was intended to help understand the strategic landscape until 2050 and it is different from the ‘with measures’ scenario developed under the PNAC. PNAC 2020, currently under development, includes updated projections up to 2030. Although this work will be finalized in the second quarter of 2014, the NC6 provides the preliminary result of its ‘with measures’ scenario projections starting from 2011, in accordance with the latest GHG inventory data available at the time of preparation of the NC6. During the review, Portugal provided the latest version of the ‘with measures’ projections with high and low scenarios for 2020–2030. The high scenario, with a GDP growth rate assumption of 3 per cent per year, was almost identical to the ‘with measures’ scenario provided in the NC6, while the low scenario assumes a lower GDP growth rate of 1 per cent per year for 2020–2030. The quantified analysis given in this report is based on these latest projections.

1. Projections overview, methodology and key assumptions

85. The GHG emission projections provided by Portugal in the NC6 include a ‘with measures’ and a ‘without measures’ scenario until 2030, presented in absolute values of CO₂ eq. During the review, Portugal provided the ERT with updated information on the two ‘with measures’ projections, which consist of a high scenario and a low scenario for the period 2020–2030, while the projections before this period are presented in a single ‘with measures’ scenario. Projections are presented on a model-specific sectoral basis and on a gas-by-gas basis for the following GHGs: CO₂, CH₄, N₂O, HFCs and SF₆. Projections are also provided in an aggregated format for each sector as well as for a national total, using global warming potential values. Emission projections related to fuel sold to ships and aircraft engaged in international transport were not included in the totals.

86. The ERT noted some lack of transparency in the information reported in the NC6 caused by missing definitions and explanations of scenarios as well as inconsistencies and mistakes in and between the tables and figures (e.g. figure 4.3 and table 4.5), although the

NC6 covers most of the information required by the UNFCCC reporting guidelines on NCs. During the review, Portugal provided explanations, definitions and corrections to identified inconsistencies and mistakes. The ERT recommends that Portugal maintain consistency between the ‘with measures’ and ‘without measures’ scenarios, in particular with some specific assumptions updated in the ‘with measures’ scenario, and provide precise explanations and definitions of scenarios in its next NC in order to increase the transparency of reporting.

87. The NC6 does not include information on an analysis or assessment of the implications related to future trends and drivers of the scenarios provided. Such analysis and assessment are important to help understand the drivers of the projections. For example, comparison with past performance indicators/intensities (especially those for 2005–2011) and potential analyses of the emission reduction options can show the plausibility of the scenarios. The ERT encourages Portugal to undertake analysis and assessment of the implications of scenarios in its next NC and to report thereon. The ERT also encourages Portugal to include the ‘with additional measures’ scenario projections in its next NC as they are useful when assessing the effects of the PaMs not yet introduced.

88. The ‘without measures’ scenario in the NC6 (called the ‘sectoral business as usual’ (BAU) scenario) is defined as the scenario with fixed sectoral energy intensities (i.e. the ratio of energy demand for each sector by fuel to production or output of the sector (e.g. energy demand, passenger-km, t-km or industrial production) will remain constant until the end of the time frame). The ERT identified some mistakes and inconsistencies (e.g. the values of non-carbon dioxide GHGs in table 4.5 of the NC6) and encourages Portugal to enhance its quality control procedures to avoid such mistakes in the future. In contrast, the ‘with measures’ scenario incorporates energy and EU emission allowance prices as well as policy assumptions for energy use. Both ‘with measures’ and ‘without measures’ scenarios use common key assumptions, for example, GDP and population growth, as well as energy prices as reported in the NC6.

89. The partial-equilibrium MARKAL-type TIMES_PT model is used by Portugal in developing energy-related CO₂ emission projections. This model is a technological model of linear optimization in terms of cost-effectiveness. It requires exogenous chronological inputs such as the demand for energy services and detailed datasets of technologies from the International Energy Agency (IEA). The outputs are given as the optimal combination of energy supply and demand technologies. For the TIMES_PT model, technological options result from its cost-effectiveness character, which represents a simplified reality without fully including aspects of consumer behaviour, such as the resistance to change due to imperfect information, or subjective preferences. To minimize this aspect, Portugal’s modelling team has introduced inertia factors to capture the behaviour of economic agents. Other spreadsheet-based simplified methods are used for the non-energy sectors (industrial processes, LULUCF and waste) emissions. The methodologies used are identical to those described in the NC5.

90. Key assumptions of the model exercises are set for GDP growth: –1.0 per cent per year, 1.8 per cent per year, 3.0 per cent per year, 3.0 per cent per year for every five-year period starting from 2010: 2015, 2020, 2025 and 2030 for the high scenario; and 1.0 per cent per year for 2020–2030 for the low scenario. International energy prices of coal, oil and natural gas are those specified in the *Energy Technology Perspectives 2012* of the IEA. These assumptions have been updated since the NC5 and seem reasonable. Although sensitivity analyses for hydropower production and fuel prices were given in the NC5, the NC6 does not provide such analyses. While high and low scenario analysis may be considered a sensitivity analysis, the ERT encourages Portugal to provide other sensitivity analyses by changing influential parameters and their implications in its next NC.

2. Results of projections

91. To assess the progress made by Portugal to meet its target for the first commitment period of the Kyoto Protocol, 2008–2012, projections are no longer relevant as historical data (GHG inventory up to 2012) covering this period is now available. Based on this data, Portugal is expected to meet its target (27 per cent increase in relation to the base year level). During the review, Portugal presented the following information for this five-year period: total GHG emissions were 361,590 kt CO₂ eq, while Portugal's assigned amount for this period is 381,940 kt CO₂ eq. In addition, certified emission reductions and assigned amount units (AAUs) accrued by Portugal (6,800 kt CO₂ eq) and removal units (RMUs) resulting from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol (50,350 kt CO₂ eq) are additional to domestic efforts. However, an amount of unused EU emission allowances owned by Portugal's private companies (26,510 kt CO₂ eq) should be subtracted from this amount. Therefore, Portugal is expected to hold an excess of Kyoto Protocol units (50,990 kt CO₂ eq) equivalent to 13.35 per cent of its assigned amount. As this number is positive, Portugal is expected to comply with its Kyoto Protocol target for the first commitment period.

92. For the second commitment period of the Kyoto Protocol, 2013–2020, Portugal committed to reduce its GHG emissions by 20 per cent below the base year level; however, there is an understanding that the EU and its member States will fulfil jointly the EU commitment to reduce its GHG emissions by 20 per cent below the base year level in accordance with Article 4 of the Kyoto Protocol, for the second commitment period of the Kyoto Protocol. The EU declared that it would not to use its surplus AAUs carried over from the first commitment period to meet this target.

93. Under the Convention, the EU has a 'single year' target to achieve at least the 20 per cent reduction of GHG emissions below the base year level in 2020 (equivalent to a 14 per cent reduction below 2005) excluding the LULUCF sector and limiting the use of eligible Kyoto Protocol units. This economy-wide target is divided into two parts: a 21 per cent reduction of emissions for EU ETS covered sectors and a 10 per cent reduction for non-EU ETS covered sectors in 2020 compared with the 2005 level. No country-specific target for the member States is set for the EU ETS covered sectors. For non-EU ETS covered sectors as a whole, Portugal's effort-sharing target is 1 per cent above the 2005 level. The economy-wide target includes linear trajectories (targets) for each year up to 2020, starting in 2009.

94. The relevant decisions related to the EU reduction commitment are the EU ETS directive (2003/87/EC and respective amendments) and the EU ESD (406/2009/EC). The ERT noted that CO₂ emissions from aviation are covered under the EU ETS for all flights falling within the aviation activities listed in annex I to the EU ETS directive, which are those that depart from an aerodrome situated in the territory of a member State and those that arrive in such an aerodrome from a third country, excluding small commercial emitters for 2010–2011. This means that the emission sources covered were wider than those under the Kyoto Protocol. However, the directive was recently amended through regulation 421/2014 limiting the coverage to flights within the European Economic Area countries from 2012 onwards.

95. Each member State of the EU has a responsibility to meet its effort-sharing target for non-EU ETS covered sectors, while emission sources in the EU ETS covered sectors are bound by the above-mentioned EU directive for compliance. Portugal has been introducing several measures that contribute to CO₂ emission reductions in the EU ETS sectors, such as those to promote renewable power generation (under PNAER 2010) and energy efficiency measures for energy-intensive industries (under PNAEE 2016).

96. The ‘with measures’ scenario shows that total GHG emissions for Portugal would be 0.8 per cent below 1990 level in 2020, and 31.5 per cent below the 2005 level in 2020. During the review, Portugal provided the ERT with a breakdown of projection figures in addition to the historical emissions of 2005 and 2008–2012. These show that the EU ETS covered sectors will be 41 per cent below the 2005 level and the non-EU ETS covered sectors will be 24 per cent below the 2005 level in 2020. Therefore, Portugal is expected to meet the target of non-EU ETS covered sectors. The contribution of emissions in the EU ETS covered sectors to Portugal’s total GHG emissions is expected to decline over time: 42 per cent (2005), 37 per cent (2008–2012), 36 per cent (2020), and 34 per cent (high scenario) or 32 per cent (low scenario) (2030), probably because of more stringent regulation in the EU ETS covered sectors.

97. As shown in the figure below, Portugal projects to continue reducing its total GHG emissions following the historical trend of the years since 2005: –14 per cent for 2011–2020, and –23 per cent (high scenario) or –32 per cent (low scenario) for 2011–2030. Corresponding to these figures, average annual change rates are –0.9 per cent (2011–2015), –2.2 per cent (2015–2020), and –1.1 per cent (high scenario) or –2.4 per cent (low scenario) (2020–2030), while the historical performance for 2005–2011 was –3.8 per cent per year. This means that the decreasing trend will continue, but its rate of change will be more modest than the rapid change observed for 2005–2011.

98. The results of the projections show that the strong historical tendency of reduction in GHG emissions intensity per GDP (4 per cent per year) and CO₂ emissions intensity per GDP (5 per cent per year) for 2005–2011 will lose momentum in 2011–2015, as almost the same annual change rates are observed for GDP, CO₂ emissions and GHG emissions intensities. The strong tendency of the GHG and CO₂ emissions intensity against GDP (a gap between GDP growth and GHG emissions growth) will recover in 2015–2025 (decrease of 4–5 per cent per year). For 2020–2030, the high scenario projects around a 4 per cent per year reduction of GHG and CO₂ emissions intensity, while the low scenario projects a much higher reduction (5.4–6 per cent per year). CO₂ emissions from the energy sector show a stronger declining trend than total GHG emissions in general; that is, the share of CO₂ emissions in total GHG emissions is decreasing from 79 per cent in 2005 to 72 per cent in 2020. Also, it is noted that HFCs (mainly HFC-134a) are expected to grow by 66 per cent in 2020 from the 2011 level, and reach a share of 4 per cent of total GHG emissions in 2020. The ERT noted that the analysis and implications of the results of the projections, including these trends, are not provided in the NC6. The ERT encourages Portugal to undertake and to report on this analysis and assessment of the implications of the results of the projections in its next NC.

99. In the results of projections by sector, the ERT noted significant changes in the trend of emissions for the energy industries sector, the CO₂ emissions share of which was 34 per cent of the total energy-related CO₂ emissions of Portugal in 2011. Compared with the 2011 level, CO₂ emissions of the sector were 55 per cent higher in 2005, and are expected to be 25 per cent lower in 2020, and 50 and 62 per cent lower in 2030 for the high and low scenarios, respectively. This trend is mainly driven by expansion of RES. As already mentioned, the second largest contribution to total CO₂ emissions comes from the transport sector, with its strong decreasing trend: compared with the 2011 level, its CO₂ emissions were 13 per cent higher in 2005, and are expected to be 16 per cent lower in 2020, and 18 and 29 per cent lower in 2030 for the high and low scenarios, respectively. The manufacturing industries and construction sector shows a similar decreasing trend: compared with the 2011 level, its CO₂ emissions were 25 per cent higher in 2005, and are expected to be 19 per cent lower in 2020, and 21 and 33 per cent lower in 2030 for the high and low scenarios, respectively. Other non-energy-intensive sectors, such as commercial and residential sectors and fugitive emissions from the oil/gas sector, do not show a decreasing trend, except for fugitive emissions after 2020 (31 and 21 per cent lower in 2030

for the high and low scenarios, respectively). The driver analyses as well as the key indicators are not provided by Portugal, making it difficult for the ERT to assess the reasonableness of the underlying future scenarios of the projections.

100. In summary, in its projections Portugal expects the strong decreasing trend of CO₂ emissions from 2005 onwards to continue despite its high GDP growth assumptions (3 per cent per year for 2020–2030 in the high scenario), although a temporary stable state until 2015 is expected, mainly owing to the energy industries sector (an EU ETS covered sector) followed by the transport sector (a non-EU ETS covered sector). If the assumptions hold true and this trend continues as projected, Portugal will easily meet its target for 2020.

101. In order to keep the projected declining trend for around 20 more years, Portugal may require some structural changes in declining components in order to bypass several potential limitations (e.g. economic growth, population, demand for energy services, ability of the government and markets to influence the country's development). It is unclear to the ERT if or how the model used in the projections is fit for this purpose. Therefore, the ERT encourages Portugal to assess the simulated results in detail in order to obtain a robust analysis of the model's feasibility and the political implications of strengthening the PaMs, as well as to undertake sensitivity analyses of influential factors in its next NC.

102. The projected GHG emission levels under different scenarios and information on the Kyoto Protocol targets and quantified economy-wide emission reduction target are presented in table 5 and the figure. below:

Table 5
Summary of greenhouse gas emission projections for Portugal

	<i>Greenhouse gas emissions (kt CO₂ eq per year)</i>	<i>Changes in relation to the base year^a level (%)</i>	<i>Changes in relation to the 1990 level (%)</i>
Kyoto Protocol base year ^b	60 147.62	0.0	-1.0
Kyoto Protocol target for the first commitment period (2008–2012)	76 387.51	27.0	25.7
Kyoto Protocol target for the second commitment period (2013–2020) ^c	Not available yet		
Quantified economy-wide emission reduction target under the Convention ^d	Not available yet		
Inventory data 1990 ^e	60 766.81	1.0	0.0
Inventory data 2012 ^e	68 751.89	14.3	13.1
Average annual emissions for 2008–2012 ^e	72 317.69	20.2	19.0
‘Without measures’ projections for 2020 ^{f, g}	75 273	25.1	23.9
‘With measures’ projections for 2020 ^f	60 308	0.3	-0.8
‘Without measures’ projections for 2030 ^{f, g}	82 266	36.8	35.4
‘With measures’ (high) projections for 2030 ^f	54 096	-10.1	-11.0

	Greenhouse gas emissions (kt CO ₂ eq per year)	Changes in relation to the base year ^a level (%)	Changes in relation to the 1990 level (%)
‘With measures’ (low) projections for 2030 ^f	47 311	-21.3	-22.1

^a “Base year” in this column refers to the base year used for the targets under the Kyoto Protocol.

^b The Kyoto Protocol base year level of emissions is provided in the initial review report contained in document FCCC/IRR/2007/PRT.

^c The Kyoto Protocol target for the second commitment period (2013–2020) is a joint target for the European Union and its 28 member States and Iceland. The target is to reduce emissions by 20 per cent by 2020 compared with the base year (1990) level. The target for sectors not covered by the European Union Emissions Trading System is a 1 per cent increase in emissions compared with the 2005 level for Portugal under the European Union effort-sharing decision.

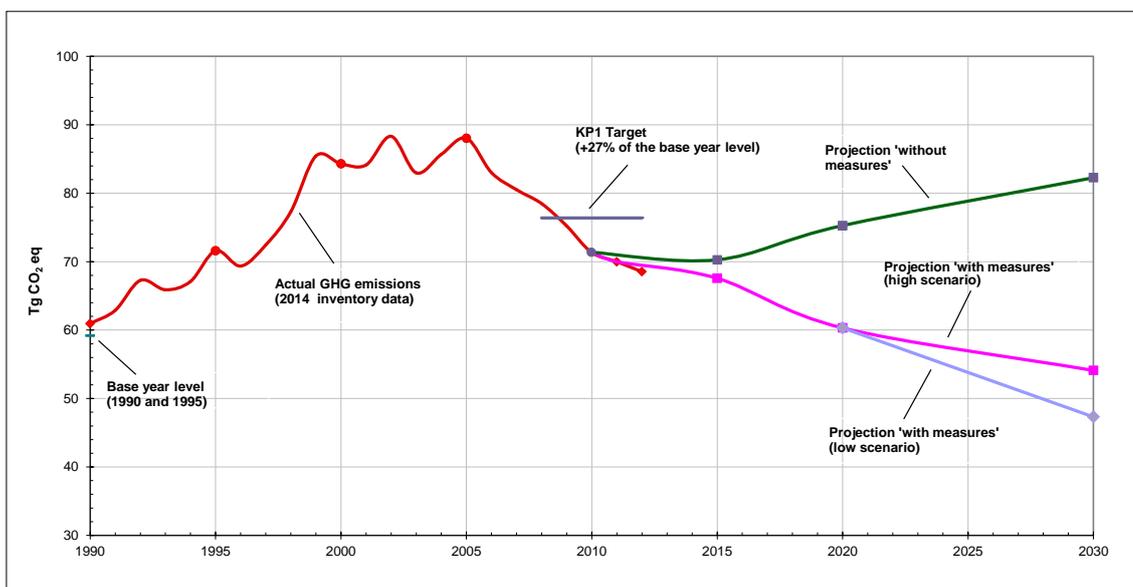
^d Quantified economy-wide emission reduction target under the Convention is a joint target for the European Union and its 28 member States. The target is to reduce emissions by 20 per cent by 2020 compared with the base year (1990) level.

^e Portugal’s 2014 greenhouse gas inventory submission; the emissions are without land use, land-use change and forestry.

^f Portugal’s sixth national communication and/or first biennial report, including updated information provided during the review on high and low scenarios for 2020–2030. Projections are for greenhouse gas emissions without land use, land-use change and forestry.

^g ‘Without measures’ projection values are reconstructed from the gap between the ‘without measures’ and ‘with measures’ projections provided in the sixth national communication and the updated ‘with measures’ (high) scenario projections in order to keep consistency between different versions of the projections.

Greenhouse gas emission projections



Sources: (1) Data for the years 1990–2012: Portugal’s 2014 greenhouse gas inventory submission; the emissions are without land use, land-use change and forestry; (2) Data for the years 2011–2030: Portugal’s sixth national communication and/or first biennial report, including updated information provided during the review on high and low scenarios for the ‘with measures’ projections for 2020–2030; the emissions are without land use, land-use change and forestry; (3) ‘Without measures’ projection values are reconstructed from the gap between the ‘without measures’ and ‘with measures’ projections provided in the sixth national communication and the updated ‘with measures’ (high) scenario projections in order to keep consistency between different versions of the projections.

Note: Portugal, as a member State of the European Union, does not have a specific economy-wide target under the Convention, as the European Union and its 28 member States have a joint target. Similarly, Portugal's target for the second commitment period of the Kyoto Protocol is also a joint European Union target.

Abbreviations: GHG = greenhouse gas, KP1 = first commitment period of the Kyoto Protocol.

3. Total effect of policies and measures

103. In the NC6, Portugal presents the estimated and expected total effect of implemented and adopted PaMs as the gap between the 'without measures' and 'with measures' projections. Here, the 'without measures' scenario is defined as the scenario in which the energy intensities per production for all sectors are fixed at 2010 values. Therefore, the total effect was not calculated as the sum of each individual policy or measure's effect. Information is presented in terms of GHG emissions avoided or sequestered, by gas (on a CO₂ eq basis), as the absolute emission value every five years from 2010 to 2030. The ERT received revised projected values for the agriculture and waste sectors during the review. However, this revised scenario is not fully comparable with the 'with measures' scenario reported in the NC6 or the scenario provided by Portugal during the review. Therefore, the ERT reconstructed the 'without measures' scenario as the latest 'with measures' scenario provided by Portugal plus the gap between the 'without measures' and 'with measures' scenarios reported in the NC6. The ERT encourages Portugal to provide a consistent and comparable treatment of scenarios and projections with clear definitions in its next NC.

104. Portugal reported that the total estimated effect of adopted and implemented PaMs is 14,965 kt CO₂ eq in 2020 (see table 6 below; totals are recalculated by the ERT). According to the information reported in the NC6, PaMs implemented (defined as the gap between the 'with measures' and 'without measures' projections) in the public electricity and heat production sector (by far the dominant sector in the country) will deliver the largest emission reductions – around 40 per cent of the total effect. Although the NC6 does not provide any assessment or relevant information on key indicators, such as electricity generated and its energy source mix, the ERT understands that this significant contribution to the total effect comes from the expansion of the use of RES in power generation. The second largest contribution to emission reductions comes from the transport sector (around 23 per cent of the total effect). The ERT noted that the contributions of the agriculture/forestry/fisheries and waste management sectors are expected to grow rapidly, from 15 per cent of the total in 2020 to 27 per cent in 2030.

105. The ERT noted that a significant decline in the contribution of the manufacturing industries and construction sector and the industrial process sector to the total effect is expected, from 7.5 per cent in 2020 to 0.9 per cent in 2030, despite the strengthening of targets for energy intensive installations by the EU ETS. Because the 'without measures' scenario is defined as the fixed energy intensity scenario, the declining effect in these sectors implies that the energy intensity in the 'with measures' scenario would be worse and/or production in the sector would shrink. The most effective PaMs and drivers behind GHG emission reductions are described in chapter II.B above. Table 6 provides an overview of the total effect of PaMs as reported by Portugal.

Table 6
Projected effects of planned, implemented and adopted policies and measures in 2020 and 2030

Sector	Effect of implemented and adopted measures (kt CO ₂ eq)	Relative value (% of 1990 emissions)	Effect of planned measures (kt CO ₂ eq)	Relative value (% of 1990 emissions)	Effect of implemented and adopted measures (kt CO ₂ eq)	Relative value (% of 1990 emissions)	Effect of planned measures (kt CO ₂ eq)	Relative value (% of 1990 emissions)
	2020				2030			
Energy (without transport)	9 312	15.3	NA	NA	14 374	23.6	NA	NA
Transport	3 415	5.6	NA	NA	6 330	10.4	NA	NA
Industrial processes	NA	NA	NA	NA	NA	NA	NA	NA
Agriculture	1 087	1.8	NA	NA	4 204	6.9	NA	NA
Land-use change and forestry	NA	NA	NA	NA	NA	NA	NA	NA
Waste management	1 151	1.9	NA	NA	3 262	5.4	NA	NA
Total	14 965	24.6	NA	NA	28 170	46.2	NA	NA

Source: Portugal’s sixth national communication.

Note: The total effect of implemented and adopted policies and measures is defined as the difference between the ‘without measures’ and ‘with measures’ scenarios (high scenario for 2030) starting from 2010; the total effect of planned policies and measures is not available in the sixth national communication.

Abbreviation: NA = not available.

106. The NC6 includes most of the information required by the UNFCCC reporting guidelines on NCs; however, the ERT noted the lack of the ‘with additional measures’ scenario as well as an explanation, analysis and assessment of the projected results. In addition, the NC6 does not present relevant information on factors and activities for each sector for the years 1990 to 2030. The ERT emphasizes that reporting projected values only does not constitute transparent and complete information. Therefore, the ERT recommends that Portugal provide information on factors and activities for each sector that corresponds to the requirement of the UNFCCC reporting guidelines on NCs. The ERT encourages Portugal to report the analyses indicated above – that is, information on how to read the results of the scenarios and what kind of implications can be found from the simulated results as well as information on how the results are reflected in the latest policymaking process – to improve the transparency of the reporting in its next NC. Because the ‘without measures’ scenario is the fixed energy intensity scenario by sector, such intensity-based analyses are recommended to factorize the trends including historical emissions.

107. The ERT encourages Portugal to further assess the ‘with additional measures’ scenario, which can be integrated into the policymaking process in the future. The ERT notes that the new ‘with measures’ high and low scenarios exercise for 2020–2030 may include several implications most likely beyond a sensitivity analysis, which it is also encouraged to undertake and provide in the next NC. Since Portugal is an EU member State, it is encouraged to undertake categorized analyses of EU ETS and non-EU ETS covered sectors. It is also encouraged to integrate a related study for the LULUCF sector in the projection exercise, because the measures in this sector can have a major contribution as indicated in the PaMs section of the NC6. The ERT also encourages Portugal to make all reported projections in its next NC consistent.

4. Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol

108. Portugal in its NC6 provided relevant information implicitly on how its use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action, although it did not elaborate on supplementarity as such. The ERT recommends that Portugal include such information explicitly in its next NC to improve completeness, as well as to enhance transparency.

109. During the review, Portugal informed the ERT that the information on the use of units from Kyoto Protocol mechanisms reported in the NC5⁹ is still valid. This information clearly demonstrates that the use of mechanisms is supplemental to the implementation of PaMs, even though Portugal has not clarified exactly how many credits from the clean development mechanism/joint implementation would be used, because the 2012 GHG inventory information was not ready and included in the NC6 and the true-up period of the first commitment period has not yet started. In addition, it should be noted that total effects of PaMs and the effect of the economic crisis made conservative the estimate of emission reductions in the PNAC (see para. 84 above).

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

1. Financial resources, including ‘new and additional’ resources and resources under Article 11 of the Kyoto Protocol

110. In its NC6, Portugal provided information on provision of support required under the Convention and its Kyoto Protocol.

111. The ERT noted that the information reported in the NC6 is not well structured and does not allow for ease of understanding of the flow of resources and how the components add to the total official development assistance (ODA). During the review, Portugal provided additional and detailed information and clarified the definitions used. Portugal informed the ERT that the approach to tracking the provision of financial support follows the provisions of the Creditor Reporting System of the Organisation for Economic Co-operation and Development (OECD). This system established markers to track the ‘Rio markers’, including the climate change related aid that is classified in accordance with the objective of the aid (mitigation or adaptation). The ERT recommends that Portugal increase the transparency of its reporting by providing more details of its climate change related financial support in its next NC.

112. In its NC6, Portugal provided details on measures taken to meet its commitments under Article 4, paragraphs 3, 4 and 5, of the Convention as required by the UNFCCC reporting guidelines on NCs and under Article 11 of the Kyoto Protocol, as required by the “Guidelines for the preparation of information required under Article 7 of the Kyoto Protocol”. Portugal has not reported what ‘new and additional’ financial resources it has provided pursuant to Article 4, paragraph 3, of the Convention and did not clarify how it has determined such resources as being ‘new and additional’. Nevertheless, it identified that the resources included in its fast climate change implementation (fast-start finance)

⁹ “... the estimated amount of Kyoto Protocol mechanisms foreseen to be used for compliance, amounting to at most 6.8 Mt. PNACs assessment of emissions reductions delivered from the overall PaMs is estimated at around 8.5 Mt. In addition, domestic projects financed by the Carbon Fund – which were created under the rationale of leveraging reductions nationally instead of only in other countries through the use of CDM and JI – delivered a reduction of around 2.3 Mt.”

initiative are considered to be additional. Fast-start finance is a programme agreed under the UNFCCC aiming to support developing countries on climate change measures – in particular with regard to strategies to reduce emissions, to increase resilience and adaptation to the impacts of climate change, and for capacity-building. Under this agreement, the EU agreed on a joint contribution. During the review, Portugal additionally informed the ERT that it has institutionalized the Portuguese Carbon Fund as a new source of funding for climate change cooperation with developing countries since 2010. The financial flows provided are additional to previous sources, meaning that Portugal has not redirected previously existing flows. The financial contribution of the Portuguese Carbon Fund counts towards ODA but is an independent source relying entirely on the Fund's autonomous income. The ERT recommends that Portugal clearly indicate what 'new and additional' financial resources it has provided pursuant to Article 4, paragraph 3, of the Convention and clarify how it has determined that such resources are 'new and additional' in its next NC.

113. Portugal has provided information on financial resources related to the implementation of the Convention provided through bilateral and multilateral channels, including the Global Environment Facility (GEF). However, Portugal has not reported detailed information on the assistance it has provided to developing country Parties that are particularly vulnerable to the adverse effects of climate change in meeting the costs of adaptation to those adverse effects. Portugal did highlight, however, that most of its partner countries are highly vulnerable. In fact, most of the recipient countries of Portugal's ODA are least developing countries, including Angola, Mozambique, Sao Tome and Principe, and Timor-Leste. The ERT recommends that Portugal report this information in its next NC.

114. Between 2007 and 2012, Portugal's ODA increased by 23.4 per cent, with a peak in 2011 and a decrease between 2011 and 2012 of 17.9 per cent, largely owing to the financial situation of the country. Bilateral ODA is the main channel of support and its share in the total ODA is increasing (57.4 per cent in 2007 and 68.4 per cent in 2012). Portugal reported that ODA for the environment has a limited significance when compared with the total value of bilateral ODA (5.2 per cent of bilateral ODA in 2012). In particular, the share of climate change related bilateral ODA amounted to 4.9 per cent in 2012. This is a function of the strategic priorities (education, health, security and justice) established by Portugal. The multilateral ODA intended to be used for climate change projects has been reduced since 2010 as Portugal has not formally established any commitment regarding a contribution to the fifth replenishment of the GEF. Portugal's ODA is mainly directed towards African countries using Portuguese as an official language (PALOPs) and Timor-Leste.

115. The vast majority of the climate change related support provided by Portugal is directed towards mitigation objectives (99.4 per cent in 2012). The programmes and projects of support are mainly related to the energy sector, in particular to promoting the use of RES, such as photovoltaic microgrid systems for electrification and biogas projects.

116. Despite the focus on mitigation to date, Portugal has reported that among the already approved future projects, the share of adaptation projects will rise to 14.8 per cent when the approved projects under fast-start finance are implemented. Portugal describes in the NC6 the actions it has been taking in line with the EU and the OECD initiatives to integrate adaptation to climate change with the development cooperation it provides. In response to questions raised by the ERT during the review, Portugal informed the ERT that it has recently begun implementing two projects together with Cabo Verde, Mozambique, and Sao Tome and Principe with a view to addressing adaptation and strengthening the capacity of these countries to tackle the impacts of climate change in accordance with their

national circumstances and specific needs. The ERT encourages Portugal to include information on the development of these projects in its next NC.

117. With regard to the most recent financial contributions to enhance the implementation of the Convention by developing countries, Portugal has committed itself to provide EUR 36 million under its fast-start finance. Under this provision, EUR 14.3 million has been allocated to approved projects and to December 2012 payments were made amounting to EUR 5.7 million. Table 7 summarizes information on financial resources.

Table 7
Summary of information on financial resources for 2009–2012
 (United States dollars)

<i>Allocation channel of public financial support</i>	<i>Years of disbursement</i>			
	2009	2010	2011	2012
Official development assistance	512 682 048	648 296 763	707 821 591	580 782 597
ODA contributions through multilateral channels, including:	235 389 222	252 214 570	230 659 066	183 502 571
Contributions through United Nations bodies	2 682 203	1 838 781	1 002 736	667 992
Climate-specific contributions through multilateral channels, including:	1 920 000	0	0	0
Contributions to the Global Environment Facility	1 920 000	0	0	0
ODA contributions through bilateral, regional and other channels	277 292 827	396 082 193	477 162 525	397 280 026
Climate-specific contributions through bilateral, regional and other channels, including:	339 476	49 979 028	21 635 862	18 643 581
Contributions to mitigation	339 476	49 863 983	21 371 481	18 529 060
Contributions to adaptation	0	115 045	264 381	114 521

Abbreviation: ODA = official development assistance.

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

118. Portugal has provided in its NC6 information on activities related to the transfer of technology. A detailed review of reported information is provided in chapter II.D.3 of the report of the technical review of the first biennial report (TRR/BR1).

119. Among the reported activities related to technology transfer, Portugal included two success stories (see paras. 43 and 44 of the TRR/BR1). During the review, Portugal provided additional information, elaborating on activities including financing access by developing countries to ‘hard’ and ‘soft’ environmentally sound technologies. Furthermore, Portugal has reported in textual format on the steps taken by its government to promote, facilitate and finance the transfer of technology, and to support the development and enhancement of endogenous capacities and technologies of developing countries. The focus of technology support has been in the energy sector and particularly on renewable energy.

E. Vulnerability assessment, climate change impacts and adaptation measures

120. In its NC6, Portugal has provided the required information on adaptation options, as well as on institutional and governmental arrangements, which are part of its ENAAC to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation. The ERT noted that Portugal did not provide in its NC6 the required information on the expected impacts of climate change in the country.

121. During the review, Portugal provided additional information, elaborating on impacts of climate change, which are included in table 8 below. The ERT recommends that Portugal include the provided mandatory information on the expected impacts of climate change in the country in its next NC and encourages Portugal to associate the trends of the main climate variables with the expected impacts in the different sectors.

122. Table 8 summarizes the information on vulnerability and adaptation to climate change presented in the NC6.

**Table 8
Summary of information on vulnerability and adaptation to climate change**

<i>Vulnerable area</i>	<i>Examples/comments/adaptation measures reported</i>
Agriculture and food security	<p><i>Vulnerability:</i> climate scenarios for Portugal point to increasingly unfavourable conditions for agricultural activity resulting from reduction in precipitation, increase in temperature, increase in the frequency and intensity of droughts and other extreme weather events (such as precipitation peaks) and increase in susceptibility to desertification. On the other hand, reduction in the number of freezing nights may have beneficial effects for winter crops.</p> <p><i>Adaptation:</i> the main measures for adaptation within the agriculture sector address issues such as: (1) increasing water availability and promoting sustainable irrigation practices; (2) improving soil fertility and preventing erosion; (3) guaranteeing the availability of gene pools adapted to new climatic conditions; (4) promoting risk management for extreme events and greater climate variability; and (5) preparing for threats of propagation from biotic agents harmful to crops and livestock.</p>
Biodiversity and natural ecosystems	<p><i>Vulnerability:</i> the natural ecosystems most vulnerable to climate change of Portugal are those in the coastal zones and inland wetlands. In general, species with narrower climatic niches are more sensitive to extreme weather events. Therefore, amphibians and reptiles are two groups of vertebrates that have great vulnerability.</p> <p><i>Adaptation:</i> actions on planned adaptation to climate change in this area aim at: (1) minimizing the direct and indirect losses of biodiversity of species and ecosystems; (2) maintaining ecosystem services; (3) affirming the role of biodiversity in adaptation to climate change in other sectors (e.g. agriculture); and (4) improving mechanisms that ensure the identification and timely response to changes in biodiversity due to climate change.</p>
Coastal zones	<p><i>Vulnerability:</i> climate change is a big concern in coastal areas of Portugal due to environmental, social and economic impacts. Sea level rise leads to an increase in erosion intensity and changes in the frequency and intensity of coastal flooding, particularly in areas with mild or mobile and low bedrock. Risk situations are also expected in areas with high human occupation, which include most coastal areas in mainland Portugal.</p> <p><i>Adaptation:</i> adaptation measures aim to reduce the impacts described above. A key aim is to increase resilience and reduce vulnerability in these zones. Proposed measures are based on three fundamental principles: consolidation and dissemination of knowledge, risk management, and strengthening the effectiveness</p>

<i>Vulnerable area</i>	<i>Examples/comments/adaptation measures reported</i>
Fisheries	<p>and coordination of institutions and instruments for risk management and coastal planning. Concrete measures identified are: (1) protection and risk management of people and property in coastal areas; (2) improving knowledge of coastal dynamics through the implementation of a coastal monitoring system and the characterization of vulnerability of aquifers to saline intrusion; (3) interventions to correct sediment supply based on assessments of cost-effectiveness; (4) reassessment of the need for ‘hard’ coastal defence interventions through the application of multicriteria models and cost–benefit analyses; and (5) the development of spatial estuary plans considering the relationship and dependence of the estuary with neighbouring areas to ensure sustainable use.</p> <p><i>Vulnerability:</i> a high level of uncertainty lies within this sector in Portugal. Understanding the effects of climate change on fisheries resources and finding cause–effect relations is extremely complex because weather phenomena act in conjunction, and their timing of occurrence may lead to quite opposite effects. At present, Portugal has little capability to forecast how environmental and climatic changes may affect recruitment, and limited knowledge of how species interact with one another in the ecosystem or in the fishery.</p> <p><i>Adaptation:</i> one key measure for this sector is knowledge improvement, mainly through the inclusion of environmental variables and population dynamics in fishery management models in order to better address the climate change issues facing fisheries.</p>
Forests	<p><i>Vulnerability:</i> as is the case with agriculture, forests will be severely affected by climate change due to reduction of precipitation, increase in temperature, increase in the frequency and intensity of droughts and other extreme weather events, and increase in susceptibility to desertification, plague and disease.</p> <p><i>Adaptation:</i> the critical issues to be addressed for the adaptation to climate change within forests are: (1) the increased risk of wildfires; (2) the increased exposure to harmful biotic agents that find better conditions for their development; and (3) the decreased productivity and reduction of the sequestration capacity. One way to promote the resilience of forests is through the integration of these critical issues within planning and management mechanisms.</p>
Human health	<p><i>Vulnerability:</i> the cross-cutting character of climate change is responsible for various indirect implications for human health: (1) the occurrence of extreme weather events may lead to interruption of services (e.g. water supply), loss of life, property and materials, and psychological disorders; (2) the increased frequency, intensity and duration of heatwaves will increase associated deaths, in particular in the most vulnerable members of the population; (3) the increased forest fires may have implications for cardiorespiratory disorders and diseases associated with air pollution; (4) climate change may lead to significant changes in the geographical and seasonal distribution of vector-borne diseases; (5) the increased temperature and increased frequency and intensity of heavy precipitation events will contribute to the increased risk of food-borne and waterborne diseases; and (6) the reduced water flow rates associated with higher temperatures may increase human exposure to cyanotoxins produced by cyanobacteria.</p> <p><i>Adaptation:</i> the expected impacts of climate change on the distribution and prevalence of diseases in Portugal will lead to the emergence of new demands on health systems. Concrete guidelines on how to cope with these climate change impacts were established in the Contingency Plan for Adverse Extreme Temperatures – Module Heat and in the National Surveillance Programme of Culicidae Vectors.</p>
Infrastructure and economy	<p><i>Vulnerability:</i> national vulnerabilities are related to the increase in precipitation intensity, heatwaves, drought severity, wind frequency and intensity, fire risk conditions and sea level rise as well as to the reduction in stream flow. Industrial and chemical poles are located on the coast or near large estuaries, and are more</p>

<i>Vulnerable area</i>	<i>Examples/comments/adaptation measures reported</i>
Water resources	<p>exposed to sea level rise and changing river flows.</p> <p><i>Adaptation:</i> appropriate regulatory measures should be evaluated to encourage adaptation and coordination among stakeholders. Larger companies have already undertaken some measures to reduce the impact of climate change, representing in some cases significant investments. However, actions should be undertaken for the adaptation to climate change by business and by society. Climate change should be integrated in the structure of internal emergency plans. The main adaptation measures identified are: (1) measures in tourism-related activities, including sustainable construction using adapted materials (for instance to heatwaves) and the rehabilitation of existing buildings as an alternative to investment in new buildings; (2) measures in ports, roads and railway infrastructure, mainly for reinforcement and protection against extreme events; (3) relocation of people in the case of high risk zones, investment in flow pumps and creation of green infrastructure; and (4) strengthening and protecting linear energy infrastructure against extreme events.</p> <p><i>Vulnerability:</i> Portugal is likely to experience an increase in seasonal and spatial asymmetries in the distribution of precipitation, a decrease in water availability in the south, an increase in the risk of flooding and drought, and water quality problems. Sea level rise may also affect groundwater levels and groundwater quality and availability. The impact of climate change on water resources will depend not only on changes in the availability of and demand for water, but also on the characteristics of the systems and how their management will progressively integrate new conditions, including the new climate framework. Climate change will have significant impacts on the temporal and spatial distribution of the availability of water resources, water quality and the risk of floods and droughts. To these direct impacts must be added the indirect effects resulting from changes in economic and social activities that may exacerbate pressures through an increase in water demand and in pollution load.</p> <p><i>Adaptation:</i> climate change should be considered in all phases of water planning and management and integrated in policies at national, regional, local and organizational levels. The main measures identified are: (1) increase the resilience of water storage infrastructure and distribution; (2) promote the use of non-conventional sources of water (including desalination) and recycling of wastewater and stormwater; (3) promote the control and reduction of water pollution (point and diffuse discharges); (4) identify flood risk areas and prepare flood risk management plans (EU floods directive); (5) promote investments for the prevention and management of droughts and floods; (6) improve monitoring, forecasting and warning systems; and (7) develop procedures with Spain for the integrated management of international river basins.</p>

123. The ERT acknowledges the vast list of national and international research projects from the CIRCLE-2 database of adaptation projects included in the NC6 of Portugal (table 5.2 in annex II-3).

124. The ERT noted that there is no information in the NC6 on the use of the Intergovernmental Panel on Climate Change (IPCC) *Technical Guidelines for Assessing Climate Change Impacts and Adaptations* and the United Nations Environment Programme *Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies*. The ERT encourages Portugal to report on whether it uses the above-mentioned guidelines and handbook in its next NC.

125. The NC6 presents a broad list of measures, classified by sector, focused to facilitate adequate adaptation to climate change. The list includes a mix of specific and very general measures. Portugal reported that it will continue working on the basis of this list to prioritize the measures to ensure greater impact. In order to increase transparency of

reporting, the ERT encourages Portugal to provide a clearer description of these measures, prioritize them in relation to the main vulnerabilities, and indicate for each measure the geographical area (mainland Portugal, the Azores or Madeira) whose vulnerabilities it is addressing.

126. The ERT noted that the section on vulnerability and adaptation of the NC6 does not include information on actions taken in cooperation with Parties not included in Annex I to the Convention (non-Annex I Parties) in preparing for the impacts of climate change, in order to implement Article 4, paragraph 1(e), of the Convention. Nonetheless, in the section on financial commitments, technology transfer and international cooperation, the NC6 reports cooperation with non-Annex I Parties (Cabo Verde, El Salvador, Guinea-Bissau and Mozambique) on adaptation, capacity-building and vulnerability assessment. Portugal also implemented some international training activities under the Portuguese cooperation with non-Annex I Parties. Notably, the cooperation on adaptation is significantly less than on mitigation. The ERT recommends that Portugal report information on cooperation with non-Annex I Parties in preparation for climate change impacts in its next NC, as required by Article 4, paragraph 1(e), of the Convention and the UNFCCC reporting guidelines on NCs.

F. Research and systematic observation

127. Portugal has provided in its NC6 information on its actions relating to research and systematic observation, and addressed both domestic and international activities, including the Global Climate Observing System (GCOS). Portugal presents this information, including the GCOS Surface Network, the GCOS Upper Air Network, Global Atmosphere Watch, and CLIMAT, in table 7.1 of its NC6 in adherence to the UNFCCC reporting guidelines on NCs. Regarding observation, Portugal provided information on actions relating to atmosphere, oceans, earth and space. The ERT notes that regarding oceanographic platforms, Portugal does not disaggregate information as proposed by the UNFCCC reporting guidelines on NCs on how many of the platforms are providing data to international centres and on how many were operating in 2012. The ERT encourages Portugal to report this information in its next NC.

128. The NC6 does not include information required by the UNFCCC reporting guidelines on NCs on activities under the World Climate Programme (WCP), the International Geosphere–Biosphere Programme (IGBP), and on Portugal’s participation in the IPCC. During the review, Portugal provided information on these activities that increased completeness of the data. The ERT encourages Portugal to provide information on its participation in the WCP, the IGBP and the IPCC in its next NC.

129. The ERT noted that Portugal’s NC6 contains less information on research projects than its NC5 (for example in table 52 of the NC6). During the review, Portugal provided additional information on capacity-building (e.g. fellowships) and research projects funded by its Science and Technology Foundation (FCT). The ERT noted that research projects have been implemented on the paleoclimate, modelling, impacts of climate change, socio-economic analysis, and mitigation and adaptation technologies. The ERT encourages Portugal to provide more detailed information on these types of actions in its next NC to enhance the completeness of its reporting on elements in the research and systematic observation chapter.

130. The ERT found that the NC6 does not report transparently information on the assistance provided to developing countries to establish and maintain observing and monitoring systems. During the review, Portugal provided additional information on this issue. Some of the main actions in this regard are: (1) a protocol signed between the

Portuguese Institute for Sea and Atmosphere (formerly the Institute of Meteorology) and the National Meteorological Service of Angola; (2) similar activities as in (1) with Cabo Verde; and (3) training events for the use of Earth Observation techniques and products in African countries. The ERT welcomes this information and encourages Portugal to increase the transparency of its next NC by reporting on its assistance to developing countries to establish and maintain observing and monitoring systems.

131. The ERT noted that Portugal did not provide information on the results of research studies in its NC6. To improve completeness and transparency, the ERT encourages Portugal to provide information on the most relevant results of scientific research in its next NC.

G. Education, training and public awareness

132. In the NC6, Portugal has provided information on its actions relating to education, training and public awareness at the domestic level. The information is in general transparent, but the ERT noted that the information is not sufficiently specific to climate change. In addition, the distinction between education, training and public awareness activities is not always clear (e.g. postgraduate education activities are classified as training). The ERT encourages Portugal to revise this section in its next NC, ensuring that more climate change specific information is included and that there is a transparent distinction between the different categories of actions in education, training and public awareness.

133. The ERT noted that the NC6 does not include information required by the UNFCCC reporting guidelines on NCs on the training of experts from developing countries. The ERT encourages Portugal to provide this information in its next NC if any of these activities took place since submission of its NC6.

134. The ERT noted that MAOTE and the Ministry of Education of Portugal cooperate to support and develop initiatives relating to climate change education. A significant improvement since the NC5 is the creation of the working group on environmental education (GTEAS), which implements seminars and training activities in the country.

135. The role and involvement of the public and NGOs in framing climate change policy is not described clearly enough in the NC6. In addition, there is no information on how the impact of public awareness campaigns is monitored and if a stakeholder information management system is in place. The ERT encourages Portugal to fully report on these matters in order to increase the transparency of its next NC. During the review, Portugal informed the ERT that there is no public participation in the review of the NC. The ERT encourages Portugal to implement opportunities for public participation in the review of the NC, including specialized NGOs and academia, which would improve the quality assurance process.

III. Summary of reviewed supplementary information under the Kyoto Protocol

A. Overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

136. Supplementary information provided by Portugal under Article 7, paragraph 2, of the Kyoto Protocol in its NC6 is mostly complete and mostly transparent. The supplementary information is located in different sections of the NC6. Table 9 provides an

overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol as well as references to the NC6 chapters in which this information is provided.

137. Portugal has not fully reported the following elements of the supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol: a description of the national registry, complementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol, a description of national legislative arrangements and administrative procedures that seek to ensure that the implementation of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol also contribute to the conservation of biodiversity and sustainable use of natural resources, and information on what ‘new and additional’ financial resources it has provided. The relevant information was provided to the ERT during the review week, including an addendum to the NC6 containing the required information on the national registry which was officially submitted on 11 April 2014. The technical assessment of the information reported under Article 7, paragraph 2, of the Kyoto Protocol is contained in the relevant sections of this report. The ERT recommends that Portugal include information in full on these reporting elements in its next NC.

Table 9

Overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

<i>Supplementary information</i>	<i>Reference to the sixth national communication</i>
National registry	Chapter 3, section 3.8, and addendum to the sixth national communication
National system	Chapter 2, sections 2.1, 2.2
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Chapter 3, sections 3.1–3.3, 3.7
Policies and measures in accordance with Article 2	Chapter 3, sections 3.1–3.3, 3.5, 3.6
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	Chapter 3, section 3.4
Information under Article 10	(a) Chapter 2, sections 2.1, 2.2 (b) Chapters 3 and 5 (c) Chapter 6, section 6.5 (d) Chapter 7 (e) Chapter 8 (f) and (g) throughout the sixth national communication
Financial resources	Chapter 6

B. Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol

138. Portugal reported the information requested in section H, “Minimization of adverse impacts in accordance with Article 3, paragraph 14”, of the annex to decision 15/CMP.1 as a part of its 2013 annual submission. The ERT noted, however, that the NC6 provides limited information, making the report not sufficiently transparent in relation to how Portugal strives to implement PaMs under Article 2 of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention. The ERT also noted that the NIR of the 2013 annual submission includes detailed information on these issues, and assessed the NC6 together with this NIR. The ERT

considers the reported information to be complete and transparent. The NIR of the 2013 annual submission reports on several of Portugal's initiatives aimed at minimizing adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, including: (1) a strong commitment to implementing the Convention and its Kyoto Protocol; (2) targeting the six GHGs for mitigation and diversifying primary energy sources; (3) supporting adaptation, focusing on CPLP; and (4) supporting governments and NGOs in developing countries in the integration of adaptation with development programmes. The ERT recommends that Portugal improve the transparency of information on how the Party 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, effects on international trade, and social, environmental and economic impacts on other Parties, especially developing country Parties.

IV. Conclusions and recommendations

139. The ERT conducted a technical review of the information reported in the NC6 of Portugal according to the UNFCCC reporting guidelines on NCs. The ERT concludes that the NC6 provides a good overview of the national climate policy of Portugal. The information provided in the NC6 includes most elements of the supplementary information under Article 7 of the Kyoto Protocol. During the review, Portugal provided additional information on the national registry, supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol, and a description of national legislative arrangements and administrative procedures that seek to ensure that the implementation of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol also contribute to the conservation of biodiversity and the sustainable use of natural resources.

140. Portugal's GHG emissions for 2011 were estimated to be 14.8 per cent above its 1990 level excluding LULUCF and 6.9 per cent below including LULUCF. Portugal has two notably different phases in its GHG emissions trends in the period 1990–2011: 1990–2005 and 2005–2011. The first phase is characterized by a strong increase in GHG emissions, especially CO₂ emissions from the energy sector (3.0 per cent per year), driven by economic growth with almost no energy saving and fuel switching measures. However, the second phase shows a sharp decline in CO₂ emissions from the energy sector (4.8 per cent per year), as well as a decline in their intensity against GDP (5 per cent per year). For the second phase, notable performance was recorded both for end-use efficiency improvements (energy saving in most energy subsectors) and energy source switching (mainly from oil to natural gas, wind power and hydropower), which have been the main drivers of the GHG emission reductions.

141. In the NC6, Portugal presents GHG projections for the period from 2011 to 2030. Two scenarios are included: baseline ('without measures') and 'with measures' scenarios (with two 'sub-scenarios', high and low, for 2020–2030). The projections under the 'with measures' scenario indicate that the total GHG emissions would be 0.8 per cent below the 1990 level (31.5 per cent below the 2005 level) in 2020 as a continuation of the current decreasing trend seen since 2005. Based on the comparison of the target (76,388 kt CO₂ eq) with the average annual emissions (72,318 kt CO₂ eq) for the first commitment period of the Kyoto Protocol (2008–2012), Portugal is in a position to meet its Kyoto Protocol target for the first commitment period (27 per cent above the base year).

142. Portugal participates in and contributes to the EU target of a 20 per cent emissions reduction in 2020 under the Convention and its Kyoto Protocol, and therefore does not have a specific national target. The EU ETS covered sectors have an EU-wide emission cap (effort sharing target of 21 per cent below the 2005 level in 2020). For the non-EU ETS covered sectors (excluding LULUCF), projections indicate that Portugal would most likely

be able to achieve its 2020 target of a 1 per cent emission increase by 2020 compared with the 2005 level.

143. The NC6 contains information on how use by Portugal of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action, although it did not elaborate on supplementarity as such. As indicated in paragraph 141 above, Portugal is expected to meet its Kyoto Protocol target for the first commitment period. Therefore, Portugal has not yet taken a final decision on its use of the Kyoto Protocol mechanisms to meet its Kyoto Protocol target, because it is expected to hold an excess of Kyoto Protocol units (50,990 kt CO₂ eq, equivalent to 13.35 per cent of its assigned amount), including the units from the Kyoto Protocol mechanisms (6,800 kt CO₂ eq) and RMUs (50,350 kt CO₂ eq) held by the government.

144. The ERT acknowledges the efforts made by Portugal to develop its climate mitigation PaMs. Implemented PaMs address all relevant sectors and GHGs, except F-gases. The NC6 reported on the essential policy instrument in the country, the RNBC, and its action plan PNAC 2020. Among other policy instruments reported in the NC6, most relevant are the cross-sectoral action plans such as PNAEE, PNAER and ECO.AP. Increase in the share of RES used for primary energy production (renewable energy strategy) is one of the main PaMs in the energy sector, and also contributes to strengthened energy security in the country. In addition, PaMs in the forestry sector are expected to have an effect comparable to the mitigation actions in other sectors. Many of the PaMs are coordinated at the EU level, especially the EU ETS, which has significant mitigation impact (energy supply and industry). Other PaMs with significant mitigation impact are: the Energy Efficiency Strategy – PNAEE 2016 (energy demand), Home and Office Renewal and Energy Efficiency System in Buildings (residential and commercial sectors), Eco-car and Urban Mobility and Efficiency in the Transport System (transport), Energy Efficiency System in Industry, Energy Efficiency in the Agrarian Sector, and the National Waste Management Plan and the Strategic Plan for Municipal Solid Waste (waste management).

145. During the review, Portugal provided additional information on PaMs, elaborating on detailed arrangements of the climate change management structure and on preparation of additional strategic policy documents such as the Green Growth Action Plan, the forestry policy and the energy sector policy, including transport.

146. The information reported in the NC6 provides a good overview of financial resources and technology transfer required under the Convention and its Kyoto Protocol. Between 2007 and 2012, the amount of Portugal's ODA increased by 23.4 per cent, with a peak in 2011 and a decrease between 2011 and 2012 of 17.9 per cent, largely owing to the financial situation of the country. Bilateral ODA is the main channel of support and its share has been increasing since 2007. Due to the strategic priorities established by Portugal (education, health, security and justice), ODA for the environment has limited significance when compared with the total value of bilateral ODA (5.2 per cent of bilateral ODA in 2012). In particular, the share of climate change related bilateral ODA amounted to 4.9 per cent in 2012.

147. Portugal's ODA is mainly directed towards the community of PALOPs and Timor-Leste. The vast majority of the climate change related support provided by Portugal is directed towards mitigation objectives (99.4 per cent in 2012). The programmes and projects of support for developing countries are mainly related to the energy sector, in particular to promoting the use of RES. Most of them include a technology transfer component, emphasizing the development and enhancement of endogenous capacities and technologies. Despite the focus on mitigation to date, Portugal has reported that among the already approved future projects, the share of adaptation projects will rise to 14.8 per cent when the approved projects under fast-start finance are implemented.

148. Portugal has provided information in its NC6 on adaptation options and institutional and governmental arrangements, which are part of its ENAAC, to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation. Climate scenarios for Portugal point to increasingly unfavourable conditions for agricultural activity and forestry resulting from reduction in precipitation and increase in temperature, increase in the frequency and intensity of droughts and other extreme weather events, and increase in susceptibility to desertification. The most vulnerable natural ecosystems of Portugal to climate change are those in the coastal zones and inland wetlands. Portugal's vulnerable areas also include infrastructure, economy, water resources and human health. For each of these areas, Portugal provided a detailed list of measures under implementation to facilitate adaptation.

149. In the NC6, Portugal has provided information on its actions relating to education, training and public awareness at the domestic level. MAOTE and the Ministry of Education cooperate to support and develop different initiatives relating to climate change education. The ERT noted that, since submission of the NC5, a significant improvement has been the creation of GTEAS, which implements seminars and training activities in the country.

150. Portugal has provided in its NC6 information on its activities relating to research and systematic observation, and addressed both domestic and international activities, including GCOS. Portugal provided information on capacity-building (e.g. fellowships) and research activities funded by its FCT, with projects implemented on the paleoclimate, modelling, impacts of climate change, socio-economic analysis, and mitigation and adaptation technologies. Portugal also provided information on assistance provided to developing countries to establish and maintain observing and monitoring systems. Some of the main actions in this regard are: (1) a protocol signed between the Portuguese Institute for Sea and Atmosphere and the National Meteorological Service of Angola; (2) a similar activities as in (1) with Cabo Verde; and (3) training events for the use of Earth Observation techniques and products in African countries. Supplementary information under Article 7, paragraph 1, of the Kyoto Protocol on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol has been provided by Portugal in its 2013 annual submission. The ERT noted that the NIR of the 2013 annual submission includes detailed information on these issues. The ERT considers the reported information to be complete and transparent.

151. In the course of the review, the ERT formulated several recommendations relating to the completeness and transparency of Portugal's reporting under the Convention and its Kyoto Protocol. The key recommendations¹⁰ are that Portugal:

- (a) Improve completeness of reporting by including in its next NC the following information:
 - (i) Continue including full information on the national registry;
 - (ii) Provide a concrete explanation of supplementarity related to the use of the Kyoto Protocol mechanisms;
 - (iii) Provide a textual explanation of forestry sector PaMs;
 - (iv) Provide a description of PaMs for F-gases;
 - (v) Provide information on national legislative arrangements and administrative procedures that seek to ensure that the implementation of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol also contribute to the conservation of biodiversity and the sustainable use of natural resources;

¹⁰ The recommendations are given in full in the relevant sections of this report.

- (vi) Provide information on factors and activities for each sector to allow understanding of emission trends;
- (vii) Provide clear information on what ‘new and additional’ financial resources Portugal has provided pursuant to Article 4, paragraph 3, of the Convention and clarify how it has determined that such resources are ‘new and additional’;
- (viii) Provide detailed information on the assistance provided for the purpose of assisting developing country Parties that are particularly vulnerable to the adverse effects of climate change in meeting the costs of adaptation to those adverse effects;
- (ix) Provide information on the expected impacts of climate change in the country;
- (b) Improve the transparency of reporting by including in its next NC the following information:
 - (i) Provide more detailed information on how the national circumstances have affected GHG emission trends over time;
 - (ii) Provide definitions of and explanations for each projection scenario;
 - (iii) Check and remove inconsistencies and mistakes among results of different projection scenarios;
 - (iv) Provide more detailed information on Portugal’s climate change related financial support;
- (c) Improve the transparency of reporting by including in its next NC further information on how Portugal 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, effects on international trade, and social, environmental and economic impacts on other Parties, especially developing country Parties.

V. Questions of implementation

152. During the review, the ERT assessed the NC6, including supplementary information provided under Article 7, paragraph 2, of the Kyoto Protocol and reviewed information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, with regard to timeliness, completeness, transparency and adherence to the UNFCCC reporting guidelines on NCs. No question of implementation was raised by the ERT during the review.

Annex

Documents and information used during the review

A. Reference documents

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

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“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 23/CP.19. Available at <<http://unfccc.int/resource/docs/2013/cop19/eng/10a02.pdf#page=20>>.

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Sixth national communication of Portugal. Available at <http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/prt_6cn_2ressubmission_final.pdf>.

Sixth national communication of Portugal. Addendum. Available at <http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/prt_nc6_addendum.pdf>.

2013 GHG inventory submission of Portugal. Available at <http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/7383.php>.

2014 GHG inventory submission of Portugal. Available at <http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8108.php>.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Eduardo Santos and Mr. Jose Paulino (Portuguese Environment Agency), including additional material on updated policies and measures, greenhouse gas projections, the national registry and recent climate policy developments in Portugal. The following documents¹ were also provided by Portugal:

National Action Plan for Energy Efficiency (Energy Efficiency Strategy – PNAEE 2016): Resolução do Conselho de Ministros n.º 20/2013, 28 de fevereiro de 2013.

National Action Plan for Renewable Energy (Renewable Energy Strategy – PNAER 2020): Resolução do Conselho de Ministros n.º 20/2013, 28 de fevereiro de 2013.

OECD-DAC. 2013. *Converged Statistical Reporting Directives for the Creditor Reporting System (CRS) and the Annual DAC Questionnaire*. Paris: Organisation for Economic Co-operation and Development.

¹ Reproduced as received from the Party.