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Report of the technical review of the fifth national communication of Turkey

Parties included in Annex I to the Convention are requested, in accordance with decision 10/CP.13, to submit a fifth national communication to the secretariat by 1 January 2010. In accordance with decision 8/CMP.3, Parties included in Annex I to the Convention that are also Parties to the Kyoto Protocol shall include in their fifth national communications 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 report presents the results of the technical review of the fifth national communication and supplementary information under the Kyoto Protocol of Turkey 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 Turkey the Convention entered into force on 24 May 2004 and the Kyoto Protocol on 26 August 2009. Based on decision 26/CP.7, which recognizes the special circumstances of Turkey which place it in a situation different from that of other Parties included in Annex I to the Convention (Annex I Parties), Turkey has not yet submitted an official greenhouse gas (GHG) emission reduction target under the Convention and its Kyoto Protocol.

2. This report covers the in-country technical review of the fifth national communication (NC5) of Turkey, 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 13/CP.20) and the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1).

3. The in-country review took place from 20 to 25 April 2015 in Ankara, Turkey. The review was conducted by the following team of nominated experts from the UNFCCC roster of experts: Ms. Tsendsuren Batsuuri (Mongolia), Mr. Kamel Djemouai (Algeria), Mr. Till Neeff (Germany), Ms. Yue Qi (China) and Ms. Anna Romanovskaya (Russian Federation). Mr. Djemouai and Ms. Romanovskaya were the lead reviewers. The review was coordinated by Ms. Sylvie Marchand and Ms. Veronica Colerio (secretariat).

4. During the review, the expert review team (ERT) reviewed each section of the NC5. The ERT also reviewed the supplementary information provided by Turkey as a part of the NC5 in accordance with Article 7, paragraph 2, of the Kyoto Protocol.

5. In accordance with decisions 13/CP.20 and 22/CMP.1, a draft version of this report was communicated to the Government of Turkey, which provided comments that were considered and incorporated, as appropriate.

B. Summary

6. The ERT conducted a technical review of the information reported in the NC5 of Turkey 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 Protocol[1] is provided in the NC5 (see paras. 98 and 99 below).

7. Turkey considered most of the recommendations provided in the report of the in-depth review of its first national communication.[2] The recommendations not addressed are: the provision of a complete set of projections, covering all sectors, including all non-energy sectors, and gases, as required by the UNFCCC reporting guidelines on NCs; and an estimated and expected total effect of implemented and adopted policies and measures (PaMs). During the review, Turkey provided further relevant information, particularly on: the planned reporting of projections in its next national communication (NC), the latest

[1] Decision 15/CMP.1, annex, chapter II.
[2] FCCC/IDR.1/TUR.

GHG inventory available, the drivers of GHG emission trends in the energy and waste sectors, the estimation methods for quantitative impacts of some individual PaMs, the criteria used for giving priority to those PaMs that provide the most significant contribution to emission reduction efforts and the list of non-governmental organizations (NGOs) that participated in the preparation of the NC5.

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 NC5 was submitted on 17 December 2013, after the deadline of 1 January 2010 mandated by decision 10/CP.13. Turkey informed the secretariat about its difficulties with the timeliness of its NC5 on 26 March 2014 in accordance with paragraph 120 of the annex to decision 22/CMP.1. As the NC5 was not submitted within six weeks of the due date (15 February 2010), the delay was brought to the attention of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol and the Compliance Committee, and made public. The ERT noted with great concern the delay in the submission of the NC5. The ERT recommends that Turkey submit its future NCs on time.

3. Adherence to the reporting guidelines

10. The information reported by Turkey in its NC5 is partially in adherence with the UNFCCC reporting guidelines on NCs as per decision 4/CP.5 (see table 1).

Table 1
Assessment of completeness and transparency issues of reported information in the fifth national communication of Turkey[a]

Sections of national communication	*Completeness*	*Transparency*	*Reference to paragraphs*	*Supplementary information under the Kyoto Protocol*	*Completeness*	*Transparency*	*Reference to paragraphs*
Executive summary	Complete	Transparent		National systems[b]	NA, but elements reported	NA, but elements reported	
National circumstances	Mostly complete	Transparent	14	National registries[b]	NA	NA	
Greenhouse gas inventory	Mostly complete	Transparent	17	Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17[b]	NA	NA	
Policies and measures (PaMs)	Mostly complete	Partially transparent	27, 28, 29, 30, 31	PaMs in accordance with Article 2	Complete	Partially transparent	67, 68, 69
Projections and total effect of PaMs	Not complete	NA	72, 75	Domestic and regional programmes and/or arrangements and procedures	Mostly complete	Transparent	24
Vulnerability assessment, climate change impacts and adaptation measures	Complete	Transparent		Information under Article 10[c]	NA, but elements reported	NA, but elements reported	
Financial resources and transfer of technology[d]	NA	NA		Financial resources[d]	NA	NA	
Research and systematic observation	Complete	Transparent		Minimization of adverse impacts in accordance with Article 3, paragraph 14[b]	NA	NA	
Education, training and public awareness	Complete	Transparent					

Abbreviation: NA = not applicable.

[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.

[b] Turkey, as a Party included in Annex I with no commitments inscribed in Annex B to the Kyoto Protocol, has no obligation to report on: minimization of adverse impacts in accordance with Article 3, paragraph 14; supplementary information on its national system under Article 5, paragraph 1, of the Kyoto Protocol; a national registry; and supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17.

[c] For the purposes of reporting information in this table, this assessment refers to information provided by the Party on the provisions contained in Article 4, paragraphs 3, 5 and 7, of the Convention reported under Article 10 of the Kyoto Protocol, which is relevant for developed country Parties and other developed Parties included in Annex II to the Convention (Annex II Parties). Assessment of the information provided by the Party on the other provisions of Article 10 of the Kyoto Protocol is provided under the relevant substantive headings under the Convention, for example, research and systematic observation.

[d] Reporting on financial resources under the Kyoto Protocol is relevant for developed country Parties and Annex II Parties. As Turkey is not an Annex II Party, it does not have an obligation to provide information on financial resources under Article 11 of the Kyoto Protocol, including on "new and additional" resources.

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 NC5, Turkey has provided a detailed description of the national circumstances and elaborated on the framework legislation and key policy documents on climate change. Further information on the review of the institutional and legislative arrangements for the coordination and implementation of PaMs is provided in chapter II.B below.

12. However, the ERT found that, except for noting how trends in population and key changes in transportation are likely to have affected GHG emissions over time, the NC5 does not provide a complete and clear description of how national circumstances and changes in national circumstances affect GHG emissions and removals over time. Moreover, although it provides information on general aspects of national circumstances, for example, past economic growth, the NC5 does not specify how this has affected GHG emissions over time.

13. During the review, Turkey provided further information on, for example, the energy, industrial processes, agriculture and waste sectors, which helped to better present the whole picture of Turkey's national circumstances relevant to the GHG emissions and removals.

14. The ERT recommends that Turkey describe specifically how each aspect of the national circumstances and their changes affect GHG emissions and removals over time in its next NC.

15. The ERT noted that during the period 1990–2012, Turkey's population increased by 35.9 per cent and the gross domestic product (GDP) increased by 132.8 per cent, while GHG emissions per GDP unit and GHG emissions per capita increased by 0.3 and 71.8 per cent, respectively. The primary energy consumption increased by 121.7 per cent, which in 2012 consisted of 89.4 per cent of fossil fuels. From 2000 to 2008, the area of residential, commercial and public buildings increased by 56 per cent; and from 1990 to 2010, the number of vehicles in Turkey increased by 368.7 per cent. See paragraph 18 below for information on how these national circumstances and their changes over time have affected GHG emission trends. Table 2 illustrates the national circumstances of Turkey by providing some indicators relevant to GHG emissions and removals.

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

	1990	*2000*	*2005*	*2010*	*2012*	*Change 1990–2012 (%)*	*Change 2011–2012 (%)*
Population (million)	55.12	64.25	68.57	73.00	74.90	35.9	1.3
GDP (2005 USD billion using PPP)	436.22	625.31	781.24	914.06	1015.40	132.8	2.1
TPES (Mtoe)	52.72	75.96	84.21	105.27	116.90	121.7	4.2
GHG emissions without	188 434.23	298 090.87	330 740.34	403 494.70	439 873.72	133.4	3.7

	1990	*2000*	*2005*	*2010*	*2012*	*Change 1990–2012 (%)*	*Change 2011–2012 (%)*
LULUCF (kt CO_2 eq)							
GHG emissions with LULUCF (kt CO_2 eq)	144 364.14	248 032.23	281 011.58	345 646.57	380 058.71	163.3	4.6
GDP per capita (2005 USD thousand using PPP)	7.91	9.73	11.39	12.52	13.56	71.3	0.8
TPES per capita (toe)	0.96	1.18	1.23	1.44	1.56	63.2	2.9
GHG emissions per capita (t CO_2 eq)	3.42	4.64	4.82	5.53	5.87	71.8	2.4
GHG emissions per GDP unit (kg CO_2 eq per 2005 USD using PPP)	0.43	0.48	0.42	0.44	0.43	0.3	1.6

Sources: (1) GHG emissions data: Turkey's 2014 GHG inventory submission, version 1.1; (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

16. Turkey has provided in its NC5 a summary of information on GHG emission trends for the period 1990–2009. This information is fully consistent with the 2011 national GHG inventory submission. Summary tables for 1990–2009, including trend tables for emissions in carbon dioxide equivalent (CO_2 eq) (given in the common reporting format tables), are provided in an annex to the NC5. During the review, the ERT took note of Turkey's 2014 national GHG inventory submission.[3] Relevant information therein is reflected in this report.

17. However, the ERT noted that the NC5 reports data up to 2009, and in accordance with the UNFCCC reporting guidelines on NCs, Turkey was to report data up to the last but one year prior to the year of submission of the national communication, that is, 2011. The ERT recommends that Turkey report the latest available information from the national GHG inventory in line with the UNFCCC reporting guidelines on NCs in its next NC.

18. Total GHG emissions[4] excluding emissions and removals from land use, land-use change and forestry (LULUCF) increased by 133.4 per cent between 1990 and 2012, whereas total GHG emissions including net emissions or removals from LULUCF increased by 163.3 per cent over the same period. In 2012, of the total GHG emissions, CO_2 was responsible for 81.3 per cent and had increased by 152.5 per cent since 1990; methane (CH_4) was responsible for 14.0 per cent and had increased by 81.0 per cent; and nitrous oxide (N_2O) was responsible for 3.4 per cent and had increased by 21 per cent. Fluorinated gases (F-gases) were responsible for 1.3 per cent and had increased by 260.1 per cent since 2000 (all three F-gases were reported only for the period 2000–2012). The changes in

[3] Submitted to the secretariat on 15 April 2014.

[4] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding land use, land-use change and forestry, unless otherwise specified.

population, GDP and electricity consumption per capita were identified by the ERT as the main factors underlying the overall increasing trends of GHG emissions during the period 1990–2012 (see para. 15 above) except for 2001 and 2008, where GHG emissions decreased relative to the previous year owing to an economic crisis in both cases. However, limited explanations of the factors underlying the GHG emission trends were reported in the NC5. During the review, Turkey provided additional explanatory information on factors underlying GHG emission trends in the energy, agriculture and waste sectors which explained some of the changes in GHG emissions at the sectoral level. The ERT encourages Turkey to include a more detailed description of the factors underlying the GHG emission trends, for example at the sectoral level, in its next NC. An analysis of the drivers of GHG emission trends in each sector is provided in chapter II.B below. Table 3 provides an overview of GHG emissions by sector from 1990 to 2012.

Table 3
Greenhouse gas emissions by sector in Turkey, 1990–2012

	GHG emissions (kt CO_2 eq)				*Change (%)*		*Share[a] by sector (%)*	
Sector	*1990*	*2000*	*2010*	*2012*	*1990–2012*	*2011–2012*	*1990*	*2012*
1. Energy	132 882.67	213 231.62	285 136.00	308 604.26	132.2	2.4	70.5	70.2
A1. Energy industries	34 142.96	77 073.67	112 984.18	119 588.40	250.3	–2.2	18.1	27.2
A2. Manufacturing industries and construction	37 735.00	60 221.15	57 136.17	56 295.90	49.2	–2.1	20.0	12.8
A3. Transport	26 286.59	35 515.51	45 142.42	61 562.84	134.2	28.4	14.0	14.0
A4.–A5. Other	32 533.56	38 150.96	67 410.91	68 829.61	111.6	–3.2	17.3	15.6
B. Fugitive emissions	2 184.56	2 270.34	2 462.32	2 327.50	6.5	–7.0	1.2	0.5
2. Industrial processes	15 442.26	24 373.81	55 674.47	62 773.50	306.5	7.1	8.2	14.3
3. Solvent and other product use	NA, NE	NA, NE	NA, NE	NA, NE	–	–	–	–
4. Agriculture	30 387.74	27 847.56	27 126.84	32 280.78	6.2	12.0	16.1	7.3
5. LULUCF	–44 070.09	–50 058.64	–57 848.12	–59 815.01	35.7	–1.7	NA	NA
6. Waste	9 721.57	32 637.87	35 557.38	36 215.19	272.5	2.6	5.2	8.2
GHG total with LULUCF	**144 364.14**	**248 032.23**	**345 646.57**	**380 058.71**	**163.3**	**4.6**	**NA**	**NA**
GHG total without LULUCF	**188 434.23**	**298 090.87**	**403 494.70**	**439 873.72**	**133.4**	**3.7**	**100.0**	**100.0**

Source: GHG emissions data: Turkey's 2014 GHG inventory submission, version 1.1.

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, NE: not estimated.

[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.

3. National system

19. Turkey provided in its NC5 some elements of 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).

However, Turkey, as a Party included in Annex I to the Convention with no commitments inscribed in Annex B to the Kyoto Protocol, has no obligation to report supplementary information on its national system under Article 5, paragraph 1, of the Kyoto Protocol. The ERT commends Turkey for its efforts to include the information on the national system in its NC5.

20. During the review, Turkey provided additional information on the national system, elaborating on the legal and procedural arrangements made to prepare the inventory and on activity data collection. According to the additional information provided, besides Turkey's Statistics Law No. 5429, the decision by the Turkish Coordination Board on Climate Change and Air Management on setting up technical working groups and defining the coordinator institutions of the working groups, provides a legal basis for the preparation of the GHG inventory. Furthermore, Turkey provided the contact information for the national entity with overall responsibility for the national inventory.

21. The ERT noted that Turkey's 2014 national GHG inventory submission provided some of the missing elements (key source identification and uncertainty analysis) of the information on the national system provided in the NC5.

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

22. Turkey has reported in its NC5 information on legislative arrangements and procedures related to the Kyoto Protocol. Because Turkey does not yet have a binding target for reducing its GHG emissions under the Kyoto Protocol, it has no obligation to report on institutional arrangements and decision-making procedures relating to commitments, including those relating to participation in the Kyoto Protocol mechanisms.

23. The overall responsibility for implementing the Kyoto Protocol lies within the Ministry of the Environment and Urbanisation (MEU) of Turkey. For reporting under the Kyoto Protocol, MEU coordinates the national institutions through the Coordination Board on Climate Change and Air Management, which uses a set of seven technical working groups.

24. The ERT noted that the NC5 does not include a complete description of the provisions to make information on legislative arrangements and administrative procedures established pursuant to the implementation of the Kyoto Protocol publicly accessible. During the review, the ERT noted that information is available on the websites of government agencies, for example, the website of the Ministry of Energy and Natural Resources contains a list of relevant laws and regulations. The ERT recommends that Turkey improve the completeness of its reporting by explicitly specifying in its next NC the means used for informing the public of its administrative procedures for reporting under the Kyoto Protocol.

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

25. Turkey has provided in its NC5 information on its package of PaMs implemented, adopted and planned in order to fulfil its commitments under the Convention and its Kyoto Protocol.

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

26. In its NC5, Turkey reported on its PaMs implemented, adopted and planned in achieving its commitments under the Convention. Turkey provided information on PaMs by sector and a more detailed description of some notable PaMs. A separate section on cross-sectoral PaMs was also included.

27. The ERT noted that in the NC5, each sector has a textual description of the PaMs. However, in the absence of information on PaMs that have or are expected to have the most significant impact on GHG emissions and removals (see para. 32 below), it is not clear to the ERT whether or not the PaMs reported are the principal ones. During the review, Turkey clarified that for several sectors the included PaMs were chosen based on the availability of information on those PaMs as well as according to their political significance and visibility to the team compiling the NC5. The ERT recommends that Turkey enhance the transparency of its reporting by providing transparent information in its next NC on why the PaMs reported have been determined to be the principal ones.

28. The ERT also noted that the lists of PaMs in the textual and the tabular parts of Turkey's NC5 do not fully match. There are PaMs that are included only in the table and PaMs that are included only in the text. The ERT recommends that Turkey provide a consistent set of PaMs in the textual and tabular parts of its next NC.

29. In its NC5, Turkey provided information on several PaMs in the tables that cannot be located in the text, mainly regarding the GHG affected by the PaMs, the types of PaMs and the implementation status. The ERT recommends that Turkey provide information on the GHG affected, the types of PaMs and the implementation status not only in the tables but also in the text.

30. Furthermore, Turkey did not provide a transparent subdivision of PaMs by GHG in its NC5. For some PaMs the NC5 did not specify the gas affected. For other PaMs there are gases specified that cannot be easily identified as corresponding to the GHGs referred to in the UNFCCC reporting guidelines on NCs (CO_2, CH_4, N_2O, sulphur hexafluoride, perfluorocarbons and hydrofluorocarbons) and non-standard abbreviations are used. For the PaMs in the forestry sector, the list of GHGs is not differentiated by the activities concerned and their characteristics. The ERT recommends that Turkey provide transparent information on its PaMs by subdividing them by sector and gas in its next NC.

31. The NC5 does not include the information required on how PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals consistent with the objective of the Convention. Although such trends are identified in the relevant section of the NC5, there are few references to long-term trends in the section on PaMs. The ERT recommends that Turkey include this information in its next NC.

32. Turkey did not provide information on how it has given priority to PaMs which have the most significant impact on GHG emissions and removals. Furthermore, it has not indicated which PaMs are considered particularly innovative and/or effectively replicable by other Parties. The ERT encourages Turkey to provide this information in its next NC.

33. Turkey has not provided transparent information on PaMs which encourage activities that lead to greater levels of anthropogenic GHG emissions and their rationale for such PaMs. In the section of the NC5 on the energy sector, there are descriptions of PaMs which, by their design, might lead to increasing emissions (for example the measures taken to increase the electricity supply under the Electricity Energy Market and Supply Safety Strategy), but these are not identified as such in a systematic manner. The ERT encourages Turkey to improve transparency by identifying, in a systematic manner, those PaMs that may lead to higher levels of emissions and by describing the rationale behind these PaMs.

34. Turkey did not provide information regarding the PaMs that were described in detail in the initial national communication (INC) and that have been maintained over time. The NC5 does not refer back to the INC regarding the description of PaMs. The ERT encourages Turkey to improve completeness in its next NC by referring back to the NC5 regarding any PaMs that are still in place at the time.

35. Turkey provided incomplete information on the way in which progress made with PaMs to mitigate GHG emissions is monitored and evaluated over time. During the review week, Turkey explained that a web-based approach for monitoring the progress of PaMs is currently under development to cover the actions implemented under the National Climate Change Action Plan. However, no detailed description on the planned data collection efforts for monitoring was made available. Moreover, there was no information available regarding the evaluation of the progress of PaMs, covering analytical assessment, beyond mere data collection. The ERT encourages Turkey to improve the completeness of its next NC by including information on the way in which progress made with PaMs to mitigate GHG emissions is monitored and evaluated over time.

36. Turkey has not provided complete and transparent quantitative estimates of the impacts of PaMs in its NC5. Table 4.6 of the NC5, which contains PaMs by sector, includes estimates for few PaMs and few years. The table follows a different layout for the individual sectors and it is not always clear whether the numbers provided refer to a particular given year or a period of years. Furthermore, there was no description of the estimation methods used. The ERT encourages Turkey to include in its next NC quantitative estimates of the impacts of all PaMs with a brief description of the estimation methods, using the same table layout for each individual sector and ensuring that all numbers refer to a particular given year rather than a period of years.

37. In its NC5, Turkey has not provided complete information on the costs of PaMs, their non-mitigation benefits and the interaction of PaMs at the national level. The textual description of some of the PaMs includes information on costs and non-mitigation benefits. Information on the interaction of PaMs is not provided. The ERT encourages Turkey to improve the completeness of its next NC by including information on the costs and non-mitigation benefits for all PaMs, and on the interaction of PaMs at the national level.

38. Turkey has not provided transparent information regarding PaMs listed in the INC that are no longer in place. It is stated in the NC5 that all PaMs have remained in place since the submission of the INC. However, it had been noted in the INC that some PaMs were of limited duration, which appears to be contradicted by the statement in the NC5. The ERT encourages Turkey to improve transparency in it next NC by specifying which PaMs from the NC5 are no longer in place.

2. Policy framework and cross-sectoral measures

39. Turkey's key framework climate policy is the National Climate Change Strategy from 2010. It includes a set of sectoral targets for the period 2010–2020. Turkey's Supreme Planning Council endorsed the strategy and the Coordination Board on Climate Change and Air Management (formerly the Coordination Board on Climate Change) under the coordination of MEU is tasked with its implementation.

40. The National Climate Change Action Plan from 2011 includes a set of concrete measures and activities across the portfolios of the sectoral ministries for the period 2011–2023. Turkey stated in its NC5 that it has adopted an integrated approach to development that combines the economic, social and cultural aspects of its development objectives (see para. 41 below). As such, the National Climate Change Action Plan is in line with the Ninth Development Plan for the period 2007–2013.

41. The key policy instrument for development planning and related budget allocation is Turkey's system of Development Plans. These are coordinated by the Ministry of Development and endorsed by the General Assembly. The current Tenth Development Plan for the period 2014–2018 and its previous iteration the Ninth Development Plan referred to in paragraph 40 above include climate change related aspects.

42. During the in-country visit, Turkey mentioned that there was an ongoing process to consider GHG emissions target setting as part of Turkey's preparation of an intended nationally determined contribution (INDC) planned to be submitted at the United Nations Climate Change Conference to be held in Paris, France, from 30 November to 11 December 2015.

43. Table 4 provides a summary of the reported information on the PaMs of Turkey.

Table 4
Summary of information on policies and measures reported by Turkey

Sectors affected	*List of key policies and measures*	*Estimate of mitigation impact (kt CO_2 eq)*
Policy framework and cross-sectoral measures		
	Development Plans	NE
	National Climate Change Strategy	NE
	National Climate Change Action Plan	NE
Energy supply including renewable energy	Electricity Energy Sector Reform and Privatization Strategy	NE
	Electricity Energy Market and Supply Safety Strategy	NE
	Renewable Energy Law, which includes feed-in tariffs for electricity from renewable sources	NE
Energy efficiency	Energy Efficiency Strategy	NE
	Energy Efficiency Law	NE
Transport	Transportation and Communication Strategy	NE
	Regulation Regarding Principles and Procedures on Increasing Energy Efficiency in Transportation	NE
	Vehicle taxation system	NE
	Government investment in transportation infrastructure	NE
Industrial processes	Industry Strategy Document	NE
	National Eco-Efficiency Programme	NE
Agriculture	Strategic Plan of the Ministry of Food, Agriculture and Livestock	NE
	Regulation on Good Agricultural Practices	NE
	Land Protection and Land Utilization Law (land consolidation)	NE
Forestry	National Forest Programme (under development)	NE
	National Strategy on Climate Change and Protected Areas	NE
	Afforestation and Erosion Control Mobilization Action Plan	NE

Sectors affected	*List of key policies and measures*	*Estimate of mitigation impact (kt CO_2 eq)*
	Regulation Regarding Organization, Implementation, Supervision and Renewal of Forest Management Plans	NE
	Strengthening Management of Forest Protection Areas	NE
Waste management	Waste Management Action Plan (under development)	NE
	Solid Waste Master Plan	NE
	Regulation Regarding Basic Principles of Waste Management	NE
	Regulation Regarding Regular Storage of Waste	NE

Abbreviation: NE = not estimated.

3. Policies and measures in the energy sector

44. GHG emissions from the energy sector amounted to 308,604.26 kt CO_2 eq in 2012, or 70.2 per cent of total GHG emissions. Between 1990 and 2012, GHG emissions from the energy sector increased by 132.2 per cent. The trend in GHG emissions showed notable increases in energy industries (250.3 per cent), transport (134.2 per cent) and the manufacturing industry (49.2 per cent). As noted in the report on the individual review of Turkey's 2014 GHG inventory submission, the main drivers for the emissions growth were the increase in electricity production, the increase in road transportation and the population increase.

45. The most important policy framework documents for the energy sector include the Development Plan (currently in its tenth iteration) and several sectoral policy documents: the Electricity Energy Sector Reform and Privatization Strategy, the Electricity Energy Market and Supply Safety Strategy and the Energy Efficiency Strategy for 2012 to 2023. These were endorsed by the Supreme Planning Council for implementation by the Ministry of Energy and Natural Resources. In line with these, the National Climate Change Strategy includes a set of broad objectives and the National Climate Change Action Plan includes a set of quantitative targets.

46. In its NC5, Turkey noted an overarching target in the National Climate Change Strategy and its Action Plan to reduce the GHG emissions from energy use by 7 per cent by 2020 compared with the 'business as usual' scenario. However, during the review Turkey explained that this target is no longer being pursued.

47. ***Energy supply***. Since much of Turkey's energy supply is under direct government control, the government's related investments have a direct impact on GHG emissions. In line with its policy framework objectives, Turkey is working to increase the share of electricity from nuclear power to 10 per cent by 2023, to decrease the share of natural gas within the energy mix to 30 per cent by 2023 and to boost the role of 'clean' coal to take advantage of the local lignite resource. However, the ERT noted that boosting the clean coal uptake could increase emissions and may not necessarily constitute a mitigation measure.

48. ***Renewable energy sources***. Turkey aims to increase the share of electricity from renewable sources to 30 per cent by 2023. The government is directly investing in Turkey's renewable energy supply. In addition, under the Renewable Energy Law Turkey uses a system of feed-in tariffs to promote private-sector investments in electricity production from renewable sources.

49. ***Energy efficiency***. The ERT noted that Turkey mentioned in its NC5 that its economy is relatively more energy intensive than other Annex I Parties; more specifically, Turkey reported that its energy intensity was 0.27 toe per thousands of 2000 USD in 2009 compared with 0.18 toe per thousands 2000 USD for Annex I Parties. In order to address its relatively high energy intensity, the most important policy instrument is the Energy Efficiency Law, implemented by the Energy Efficiency Coordination Board under the coordination of the Ministry of Energy and Natural Resources. It covers the industrial, transport, building and electricity sectors and has given rise to several sets of regulations (see paras. 50 and 53 below).

50. ***Residential and commercial sectors***. Under the Energy Efficiency Law, the regulation regarding energy performance in buildings stipulates measures, technical criteria and implementation guidelines to bring a more integrated approach to energy efficiency in buildings. The regulation on distribution of heating and sanitary hot water costs in central heating and sanitary hot water systems aims to control the distribution of heating costs based on the amount of heat use, and attempts to control indoor heat have become widespread. The regulations on the energy labelling of household electric refrigerators, freezers and their combinations and on the energy efficiency requirements for ballasts for fluorescent lighting are other examples of regulations related to secondary legislation that improve energy efficiency in residential areas. Furthermore, solar collectors are available in 3–3.5 million residences in Turkey, primarily in the Mediterranean, Aegean and south-east Anatolia regions.

51. ***Transport sector***. The most important policy framework documents for the transport sector include the Development Plan and Turkey's Transportation and Communication Strategy for the period 2011–2023. Targets with respect to total transportation distribution for 2023 related to the National Climate Change Strategy are to increase the share of railway load haulage to above 15 per cent and to increase the share of passenger transportation to above 10 per cent. Turkey aims to decrease the share of road haulage to 60 per cent and to decrease the share of road passenger transportation to 72 per cent.

52. Policy instruments for the reduction of GHG emissions from transport include several sets of regulations such as the Regulation Regarding Principles and Procedures on Increasing Energy Efficiency in Transportation and economic instruments such as the vehicle taxation system. The government's investment in transportation infrastructure (e.g. railway infrastructure and construction and modernization of ports) may lead to GHG emission reductions in the transport sector.

53. ***Industrial sector***. Under the Energy Efficiency Law, there are support programmes and voluntary agreements for industrial enterprises. The support programme for energy efficiency supports 32 projects in 25 industrial enterprises and is expected to achieve a saving of approximately 13,141 toe. Voluntary agreements over the period 2011–2013 have been signed with 22 industrial enterprises that are willing to decrease their energy intensity by a minimum 10 per cent within three years; this is expected to result in an annual saving of approximately 44,500 toe per year.

4. Policies and measures in other sectors

54. ***Industrial processes***. Between 1990 and 2012, GHG emissions from the industrial processes sector increased by 306.5 per cent. As noted in the report on the individual review of Turkey's 2014 GHG inventory submission, the key driver for the rise in emissions in the industrial processes sector was the increase in cement production to cover the rise in demand for cement for domestic construction activities.

55. The most important policy framework documents for the industrial processes sector include the Development Plan and the Industry Strategy Document, issued by the Ministry

of Science, Industry and Technology. In line with these, the National Climate Change Strategy and the National Climate Change Action Plan include a set of broad objectives, but no quantitative targets.

56. Policy instruments for reducing GHG emissions from industrial processes through implementing the Industry Strategy Document include the National Eco-Efficiency Programme. This also targets the cement sector, which is responsible for the bulk of emissions from industrial processes.

57. ***Agriculture***. Between 1990 and 2012, GHG emissions from the agriculture sector increased by 6.2 per cent. As noted in the report on the individual review of Turkey's 2014 GHG inventory submission, the key driver for the increase in emissions in agriculture was the increase in the livestock population (according to data available from the FAOSTAT emissions database, the number of cattle increased between 1990 and 2012 from 12.2 million to 12.4 million) as enteric fermentation and manure management cause the greater part of the emissions in this sector. However, the NC5 depicts a decrease in emissions from enteric fermentation over the period 1990–2009 this can be explained by the decrease in the number of cattle between 1990 and 2009 from 12.2 million to 10.8 million.

58. The most important policy framework documents for the agriculture sector include the Development Plan and the Strategic Plan of the Ministry of Food, Agriculture and Livestock, which is mainly concerned with the management of land, for example, through the promotion of best agricultural practices. In line with these, the National Climate Change Strategy and the National Climate Change Action Plan include a set of broad objectives, although there are no quantitative targets for the sector.

59. Policy instruments in the agriculture sector include regulations such as the Regulation on Good Agricultural Practices. The NC5 also lists several programmes and projects; however, none of these directly concern livestock, which is the principal source of emissions from agriculture. During the review, Turkey explained that the management of land receives much attention from policymakers while a Directorate on livestock has only recently been set up at the Ministry of Food, Agriculture and Livestock.

60. ***Forestry***. The forestry sector was a net sink of 44,070.09 kt CO_2 eq in Turkey in 1990, increasing by 35.7 per cent by 2012. As noted in report on the individual review of Turkey's 2014 GHG inventory submission, the trend was mainly driven by improvements in sustainable forest management, afforestation, reforestation on forest land and the conversion of coppices to productive forests in forest land remaining forest land.

61. The most important policy framework documents for the forestry sector include the Development Plan and the National Forest Programme (under development at the time of publication of the NC5) and the National Strategy on Climate Change and Protected Areas. In line with these, the National Climate Change Strategy includes a set of broad objectives and the National Climate Change Action Plan includes a set of quantitative targets relating to carbon dioxide capture from forests (to increase the amount of carbon dioxide capture in forest lands by 15 per cent by 2020 in comparison with 2007) and to reducing emissions from deforestation (to decrease deforestation and forest degradation by 20 per cent by 2020 in comparison with 2007).

62. Policy instruments in the forest sector include action plans such as the Afforestation and Erosion Control Mobilisation Action Plan and regulations such as the Regulation Regarding Organization, Implementation, Supervision and Renewal of Forest Management Plans. Since much of Turkey's forests are under direct government control, changes to management practices are an efficient means to enhance the sink potential.

63. ***Waste management***. Between 1990 and 2012, GHG emissions from the waste sector increased by 272.5 per cent, with landfills generating most of the emissions. As noted in the

report on the individual review of Turkey's 2014 GHG inventory submission, this increase was mainly driven by population growth and economic growth. During approximately the last 10 years, the increase in emissions slowed considerably as regulation in the landfill sector began taking effect.

64. An overarching objective behind the waste sector policy is planned compliance with the European Union (EU) waste sector directives, and relevant objectives for landfill operation and waste separation, minimization, recycling and reuse. Full compliance is planned for 2023.

65. The most important policy framework documents for the waste sector include the Development Plan and the soon to be published Waste Management Action Plan for the period 2015–2023. In line with these, the National Climate Change Strategy includes a set of broad objectives and the National Climate Change Action Plan includes a set of quantitative targets relating to reducing the quantity of biodegradable waste admitted to landfill sites and the introduction of landfill sites managed by municipalities, to be completed by 2023.

66. Policy instruments for GHG emission reduction in the waste sector include a set of regulations and programmes coordinated by MEU. The Regulation Regarding Basic Principles of Waste Management and the Regulation Regarding Regular Storage of Waste target municipalities to ensure that wastes are managed without damaging the environment and human health. MEU also provides capacity development and co-financing for related investments, for example, under the project for the management of uncontrolled storage sites in Turkey.

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

67. The NC5 includes information on Turkey's participation in meetings and negotiations related to emissions from international air and maritime transport, but it does not clearly identify the steps it has taken to promote and implement decisions by the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO). The ERT recommends that Turkey include the steps it has taken to promote and implement decisions by ICAO and IMO in its next NC.

68. In a section in its NC5 on information to be reported under Article 3, paragraph 14, of the Kyoto Protocol, Turkey reported that its PaMs have no adverse effects on developing countries. However, the ERT noted that as an Annex I Party without a target under the Kyoto Protocol, Turkey does not have to report information under Article 3, paragraph 14, although the requirement under Article 2 to report information on how Turkey strives to implement PaMs in such a way as to minimize adverse effects does apply. The ERT recommends that Turkey improve the transparency of its reporting by reporting the related information specifically under Article 2 of the Kyoto Protocol in its next NC.

69. Furthermore, the ERT noted that the information reported is not fully transparent as it is not clear how Turkey determined that its PaMs have no adverse effects on developing countries. For example, several reported PaMs on energy supply could have a bearing on international trade with developing country Parties. The ERT recommends that Turkey improve transparency by explaining how it strives to implement PaMs under Article 2 of the Kyoto Protocol in such a way as to minimize adverse effects, namely by explaining in its next NC how the risk of adverse effects of its PaMs on developing countries was assessed and addressed.

C. Projections and the total effect of policies and measures

70. In the projections section of its NC5 Turkey reported that because it doesn't have a GHG emissions target it did not consider the need to report the required information on GHG emission projections. During the review, Turkey provided additional information on a study conducted by MEU (2010–2011), which included GHG emission projections, impacts of climate policies and the cost of GHG emission reductions. This information, initially included in an earlier version of the NC5, was not included in the final submission by Turkey. Furthermore, following a request by the ERT during the review, Turkey indicated that there is an ongoing study carried out by the Scientific and Technological Research Council of Turkey mandated to produce information conforming to the specific requirements of the UNFCCC reporting guidelines on NCs, such as those on GHG emission projections and other related matters, the results of which are planned to be presented in the forthcoming biennial report (BR) submission.[5]

1. Projections overview, methodology and key assumptions

71. Turkey did not report a set of projections in its NC5 (see para. 70 above). During the review, Turkey mentioned that GHG emission projections had been prepared using the TIMES Macro model for 'with measures', 'without measures' and 'with additional measures' scenarios for 2020 and up to 2050, the results of which are expected to become available in late 2015 and are planned to be included in Turkey's forthcoming sixth national communication (NC6), first biennial report (BR1) and second biennial report.

72. Despite the explanation provided by Turkey in its NC5, the ERT considers that Turkey has to report the required elements on projections specified in the UNFCCC reporting guidelines on NCs, and recommends that Turkey report GHG emission projections at a minimum under a 'with measures' scenario in accordance with the specific requirements of the UNFCCC reporting guidelines on NCs in future NCs and BRs. The ERT also encourages Turkey to report GHG emission projections under 'without measures' and 'with additional measures' scenarios. The ERT noted that the failure to submit a section on projections could become a potential problem with reporting in accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1, annex, para. 138).

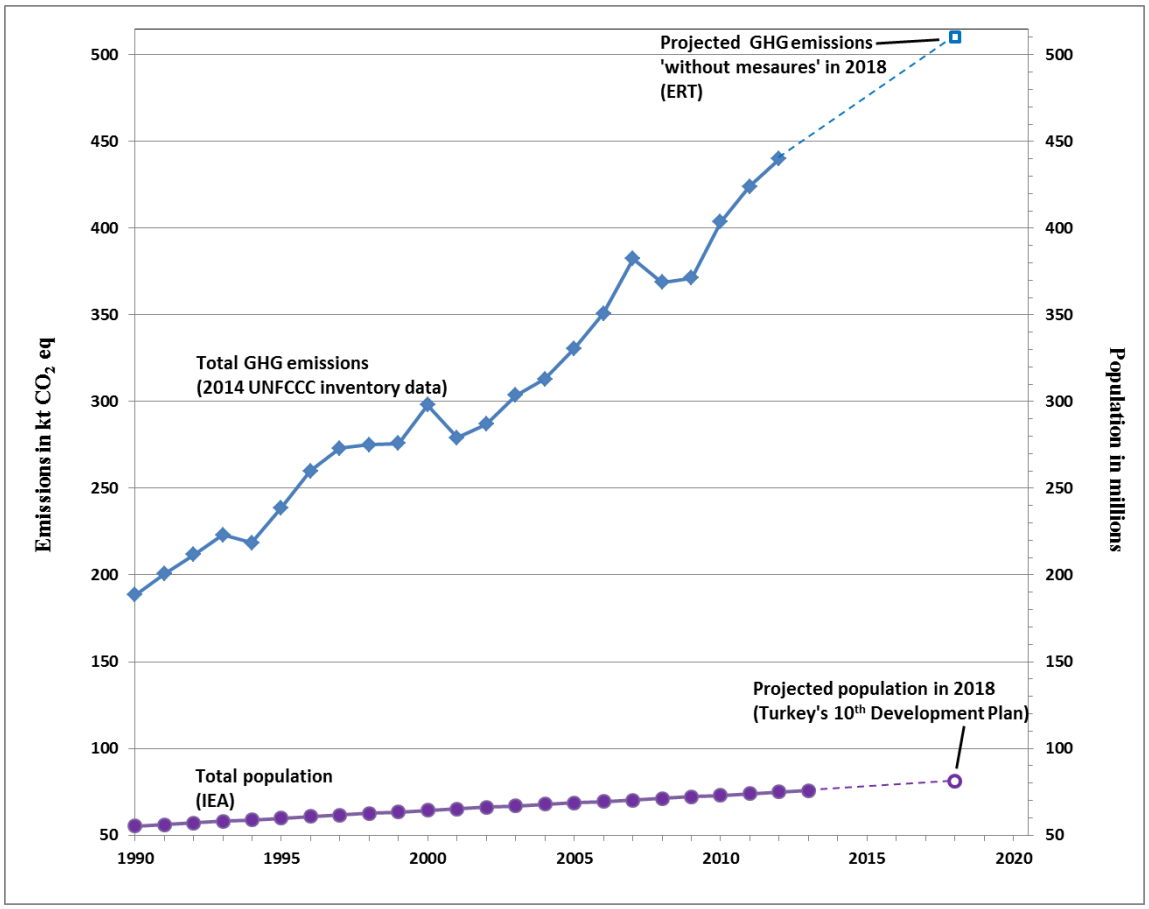
2. Results of projections

73. In the absence of GHG emission projections and related information in Turkey's NC5 (see table 5 below), the ERT used the Tenth Development Plan's forecast value for population in 2018 combined with a linear extrapolation of the trend in GHG emissions per capita in 2018 to estimate GHG emissions in 2018. The ERT used the population forecast value for 2018 rather than a GDP forecast because population forecasts are less subject to unforeseen shocks and therefore more reliable.

74. The GHG emission forecast for 2018 presented in the figure below is equivalent to a 'without measures' scenario since it includes no new measures after 2012 (the GHG emissions 1990–2012 include by default the effect of PaMs implemented before 2012). In the absence of new measures being implemented after 2012, the ERT assessed that Turkey's GHG emissions in 2018 could reach a level that is in the broad range of 170 per cent above the 1990 GHG emissions level.

[5] The first BR submission, which was not reported by Turkey was due on 1 January 2014. The second BR submission is due on 1 January 2016.

Greenhouse gas emission projections



Sources: (1) Data for the years 1990–2012: Turkey's 2014 greenhouse gas inventory submission; the emissions are without land use, land-use change and forestry; (2) Data for 2018: estimated by the expert review team based on Turkeys' Tenth Development Plan forecast value for population in 2018 and a linear extrapolation of the trend in GHG emissions per capita in 2018.

Abbreviations: ERT= expert review team, GHG = greenhouse gas, IEA = International Energy Agency.

Table 5
Summary of greenhouse gas emission projections for Turkey

	Greenhouse gas emissions (kt CO_2 eq per year)	*Changes in relation to the base year level (%)*	*Changes in relation to the 1990 level (%)*
Kyoto Protocol base year[a]	Not applicable	Not applicable	Not applicable
Kyoto Protocol target for the first commitment period (2008–2012)[b]	Not applicable	Not applicable	Not applicable
Kyoto Protocol target for the second commitment period (2013–2020)[b]	Not applicable	Not applicable	Not applicable
Quantified economy-wide emission reduction target under the Convention[c]	Not applicable	Not applicable	Not applicable
Inventory data 1990[d]	188 434.23	Not applicable	0.0

	Greenhouse gas emissions (kt CO_2 eq per year)	*Changes in relation to the base year level (%)*	*Changes in relation to the 1990 level (%)*
Inventory data 2012[d]	439 873.72	Not applicable	133.4
Average annual emissions for 2008–2012[d]	401 468.63	Not applicable	113.1
'Without measures' projections for 2020[e]	Not reported	Not applicable	Not available
'With measures' projections for 2020[f]	Not reported	Not applicable	Not available
'With additional measures' projections for 2020[f]	Not reported	Not applicable	Not available

[a] "Base year" in this column refers to the base year used for the targets under the Kyoto Protocol, while for the target under the Convention it refers to the base year used for that target.

[b] Turkey does not have a target under the Kyoto Protocol's first and second commitment periods.

[c] Turkey does not have a quantified economy-wide emission reduction target under the Convention.

[d] Turkey's 2014 greenhouse gas inventory submission; the emissions are without land use, land-use change and forestry.

[e] Although Turkey did not report projections in its fifth national communication, the expert review team estimated that in 2018, the emissions level corresponding to a 'without measures' scenario would be around 510,300 kt CO2 eq, or 170.8 per cent above the 1990 emissions level.

[f] Turkey's fifth national communication does not include any information on greenhouse gas emission projections.

3. Total effect of policies and measures

75. The NC5 does not include information required by the UNFCCC reporting guidelines on NCs on the estimated and expected total effect of implemented and adopted PaMs (see table 6 below). The ERT recommends that Turkey report the estimated and expected total effects of its PaMs in its future NCs and BRs.

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

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)*
Energy (without transport)	NE	NA	NE	NA
Transport	NE	NA	NE	NA
Industrial processes	NE	NA	NE	NA
Agriculture	NE	NA	NE	NA
Land-use change and forestry	NE	NA	NE	NA
Waste management	NE	NA	NE	NA
Total	**NE**	**NA**	**NE**	**NA**

Abbreviations: NE = not estimated, NA = not available.

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

76. Turkey is not included in Annex II to the Convention and is therefore not obliged to adopt measures and fulfil the obligations referred to in Article 10 of the Kyoto Protocol, as defined in Article 4, paragraphs 3–5, of the Convention. However, its NC5 did include some relevant information on the provided support on capacity-building and technology transfer to other Parties (Afghanistan, Azerbaijan, Cyprus, Kazakhstan, Uzbekistan and others) in relation to the meteorological observation and satellite communication systems (see paras. 89 and 105 below). The ERT commends Turkey for the information provided.

E. Vulnerability assessment, climate change impacts and adaptation measures

77. Turkey has provided the required information in its NC5 on the expected impacts of climate change in the country and on adaptation options, addressing the encouragement made to that effect in the previous review report related to the impacts of climate change on electricity demands, tourism, forests and water storage. The ERT welcomes the comprehensive reporting on adaptation measures in the areas of water resources; agriculture and food security; natural disasters; services of aquatic (lake and rivers), terrestrial (meadows, pastures, forests and wetlands) and marine ecosystems; coastal zones; public health; settlements; and tourism.

78. During the review, Turkey provided the ERT with information on its national policies on adaptation as contained in the National Climate Change Adaptation Strategy and Action Plan, published in 2012. Furthermore, Turkey presented updated information on the expected impacts of climate change in the region and recent adaptation measures undertaken or planned. Turkey conducted an assessment of the vulnerability of water resources as part of the Climate Change Impacts on Water Resources project (2013–2016) under the Ministry of Forestry and Water Affairs. In addition, a new vulnerability project is planned in order to assess the consequences of the changes in the water regime for the other sectors. In the agriculture and food security area, several projects are ongoing under the General Directorate of Agricultural Reform of the Ministry of Food, Agriculture and Livestock, including the Land Consolidation Project, the Land Rehabilitation and Soils Conservation Project and the development of an Action Plan for Combating Agricultural Drought. For the management of disaster risk, the Disaster and Emergency Management Presidency has undertaken the following recent initiatives: the Disaster Data Inventory, the Technological Disasters Guideline Document 2015–2023 (implementation phase) and the Turkish Integrated Disaster Hazard Map (under development).

79. Turkey presented the National Programme and Action Plan for the Mitigation of Climate Change Health Effects, developed in 2015 by the Ministry of Health and the Public Health Institute, which had recently entered into force. The aim of the action plan is to inform the population on, and protect it from, extreme events. Turkey provided information on adaptation measures for the fisheries sector developed by the General Directorate of Fisheries of the Ministry of Food, Agriculture and Livestock. During the review, Turkey also provided information on the vulnerability of some industrial production sectors (e.g. textile production).

80. The ERT encourages Turkey to provide information on vulnerability and adaptation measures in industry and fisheries in its next NC. Table 7 summarizes the information on

vulnerability and adaptation to climate change presented in the NC5. The list of vulnerable areas is in the order given by the Party.

Table 7
Summary of information on vulnerability and adaptation to climate change

Vulnerable area	*Examples/comments/adaptation measures reported*
Water resources	*Vulnerability*: significant decreases in precipitation rates expected in the Mediterranean region and increases in the Black Sea region in winter and spring, which could lead to both drought and floods. Expected changes in surface water resources will affect groundwater, resulting in a lack of resources for agricultural application in some regions and salinization. Urban water distribution systems and hydroelectric power plants could be affected *Adaptation*: further implementation of the European Union (EU) water framework directive; development of basin management plans for the integrated management of water resources; promotion of the effective use of water resources by enhancement, rehabilitation and modernization of irrigation systems; prevention of water pollution; increase in capacities of hydroelectric power plants and water storage facilities
Agriculture and food security	*Vulnerability*: decrease in yields and total agricultural production owing to the changes in the temperature and precipitation regimes, particularly in the Mediterranean Basin. Non-irrigated regions that receive less rainfall are the most vulnerable. Product losses in agriculture could be caused by flooding *Adaptation*: research and development studies on climate change and agriculture; a number of agricultural projects on aridity issues (e.g. Action Plan for Combating Agricultural Drought); land consolidation, rehabilitation and soils conservation; development of crop varieties best adapted to changing climate; dissemination of water-saving irrigation systems; increase awareness of farmers
Natural disasters	*Vulnerability*: third highest exposure to extreme hydro-meteorological events from climate change in Europe and Central Asia; increased number of storms and floods; landslides and rock falls will increasingly threaten eastern Anatolia, the south-eastern and Black Sea regions; economic losses are projected to increase owing to natural disasters; heatwaves lead to the growth of electricity consumption *Adaptation*: measures for drought and flooding prevention; climate-resilient management of agriculture and water; disaster risk management and reduction; number of projects on the assessment and management of flood risks, such as EU directive 2007/60/EC, early warning systems and the Disaster Data Inventory
Ecosystem services	*Vulnerability*: rivers and lakes: decreased precipitation in the Mediterranean region leads to increased drought that may result in water shortage, reduction of river flow, reduction in surface areas of lakes and growth of cyanobacteria Meadow and pastures may become forests if temperatures increase, steppe may be transformed into a desert ecosystem as a result of wind erosion Forests: increase in forest fires, loss of biodiversity of up to 50 per cent, introduction of exotic species, development of plant diseases and insect infestations, forest expansion due to the shift of steppe and meadow zones, forest area reduction due to drought conditions

Vulnerable area	*Examples/comments/adaptation measures reported*
	Wetlands: desertification might impact flora and fauna in wetlands in central Anatolia and Salt Lake
	Marine ecosystems: rise in the Black Sea level of about 2 mm per year, rise in the Mediterranean Sea level of about 1.2 mm per year, change of biodiversity due to the temperature fluctuations, increased water salinity
	Adaptation: irrigation management, prevention of water pollution, adjustment of the fish population by biomanipulation, sustainable use of forest resources, protection of biological diversity via the National Biological Diversity Strategy and Action Plan, the Afforestation and Erosion Control Mobilisation Action Plan, the Combating Desertification Turkish National Forestry Program and the protection of marine ecosystems
Coastal zones	*Vulnerability*: local tectonic movements increase the vulnerability of coastal zones, low vulnerability due to sea level rise except the Marmara region, increased coastal erosion, risk of inundation of agricultural lands, dunes and wetlands in coastal zones, adverse impact on tourism
	Adaptation: restoration and rehabilitation of dunes, river basin management in the coastal zones, research and modelling
Public health	*Vulnerability*: deaths and diseases from extreme weather events, increased number of various diseases such as respiratory diseases due to rising temperatures and air pollution; malaria, leishmania and dengue from vectors and rodents; waterborne and foodborne diseases; and skin cancer and cataracts
	Adaptation: raising public awareness, prevention of infectious diseases, control of air pollution, sustainable management of water resources, disaster risk management
Settlements and tourism	*Vulnerability*: settlements may be greatly affected by extreme events, water shortage and drought; shift of comfortable temperature levels towards autumn and winter in coastal zones may affect tourism positively
	Adaptation: measures to manage water resources, protection of coastal zones, "resilience cities" project that supports the integration of ecosystem services into urban planning, Integrated Urban Development Strategy and Action Plan 2010–2023

81. In its NC5, Turkey presented a balanced report on mitigation and adaptation measures undertaken and planed. It has reported research studies on vulnerability and climate change impacts in the following areas: water resource management; agriculture and food security; forest and other ecosystems; public health; and settlements and tourism. The major expected socioeconomic impacts in Turkey will be caused by a change in precipitation and river water regimes causing flood or drought. This will affect agriculture, urban water distribution systems, production of hydroelectricity and other sectors.

82. Turkey reported international cooperation on adaptation, including: the establishment of the Regional Centre for Black Sea and Middle East early warning system, and membership of the Black Sea Commission under the Convention on the Protection of the Black Sea Against Pollution.

F. Research and systematic observation

83. Turkey has provided information on its actions relating to research and systematic observation, and addressed both domestic and international activities, including relevant World Meteorological Organization (WMO) programmes, the Global Observing System (GOS), the Global Climate Observing System (GCOS), the Baseline Surface Radiation Network, the Global Atmosphere Watch, the monitoring network under the United Nations Economic Commission for Europe Convention on Long-range Transboundary Air Pollution, the Convention on the Protection of the Black Sea Against Pollution and a number of scientific projects under EU 7th Framework Programme. The NC5 also reflects action taken to support related capacity-building in developing countries. Furthermore, Turkey has provided a summary of information on GCOS activities.

84. The ERT noted that, in its NC5, Turkey has reported information on opportunities for free and open international exchange of data and information (such as exchange of data within the frameworks of WMO, GOS and GCOS). However, barriers for that exchange and actions taken to overcome such barriers had not been identified. Furthermore, the ERT noted that the results of socioeconomic analysis, including analysis of both the impacts of climate change and the response options, are not explained in the NC5.

85. During the review, Turkey specified that there are no identified barriers for the exchange of data and information. In addition, Turkey reported on the progress made in the socioeconomic studies of the impact of climate change on the national level and of response measures. The ERT welcomes this progress.

86. The ERT therefore encourages Turkey to enhance the transparency of its reporting by providing detailed information on barriers to the free exchange of data and information in its next NC, even if there are no barriers identified. The ERT also encourages Turkey to report in its next NC on the results of the socioeconomic studies referred to in paragraph 85 above, including an analysis of the impacts of both climate change and response options.

87. Turkey also provided additional information on research on modelling of future climate in the region and the recent development of an automatic observation station network, including an upper air observation station, solar stations and automatic meteorological stations. Information was provided about the planned establishment of a climate change research, technology and education centre project under the EU Instrument for Pre-accession Assistance (IPA). The project will start in 2016 and continue for two years to conduct scientific studies at the Climate Change Research Institute of Turkey and encourage scientific research at the national and regional levels.

88. The Higher Board of Science and Technology (HBST) is responsible for the general policy on research and systematic observation and consists of representatives of the relevant ministers and organizations. The National Science, Technology and Innovation System operates under HBST and enables the participation of relevant stakeholders, including the private sector, civil society organizations, universities and the broader public. Funding for national research and development is increasing annually. Public budget and other various sources of research financing are available in Turkey, including private sector, universities and foreign sources. Turkey actively participates in international activities related to research and systematic observation (see para. 83 above). Domestic activities include paleoclimatology and modelling future climate change in the region, conducted in particular by the Turkish State Meteorological Service, Climatological Department. Research on the impacts of climate change has also been conducted by universities, government organizations and NGOs. The Ministry of Food, Agriculture and Livestock has performed studies on monitoring the impact of climate change on agriculture. Research on mitigation focuses on energy efficiency, renewable energy and alternative

energy sources and fuel cells. Many of such projects are supported by the Scientific and Technological Research Council of Turkey.

89. The ERT noted that although Turkey does not have obligations to support developing countries in technology transfer and capacity-building, calibration services are provided to some countries (Afghanistan, Kazakhstan, Uzbekistan and others) by the Meteorological Instruments Calibration Center. Satellite communication systems have been established in Azerbaijan and Cyprus. Regional cooperation for flood early warning has been agreed and covers Azerbaijan, Armenia, Bulgaria, Georgia and the Syrian Arab Republic.

90. Turkey has provided GCOS with information from seven surface stations on air temperature and one upper atmosphere station on wind speed and direction and water vapour. A total of 180 Turkish stations are currently included in GOS and the number of such stations is increasing.

G. Education, training and public awareness

91. In its NC5, Turkey has provided information on its actions relating to education, training and public awareness at the domestic and international levels. Compared with the NC1, the Party has provided more information on medium- and long-term objectives for education, public awareness and establishing institutional capacity, as well as on the participation of NGOs in the preparation of the NC5. The ERT commends Turkey for improved reporting.

92. During the review, Turkey provided additional updated information on new projects such as:

(a) Preparation of the NC6 (financed by national resources, executed by MEU and implemented by the Scientific and Technological Research Council of Turkey - Marmara Research Center) and BR1 (financed by the Global Environment Facility, executed by MEU and implemented by the United Nations Development Programme). A number of workshops and training on measurement, reporting and verification, and support for the process of the development of an INDC are planned under the BR1 project;

(b) Increasing Awareness of Climate Change project (national investment programme). Training of students and teachers and capacity-building in local provinces are planned with the active involvement of both public institutions and NGOs;

(c) IPA-I Capacity Building in the Field of Climate Change in Turkey project (EU grant) to increase public awareness and strengthen corporate capacity with regard to climate change and the protection of the ozone layer. A series of workshops and training programmes and grants to NGOs and universities are planned within this project.

93. During the review, Turkey further informed the ERT about cooperation with NGOs, universities, public organizations and business associations, including with regard to public awareness and education, and their involvement in the process of the preparation of NCs. Turkey has provided comprehensive information on the information centres existing in the country.

94. The ERT encourages Turkey to include updated information on the matters referred to in paragraphs 92 and 93 above in its next NC.

95. In accordance with Environmental Law No. 2872 (last revised in 2006), environmental issues should be presented in the formal education institutions of the Ministry of National Education. Moreover, means of raising public awareness of environmental issues are defined by the law. Except for the activities organized by the

centralized administration system, a large number of educational activities are conducted in cooperation with NGOs, the private sector and universities or on their own behalf. Several training programmes and workshops have been organized since 2009 in the context of the United Nations Joint Programme on Enhancing the Capacity of Turkey to Adapt to Climate Change. International education courses conducted in the WMO Regional Education Centre (Alanya, Turkey) were attended by participants from 10 developing countries. Various sources of financing are used for different actions (budget investments, international organizations, the United Nations Development Programme, the United Nations Environment Programme and the Food and Agriculture Organization of the United Nations; private-sector financing).

96. In its NC5, Turkey has identified priorities in education and public awareness actions in accordance with the National Climate Change Action Plan (2011–2023), including: the development of training programmes for staff in technical education institutions; the inclusion of climate change education courses in universities and formal education programmes; raising public awareness of the role of individuals with regard to climate change; and the creation of reliable information channels to change consumption patterns. Short-term targets include the development of basic training on climate change negotiations for the relevant personnel in the ministries, and making decision makers aware of the issue. Medium-term targets include disseminating the results of climate change research to all stakeholders, updating education and training programmes and establishing climate change centres in universities.

97. A number of climate change projects have been launched by business organizations and NGOs, including: the Protecting Forests project (WWF-Turkey and TOYOTA-SA); the Decreasing Carbon Emissions project (WWF-Turkey and Turkish Association of Banks); the "How is the Weather Tomorrow" project (Turkish energy company Aygaz and the Regional Environmental Center) on climate education; and several projects implemented by the Turkish Foundation for Combating Soil Erosion, for Reforestation and the Protection of Natural Habitants. NGOs are actively involved in projects in cooperation with public organizations, such as the Traces of the Future project, which aims to develop awareness of environmental protection (global warming) for children. NGOs, business associations and representatives from universities participated in 10 meetings for the preparation and revision of the NC5. The Turkish Industry and Business Association and the Union of Chambers and Commodity Exchanges of Turkey are members of the Coordination Board on Climate Change and Air Management.

III. Summary of reviewed supplementary information under the Kyoto Protocol

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

98. The supplementary information under Article 7, paragraph 2, of the Kyoto Protocol provided by Turkey in its NC5 is mostly complete and mostly transparent. The supplementary information is located in different sections of the NC5. Table 8 provides an overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol as well as references to the sections or pages of the NC5 in which this information is provided.

99. Turkey has not reported in a complete or transparent manner the following elements of the supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol: means used for informing the public on its administrative procedures for reporting

under the Kyoto Protocol; steps taken to promote and/or implement any decisions by ICAO and IMO; explicit reference to Article 2 of the Kyoto Protocol in providing the required information; explanation of how it strives to implement PaMs under Article 2 of the Kyoto Protocol in such a way as to minimize adverse effects; and explicit reference to Article 10 of the Kyoto Protocol in reporting the required information. 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 Turkey include these reporting elements in its next NC.

Table 8
Overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

Supplementary information	*Reference to the fifth national communication*
National registry	Not applicable
National system	Section 3.5
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Not applicable
Policies and measures in accordance with Article 2	Sections 4.9 and 4.10
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	Sections 2.7, 4.1, 4.2 and 9.5 (pages 53, 96, 101 and 267)
Information under Article 10	Sections 8.3.1 and 8.4
Financial resources	Not applicable

Note: Turkey, as a Party included in Annex I with no commitments inscribed in Annex B to the Kyoto Protocol, has no obligation to report on a national registry, national system or supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17. Reporting on financial resources under the Kyoto Protocol is relevant for developed country Parties and other developed Parties included in Annex II to the Convention (Annex II Parties). As Turkey is not an Annex II Party, it does not have an obligation to provide information on financial resources under Article 11 of the Kyoto Protocol, including on "new and additional" resources.

IV. Conclusions and recommendations

100. The ERT conducted a technical review of the information reported in the NC5 of Turkey according to the UNFCCC reporting guidelines on NCs. The ERT concludes that the NC5 provides a general overview of the national climate policy of Turkey. The information provided in the NC5 includes most elements of the supplementary information under Article 7 of the Kyoto Protocol with the exception of information on: means used for informing the public on its administrative procedures for reporting under the Kyoto Protocol; steps taken to promote and/or implement any decisions by ICAO and IMO; explicit reference to Article 2 of the Kyoto Protocol in providing the required information; explanation of how it strives to implement PaMs under Article 2 of the Kyoto Protocol in such a way as to minimize adverse effects; and explicit reference to Article 10 of the Kyoto Protocol in reporting the required information.

101. Turkey's emissions for 2012 were estimated to be 163.3 per cent above its 1990 level excluding LULUCF and 133.4 per cent above including LULUCF. Emission increases were driven by strong economic and population growth and related increases in electricity demand.

102. Turkey did not report projections of its emissions in the NC5 and did not provide additional information on its projections during the review. The ERT noted that the failure to submit a section on projections could become a potential problem with reporting in accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1, annex, para. 138).

103. In its NC5, Turkey reported on its implemented, adopted and planned PaMs in achieving its commitments under the Convention. Turkey's key framework climate policy is the National Climate Change Strategy from 2010. It includes a set of sectoral targets for the period 2010–2020. The National Climate Change Action Plan from 2011 accompanies the strategy and includes a set of activities across the portfolios of the sectoral ministries for the period 2011–2023. The energy sector represented 70.2 per cent of total GHG emissions of Turkey in 2012. The policies in this sector reported by Turkey include: increasing the share of electricity from nuclear power to 10 per cent by 2023; decreasing the share of natural gas within the energy mix to 30 per cent by 2023; increasing the share of electricity from renewable sources to 30 per cent by 2023, including through using feed-in tariffs to promote private-sector investment in electricity production from renewable sources. Turkey also reported boosting the role of 'clean' coal in its energy mix even though it could lead to an increase in emissions. Turkey also undertakes efforts to reduce GHG emissions in non-energy sectors, including in industrial processes, agriculture, forestry and waste.

104. Turkey has provided information in its NC5 on impacts, vulnerability and adaptation for the major sectors such as water resources, agriculture and food security, natural disasters, ecosystem services, coastal zones, public health and settlements and tourism. The major expected socioeconomic impacts in Turkey will be caused by a change in precipitation and river water regimes causing flood or drought. This will affect agriculture, urban water distribution systems, production of hydroelectricity and other sectors.

105. Turkey has provided information on its actions relating to research and systematic observation, and addressed both domestic and international activities. HBST is responsible for the general policy. Public budget and other various sources of research financing are available in Turkey, including the private sector, universities and foreign sources. Turkey actively participates in international activities related to research and systematic observation. Domestic activities include paleoclimatology and modelling of future climate change in the region. The ERT noted that although Turkey does not have obligations to support developing countries in technology transfer and capacity-building, calibration services are provided to some countries (Afghanistan, Kazakhstan, Uzbekistan and others) by the Meteorological Instruments Calibration Center. Satellite communication systems have been established in Azerbaijan and Cyprus.

106. Turkey has provided information on its actions relating to education, training and public awareness at both the domestic and the international level. The priorities identified in accordance with the National Climate Change Action Plan (2011–2023) include: development of training programmes for staff in technical education institutions; climate change education courses in universities and formal education programmes; and raising of public awareness of the role of individuals with regard to climate change. Except for the activities organized by the centralized administration system, a large number of activities are conducted in cooperation with NGOs, the private sector and universities or on their own behalf.

107. In the course of the review, the ERT formulated several recommendations relating to the completeness and transparency of the reporting by Turkey under the Convention and its Kyoto Protocol. The key recommendations[6] are that Turkey:

(a) Improve the completeness of its reporting by including in the next NC the following information:

(i) A description of how each aspect of the national circumstances and their changes affect GHG emissions and removals over time (para. 14 above);

(ii) Summary information from the national GHG inventory for the period from 1990 to the last but one year prior to the year of submission of the NC (para. 17 above);

(iii) Means used for informing the public on its administrative procedures for reporting under the Kyoto Protocol (para. 24 above);

(iv) How PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals (para. 31 above);

(v) Steps it has taken to promote and implement any decisions by ICAO and IMO (para. 67 above);

(vi) GHG emission projections at a minimum under a 'with measures' scenario (para. 72 above);

(vii) Expected total effects of its PaMs (para. 75 above);

(b) Improve the transparency of its reporting by including in the next NC the following information:

(i) The way in which the included PaMs were determined to be the principal PaMs (para. 27 above);

(ii) Correspondence between the lists of PaMs in the text and those in the tables (para. 28 above);

(iii) GHGs affected by PaMs, the types of PaMs and the implementation status, not only in the tables but also in the text (para. 29 above);

(iv) Specific GHGs affected for all PaMs (para. 30 above);

(v) Inclusion of a reference to Article 2 of the Kyoto Protocol (para. 68 above);

(c) Explanation of how the risk of adverse effects of its PaMs on developing countries was assessed (para. 69 above).

V. Questions of implementation

108. No question of implementation was raised by the ERT during the review.

[6] The recommendations are given in full in the relevant sections of this report.

Annex

Documents and information used during the review

A. Reference documents

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

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

"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol". Decision 15/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>.

"Guidelines for review under Article 8 of the Kyoto Protocol". Decision 22/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>.

"Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention". Annex to decision 13/CP.20. Available at <http://unfccc.int/resource/docs/2013/cop19/eng/10a02.pdf#page=20>.

FCCC/SBI/2011/INF.1. Compilation and synthesis of fifth national communications. Executive summary. Note by the secretariat. Available at <http://unfccc.int/resource/docs/2011/sbi/eng/inf01.pdf>.

FCCC/SBI/2011/INF.1/Add.1. Compilation and synthesis of fifth national communications. Note by the secretariat. Addendum. Policies, measures, and past and projected future greenhouse gas emission trends of Parties included in Annex I to the Convention. Available at <http://unfccc.int/resource/docs/2011/sbi/eng/inf01a01.pdf>.

FCCC/SBI/2011/INF.1/Add.2. Compilation and synthesis of fifth national communications. Note by the secretariat. Addendum. Financial resources, technology transfer, vulnerability, adaptation and other issues relating to the implementation of the Convention by Parties included in Annex I to the Convention. Available at <http://unfccc.int/resource/docs/2011/sbi/eng/inf01a02.pdf>.

FCCC/ARR/2014/TUR. Report on the individual review of the inventory submission of Turkey submitted in 2014. Available at <http://unfccc.int/resource/docs/2015/arr/tur.pdf>.

FCCC/IDR.1/TUR. Report of the in-depth review of the first national communication of Turkey. Available at <http://unfccc.int/resource/docs/2009/idr/tur01.pdf>.

Fifth national communication of Turkey. Available at <http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/nc5_turkey[1].pdf>.

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

2014 GHG inventory submission of Turkey. 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 Ms. Kader Tuğan (Ministry of the Environment and Urbanisation), including additional material on updated policies and measures, greenhouse gas projections, the national registry and recent climate policy developments in Turkey. The following documents[1] were also provided by Turkey:

Turkey's National Climate Change Adaptation Strategy and Action Plan 2011–2023. Ministry of Environment and Urbanization. 2014.

National progress report on the implementation of the HYDRO framework for action (2013–2015). Presidency of Disaster and Emergency Management. 2014. Available at <www.afad.gov.tr>.

Turkey's National Climate Change Strategy and Action Plan 2011–2023. Ministry of Environment and Urbanization. 2014.

[1] Reproduced as received from the Party.