Advance Version

COMPLIANCE COMMITTEE

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

Note by the secretariat

The report of the technical review of the sixth national communication of Bulgaria was published on 19 February 2015. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decisions 4/CMP.4 and 8/CMP.9), the report is considered received by the secretariat on the same date. This report, FCCC/IDR.6/BGR, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.

ADVANCE VERSION

United Nations FCCC/IDR.6/BGR

Framework Convention on Climate Change

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

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 Bulgaria 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 Bulgaria, the Convention entered into force on 10 August 1995 and the Kyoto Protocol on 16 February 2005. Under the Convention, Bulgaria made a commitment to contribute to the joint European Union (EU) economy-wide emission reduction target of a 20.0 per cent reduction in greenhouse gas (GHG) emissions below the 1990 level by 2020. Within the burden-sharing agreement of the EU for meeting commitments under the Kyoto Protocol, Bulgaria committed itself to reducing its GHG emissions by 8.0 per cent compared with the base year[1] level during the first commitment period, from 2008 to 2012. For the second commitment period of the Kyoto Protocol, from 2013 to 2020, Bulgaria, as a member State of the EU, committed to a joint EU economy-wide emission reduction target to reduce GHG emissions by 20.0 per cent below the 1990 level.

2. This report covers the in-country technical review of the sixth national communication (NC6) of Bulgaria, 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 20 to 25 October 2014 in Sofia, Bulgaria, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: Ms. Irina Atamuradova (Turkmenistan), Ms. Sayeda Ali Ahmed Khalil (Sudan), Mr. Adam Pogorzelski (Poland) and Ms. Inês Sousa Mourão (Portugal). Ms. Atamuradova and Ms. Sousa Mourão were the lead reviewers. The review was coordinated by Mr. Nalin Srivastava (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 Bulgaria 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 Bulgaria in its 2013 annual submission and previous submissions and elaborated further in its 2014 annual submission 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 Bulgaria, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

B. Summary

6. The ERT conducted a technical review of the information reported in the NC6 of Bulgaria 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

[1] "Base year" refers to the base year under the Kyoto Protocol, which is 1988 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.

information required under Article 7, paragraph 2, of the Kyoto Protocol[2] is provided in the NC6 (see para. 124 below). The supplementary information on the minimization of adverse impacts referred to in paragraph 4 above is complete and mostly transparent.

7. Bulgaria considered part of the recommendations provided in the report of the in-depth review of the fifth national communication (NC5) of Bulgaria.[3] In response to the recommendations in the in-depth review report of the NC5, Bulgaria provided projections for the land use, land-use change and forestry (LULUCF) sector and public information available on the national registry website. The ERT commended Bulgaria for its improved reporting. During the review, Bulgaria provided further relevant information such as the Climate Change Mitigation Act, the Third National Action Plan on Climate Change (TNAPCC) and the 2014 version of the model used for projections.

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 30 December 2013, before the deadline of 1 January 2014 mandated by decision 9/CP.16. Bulgaria submitted revised versions of the NC6 on 2 October 2014 and 22 October 2014. The ERT noted that the NC6 was resubmitted twice after the deadline, which posed some constraints to the in-country review of the NC6 as the resubmissions took place quite close to and during the in-country review.

3. Adherence to the reporting guidelines

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

[2] Decision 15/CMP.1, annex, chapter II.
[3] FCCC/IDR.5/BGR.

Table 1
Assessment of completeness and transparency issues of reported information in the sixth national communication of Bulgaria[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	Mostly complete	Transparent	24
National circumstances	Complete	Transparent		National registries	Complete	Transparent	
Greenhouse gas inventory	Complete	Transparent		Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Complete	Transparent	
Policies and measures (PaMs)	Partially complete	Mostly transparent	41–44	PaMs in accordance with Article 2	Mostly complete	Transparent	80
Projections and total effect of PaMs	Mostly complete	Partially transparent	84–86, 104	Domestic and regional programmes and/or arrangements and			31
Vulnerability assessment, climate change impacts and adaptation measures	Complete	Transparent		Information under Article 10[b]	NA	NA	
Financial resources and transfer of technology[c]	NA	NA		Financial resources[c]	NA	NA	
Research and systematic observation	Mostly complete	Transparent	116	Minimization of adverse impacts in accordance with Article 3, paragraph 14	Complete	Transparent	
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.

[b] 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 only. Assessment of the information provided by the Party on the other provisions of Article 10 of the Kyoto Protocol is provided under the relevant substantive headings under the Convention, for example research and systematic observation.

[c] Reporting on financial resources under the Kyoto Protocol is relevant for developed country Parties and other developed Parties that are included in Annex II to the Convention (Annex II Parties). As Bulgaria 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 NC6, Bulgaria has provided a concise 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 policies and measures (PaMs) is provided in chapter II.B below.

12. In its NC6, Bulgaria has provided information on government structure, geography, climate, population and economy, as well as on relevant economic sectors such as land use and natural resources, agriculture, forestry, energy, industry, transport and waste.

13. However, the ERT noted that the information in the NC6 does not provide a transparent description of how Bulgaria's national circumstances are relevant to factors affecting GHG emissions and removals. During the review, Bulgaria provided additional information on projected trends of macroeconomic indicators and their impacts on future developments of various economic sectors. This information, although useful, does not specifically address the factors affecting GHG emissions. The ERT encourages Bulgaria to provide more transparent information on how its national circumstances are relevant to factors affecting GHG emissions and removals, including disaggregated indicators, to explain the relationship between national circumstances and emissions or removals.

14. During the review, Bulgaria provided additional information on the national circumstances, including energy prices and subsidies, building stock and energy-efficient practices for buildings.

15. In accordance with Article 4, paragraph 6, of the Convention and decision 9/CP.2, Bulgaria, as a Party with an economy in transition, may use 1988 as its base year.

16. The ERT noted that during the period 1990–2012, Bulgaria's population decreased by 16.2 per cent and its gross domestic product (GDP) increased by 35.6 per cent, while GHG emissions per GDP and GHG emissions per capita decreased by 58.9 and 33.4 per cent, respectively. This shows that Bulgaria has been able to achieve a significant reduction in GHG emissions in spite of sustained growth in GDP, indicating a certain degree of decoupling of GHG emissions from economic growth. Table 2 illustrates the national circumstances of Bulgaria by providing some indicators relevant to GHG emissions and removals.

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

	1990	*2000*	*2005*	*2010*	*2012*	*Change 1990–2012 (%)*	*Change 2011–2012 (%)*
Population (million)	8.72	8.17	7.74	7.40	7.31	−16.2	−0.5
GDP (2005 USD billion using PPP)	65.60	58.10	75.92	86.69	88.95	35.6	0.8
TPES (Mtoe)	28.22	18.69	19.90	17.90	18.35	–35.0	–4.5
GHG emissions without LULUCF (kt CO_2 eq)	109 824.08	59 666.89	63 860.53	60 466.94	61 259.08	–44.2	–7.5
GHG emissions with LULUCF (kt CO_2 eq)	96 316.26	51 329.72	55 076.48	52 198.07	53 051.60	–44.9	−8.2
GDP per capita (2005 USD thousand using PPP)	7.52	7.11	9.81	11.72	12.18	61.9	1.4
TPES per capita (toe)	3.24	2.29	2.57	2.42	2.51	–22.5	–4.0
GHG emissions per capita (t CO_2 eq)	12.60	7.30	8.25	8.18	8.38	–33.5	–7.0
GHG emissions per GDP unit (kg CO_2 eq per 2005 USD using PPP)	1.67	1.03	0.84	0.70	0.69	–58.8	–8.0

Sources: (1) GHG emission data: Bulgaria's 2014 GHG inventory submission, version 2.1; (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

17. Bulgaria has provided a summary of information on GHG emission trends for the period 1990–2011. This information is consistent with the 2013 national GHG inventory submission. During the review, the ERT took note of the 2014 annual submission. The relevant information therein is reflected in this report. The summary information provided by Bulgaria on the GHG inventory, emissions and trends is complete and transparent.

18. Total GHG emissions[4] excluding emissions and removals from LULUCF decreased by 44.2 per cent between 1990 and 2012, whereas total GHG emissions including net emissions or removals from LULUCF decreased by 44.9 per cent over the same period.

19. According to the 2014 inventory submission, total GHG emissions without LULUCF decreased very rapidly from 1990 to 2001 by 42.8 per cent, with an average annual rate of decrease of 3.9 per cent. However, the total GHG emissions increased by 9.2 per cent from 2001 to 2007, and then decreased in 2008 following the global financial crisis. An analysis of the drivers of GHG emission trends in each sector is provided in

[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.

chapter II.B below. Table 3 provides an overview of GHG emissions by sector from 1990 to 2012.

20. The main reason for the sharply decreasing trend in GHG emissions in Bulgaria in the first decade after 1990 is the economic changes stemming from transition from a centrally planned economy to a market-based economy. The main drivers for this are: decreases in power production from thermal power plants, accompanied by increases in the share of power production from renewable energy sources (RES); structural changes in industry, including declines in production by energy-intensive enterprises and improvements in energy efficiency; the introduction of energy efficiency measures and shifts from solid and liquid fuels to natural gas in fuel consumption in the residential sector; and declines in the cattle and sheep population and reductions in fertilizer use in the agriculture sector. Since 2001, total GHG emissions have increased due to economic growth, albeit at a much smaller rate, before decreasing in 2008 due to the global financial crisis.

21. The most important GHG in Bulgaria is carbon dioxide (CO_2), which had the greatest share of total GHG emissions in 2012 (78.9 per cent). In 2012, CO_2 emissions were 39.7 per cent lower than in 1990. With this dominant share of the total GHG emissions, the trend of CO_2 emissions determines the trend of the total GHG emissions to a large extent. Consequently, the drivers of the trend in CO_2 emissions are also similar to those for the total GHG emissions. The shares of methane (CH_4) and nitrous oxide (N_2O) in total GHG emissions in 2012 were 11.7 and 8.6 per cent, respectively. Since 1990, CH_4 emissions have decreased by 56.6 per cent and N_2O emissions have decreased even more sharply by 59.8 per cent, mainly owing to the PaMs implemented in the waste and agriculture sectors. The trend in emissions of these gases is broadly similar to the trend of the total GHG emissions: a sharp decline in the first decade of the transition to a market-based economy, followed by relative stabilization in the last decade. However, significantly, in contrast to the trend of the CO_2 emissions, these two GHGs showed a steadily decreasing trend throughout the period 1990–2012.

22. Fluorinated gases (F-gases) constituted 0.8 per cent of the total GHG emissions in 2012. The emissions of F-gases have increased exponentially, with the emissions in 2012 being 11,997.1 per cent higher than in 1990. However, there are significant differences in the emission trends of different F-gases. While emissions of sulphur hexafluoride (SF_6) have risen by 208.9 per cent since 1990, the emissions of hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) have increased by as much as 62,874.5 per cent since 1991.[5] The key driver behind this trend has been the substitution of ozone-depleting substances by HFCs in many applications.

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

	GHG emissions (kt CO_2 eq)					*Change (%)*		*Share[a] by sector (%)*	
Sector	*Base year*	*1990*	*2000*	*2010*	*2012*	*Base year–2012*	*2011–2012*	*Base year*	*2012*
1. Energy	83 091.51	75 540.39	42 355.27	46 699.16	47 169.68	–43.2	–9.6	67.8	77.0
A1. Energy industries	42 117.17	38 803.08	24 071.54	31 546.90	31 572.63	–25.0	–13.2	34.4	51.5
A2. Manufacturing	17 562.87	19 608.17	8 478.91	3 794.35	3 349.90	–80.9	–7.6	14.3	5.5

[5] The first year for which HFC and PFC emissions data have been reported by Bulgaria.

Sector	GHG emissions (kt CO_2 eq)					Change (%)		Share[a] by sector (%)	
	Base year	1990	2000	2010	2012	Base year–2012	2011–2012	Base year	2012
industries and construction									
A3. Transport	7 380.46	6 794.01	5 739.55	7 936.96	8 420.09	14.1	3.6	6.0	13.7
A4.–A5. Other	13 031.01	7 774.83	2 407.70	2 012.91	2 244.51	–82.8	–1.5	10.6	3.7
B. Fugitive emissions	3 000.00	2 560.30	1 657.57	1 408.04	1 582.55	–47.2	–10.6	2.4	2.6
2. Industrial processes	11 959.94	8 846.52	6 235.08	3 574.41	3 895.22	–67.4	–2.4	9.8	6.4
3. Solvent and other product use	899.78	897.74	68.38	45.69	40.99	–95.4	–0.5	0.7	0.1
4. Agriculture	20 520.62	18 458.39	6 394.06	6 320.58	6 538.54	–68.1	3.7	16.7	10.7
5. LULUCF	–13 787.68	–13 507.82	–8 337.17	–8 268.87	–8 207.49	–40.5	–2.2	_	_
6. Waste	6 129.73	6 081.05	4 614.09	3 827.11	3 614.65	–41.0	–2.5	5.00	5.9
7. Other	NA	NA	NA	NA	NA	–	–	–	–
GHG total with LULUCF	**108 813.90**	**96 316.26**	**51 329.72**	**52 198.07**	**53 051.60**	**–51.2**	**–8.2**	**NA**	**NA**
GHG total without LULUCF	**122 601.58**	**109 824.08**	**59 666.89**	**60 466.94**	**61 259.08**	**–50.0**	**–7.5**	**100.0**	**100.0**

Source: Bulgaria's 2014 GHG inventory submission, version 2.1 (for GHG emission data).

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.

3. National system

23. Bulgaria 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 NC6 also contains a reference to the description of a national system provided in the report mandated by decision 13/CMP.1, submitted in 2006,[6] and to the national inventory report (NIR) of the 2013 annual submission. The ERT took note of the review of the changes to the national system as reflected in the report of the individual review of the GHG inventory of Bulgaria submitted in 2013.

24. The ERT noted that the NC6 does not include all elements of information on national systems required by the UNFCCC reporting guidelines on NCs, namely a description of the process, the results of key category identification and a description of the process for recalculation of the previously submitted inventory data. This information is included in the NIRs of the 2013 and 2014 annual GHG inventory submissions, but no cross references are provided in the NC6. During the review, Bulgaria acknowledged this issue and agreed to include this information in its next national communication (NC). The

[6] Bulgaria's initial report under the Kyoto Protocol. The report to facilitate the calculation of the assigned amount pursuant to Article 3, paragraphs 7 and 8, of the Kyoto Protocol is available at <http://unfccc.int/national_reports/initial_reports_under_the_kyoto_protocol/items/3765.php>.

ERT recommends that Bulgaria include this information in its next NC to improve the completeness of its reporting.

25. During the review, Bulgaria provided additional information on the national system, elaborating on institutional, legislative arrangements and administrative procedures for GHG inventory planning, preparation and management. Bulgaria provided information on the changes in the national system since the NC5 submission, including promotion of the Emissions Inventory Unit, which is responsible for GHG emissions inventory preparation within the Executive Environment Agency (EEA), to a separate department (Emissions Inventory Department).

4. National registry

26. In its NC6, Bulgaria has provided information on the national registry in accordance with the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1. The ERT took note of the review of the changes to the national registry as reflected in the report of the individual review of the GHG inventory of Bulgaria submitted in 2013.

27. In its NC6, Bulgaria has provided a description of the procedure to minimize discrepancies in the issuance, transfer, acquisition, cancellation and retirement of Kyoto Protocol units and a description of measures taken to safeguard, maintain and recover data in order to ensure the integrity of data storage and the recovery of registry services in the event of a disaster. A detailed description of these is provided in the common readiness document and specific readiness document of the Consolidated System of European Union registries (CSEUR) referenced in the NC6. The ERT recalled a recommendation relating to this in the in-depth review report of the NC5, and commends Bulgaria for providing this information. The ERT noted that the NC6 mentions that the CSEUR readiness documents have been annexed to the NC. However, they were not included in an annex to the NC6. The ERT would consider it useful if Bulgaria included the CSEUR readiness documents in an annex to the next NC.

28. Bulgaria described the changes specifically due to the centralization of the European Union Emissions Trading System (EU ETS) operations into a single EU registry operated by the European Commission and called the CSEUR. These changes were made according to the EU directive on centralization of the EU ETS operations into a single EU registry (directive 2009/29/EC). The CSEUR is a consolidated platform which implements the national registries in a consolidated manner and was developed together with the new EU registry.

29. The ERT noted that the CSEUR was certified on 1 June 2012 and the Bulgarian national registry joined the CSEUR on 20 June 2012. As part of the integration process ("go live" process), all relevant transactions and holdings data were migrated to the CSEUR platform, and the individual connections to and from the international transaction log were re-established. The ERT noted that Bulgaria has 28 joint implementation (JI) projects and out of those, 21 have already achieved verified emission reductions. The national registry has already transferred reduction units to 20 of these projects.

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

30. Bulgaria has reported in its NC6 comprehensive information on domestic and regional programmes and/or legislative arrangements and procedures related to the Kyoto Protocol, including a description of the principal legislative and policy instruments. More information is presented in chapter II.B.1 of this report.

31. The NC6 does not include information required by the UNFCCC reporting guidelines on NCs on enforcement procedures for addressing cases of non-compliance

under domestic law. During the review, Bulgaria provided the explanation that this information has not been included because national programmes are not prescriptive in nature and therefore penalty provisions are not invoked for non-compliant entities, and it agreed to take further action in order to provide this information in its next NC. The ERT recommends that Bulgaria include this information in its next submission in order to improve the completeness of its reporting.

32. The overall responsibility for climate change policymaking lies within the Ministry of Environment and Water (MoEW) of Bulgaria. MoEW implements the adopted legislations at the national level. A number of other ministries and organizations support the activities of MoEW by participating in the process of application and development of GHG mitigation measures, procedures and mechanisms including: the Ministry of Economy and Energy (MEE), the Sustainable Energy Development Agency, the Ministry of Agriculture and Food, the Ministry of Finance, the Ministry of Regional Development, the Ministry of Education, Youth and Science, the Ministry of Foreign Affairs, the National Statistical Institute and the Bulgarian Academy of Sciences (BAS) (see para. 50 below).

33. Coordination of climate change activities within interministerial working groups is performed by the Joint Implementation Steering Committee and the Inter-ministerial Working Group for Development of the National Allocation Plan. Representatives of the public sector in the working groups are the Bulgarian Chamber of Commerce and industry organizations of the industrial sectors that are covered by the EU ETS.

34. EEA within MoEW performs monitoring of the implementation of climate change-related measures. EEA is responsible for preparation of the GHG inventories. It carries out the procedures for issuing the GHG emission permits, considers the operators' application forms and drafts the permits. EEA is the national administrator of the national registry for issuing, possession, transfer and cancellation of the GHG emission allowances. The Sustainable Energy Development Agency within MEE approves, organizes and controls implementation of energy efficiency projects and measures in accordance with the national long- and short-term energy efficiency programmes and participates in preparation of legal regulations and energy efficiency standards in accordance with the EU norms for encouraging energy efficiency on the demand side. The major responsibility for rational use of energy, as well as its production and supply at the municipal level, lies with the municipal authorities. The basic instrument for energy management in municipalities is the local (municipal) energy planning.

35. The implementation of the Kyoto Protocol is underpinned mostly by TNAPCC, the EU ETS and the National Green Investment Scheme (NGIS). TNAPCC outlines the framework for action to combat climate change for the period 2013–2020 in order to fulfil Bulgaria's commitments under the Convention, the Kyoto Protocol and the EU 2020 climate and energy package. TNAPCC provides specific measures for reduction of GHG emissions across all sectors consistent with both the national policy on climate change and the potential of the national economy to reduce emissions in order to ensure achievement of Bulgaria's international and EU commitments. TNAPCC is supported by a range of sectoral policies and programmes targeting areas such as development, energy efficiency, renewable energy, promotion of biofuels, transport, forestry and waste.

36. For the second commitment period of the Kyoto Protocol (2013–2020), as an EU member State, Bulgaria is committed to fulfilling a joint target of the 28 EU member States and Iceland to reduce GHG emissions by 20.0 per cent below the 1990 level. Under the EU decision 406/2009/EC of the European Parliament and Council, EU member States are obligated to meet this target via the EU 2020 climate and energy package (see para. 52 below).

37. In its NC6, Bulgaria provided some information on provisions to make information on legislative arrangements and enforcement and administrative procedures publicly accessible. Bulgaria makes such information publicly available through publication in the State Gazette, which is an official publication of Bulgaria issued by the National Assembly and includes: national legislation; decrees of the President; decisions of the Constitutional Court; decrees, rules and regulations of the Council of Ministers; and international agreements that Bulgaria is party to. The State Gazette maintains a publicly accessible free website.[7]

38. Bulgaria provided 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. These provisions only apply to activities under Article 3, paragraph 3, of the Kyoto Protocol because Bulgaria did not elect any activities under Article 3, paragraph 4, of the Kyoto Protocol. The Forestry Act, the Biological Diversity Act and the Protected Areas Act regulate the implementation of activities under Article 3, paragraph 3, of the Kyoto Protocol. These acts directly contribute to conservation of biodiversity and sustainable use of natural resources. For instance, the Forestry Act governs public arrangements related to protection, stewardship and use of wooded areas in Bulgaria for ensuring multifunctional and sustainable management of forest ecosystems.

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

39. Bulgaria has provided in its NC6 comprehensive 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

40. In its NC6, Bulgaria reported on its PaMs adopted, implemented and planned in achieving its commitments under the Convention. Bulgaria provided information on PaMs by sector and, in most cases, by gas, and a description of the principal PaMs. The PaMs reported in the NC6 are similar to those in the NC5, except for the ones that are no longer in effect. Within each sector, PaMs are organized according to major policy objectives, called priority axes, and each priority axis is further subdivided into PaMs with direct and indirect impacts on reduction of GHG emissions. There is a textual description of principal PaMs organized by sectors, which is supplemented by a sectoral summary table containing the entire set of sectoral PaMs. The information includes the PaM name, objective, gas affected, status and mitigation impact. The textual description also includes, in some cases, information on the type of instrument.

41. Bulgaria has provided only limited 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. The NC6 briefly states that the expectation on future emission reduction levels is based on analysis of the status of implementation for the period 2006–2008. During the review, Bulgaria informed the ERT that the information on PaMs included in the NC6 is based on the PaMs in TNAPCC and those launched before 2011 and currently being implemented, and includes all the relevant details such as the description of

[7] Available at <http://dv.parliament.bg/DVWeb/index.faces>.

each measure, type of instrument, target group, responsible institution, time limit for implementation, cost, possible source of funding, indicator of implementation and expected results. The ERT recommends that Bulgaria include in its next NC transparent and comprehensive information that clearly explains how it believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals in accordance with the objective of the Convention.

42. The NC6 does not include information on the PaMs in the industrial processes sector and those aimed at reducing emissions of HFCs, PFCs and SF_6 (F-gases). The ERT recalled a recommendation on this in the in-depth review report of the NC5. During the review, Bulgaria provided additional information elaborating on policies regarding F-gases such as the application of EU legislation to these gases.[8] Revision of the national legislation and the certification procedures is planned in order to facilitate the controlled implementation of the new requirements entering into force with this regulation. Bulgaria also informed the ERT that there are no measures in place for the industrial processes sector. The ERT reiterates the recommendation in the in-depth review report of the NC5 that Bulgaria include in its next NC the missing information on PaMs in all sectors including the industrial processes sector and those aimed at reducing F-gases, or clearly state that this is the case if no PaMs are implemented, adopted or planned, in order to improve the completeness and transparency of reporting.

43. Bulgaria has not reported information on the implementing entity for each PaM. The reporting of PaMs for most of the sectors was not subdivided by gas. During the review, Bulgaria acknowledged this issue and agreed to elaborate on it in the next NC. The ERT recommends that Bulgaria improve the completeness of reporting in the next NC by including the names of the implementing entities of each PaM and by organizing the reporting on individual PaMs by sector subdivided by gas.

44. Bulgaria has not reported some information in the sectoral summary tables for PaMs, namely: GHGs affected by a PaM (for some PaMs), type of instrument, implementing entity or entities, and an indication of which measures are included in the 'with measures' projection. The ERT also noted that the descriptions provided in the textual format are not totally consistent with the summary tables. The names of the PaMs in the textual descriptions and in the summary tables are sometimes different, making it difficult to establish correspondence between them. The summary tables provide the annual mitigation effects for different years, whereas the textual descriptions only include the total cumulative mitigation effects by 2020. During the review, Bulgaria informed the ERT that a part of the information not provided in the sectoral summary tables is available in TNAPCC and will be included in the next NC. Bulgaria also acknowledged the issue of inconsistency between the sectoral summary tables and the textual descriptions on PaMs and agreed to improve consistency between the two in the next NC. The ERT recommends that Bulgaria improve the completeness of reporting by including the missing information in the sectoral summary tables on PaMs and improve the transparency by ensuring consistency between the information reported in the textual descriptions and the sectoral summary tables.

45. In its NC6, Bulgaria has not included information describing cross-sectoral PaMs such as the EU ETS or the NGIS. The ERT also noted that the EU ETS has not been listed as a PaM in any sector. During the review, Bulgaria provided additional information on the EU ETS, and the various other EU policy directives in this regard. Bulgaria further provided the explanation that the EU ETS has not been listed as a PaM because it was not

[8] The new EU regulation on F-gases (517/2014) repealing the existing regulation (842/2006) will come into force on 1 January 2015.

possible to estimate its real impact in terms of emission reductions. The ERT encourages Bulgaria to include transparent information on cross-sectoral PaMs in both textual and tabular formats, including cross-sectoral PaMs such as the EU ETS in the next NC.

46. In its NC6, Bulgaria has not provided a description of the way in which progress with PaMs to mitigate GHG emissions is monitored and evaluated over time. During the review, Bulgaria provided additional information on how it intends to monitor and evaluate the effect of PaMs based on TNAPCC. Acknowledging the issue, Bulgaria also agreed to take further action in order to provide additional information on this issue in the next NC. The ERT encourages Bulgaria to include transparent information on this in the next NC.

47. The NC6 does not include information on: innovative and/or replicable PaMs; PaMs influencing international transport; PaMs that could lead to higher emissions and the rationale for such PaMs; estimation methods; costs and non-mitigation benefits of PaMs; and an explanation on why the PaMs no longer in place were discontinued. The ERT encourages Bulgaria to include transparent information on these elements in the next NC.

2. Policy framework and cross-sectoral measures

48. The national climate change policy of Bulgaria is underpinned by PaMs developed and implemented by MoEW supported by other national ministries, agencies and interministerial groups. Table 4 provides a summary of the reported information on the PaMs of Bulgaria.

49. The key climate and energy policy instrument is TNAPCC, which is supplemented by various other cross-sectoral and sectoral policies and programmes, the EU ETS and NGIS. TNAPCC was approved by the Council of Ministers and outlines the framework of action on climate change for the period 2013–2020 in order to fulfil Bulgaria's obligations under the Convention, the Kyoto Protocol and the EU 2020 climate energy package.

50. Various legislative enactments, including the Environmental Protection Act, the Energy Act, the Renewable Energy Act, the Energy Efficiency Act, the Clean Ambient Air Act and the Forestry Act, support the climate-related PaMs. During the review, Bulgaria provided additional information regarding the newly adopted Climate Change Mitigation Act that will serve to integrate government policy on climate change with the respective sectoral and cross-sectoral policies in other fields, including transport, energy, construction, agriculture and forestry, tourism, industry and regional development. The newly established national Expert Council on Climate Change will serve as an instrument for the coordination of relevant PaMs and their interactions.

51. While no PaMs are directly deferred to the local level, the local authorities have a role in municipal energy management including rational use of energy and its production and supply at local level. The basic instrument for energy management in municipalities is municipal energy efficiency planning, which, according to the Energy Efficiency Law, mandates the municipal administration to adopt programmes such as refurbishment of housing and administrative and utility buildings throughout the municipal territory, with an aim to carry out energy efficiency measures.

52. The EU 2020 climate and energy package was adopted to ensure attainment of the EU target to reduce GHG emissions across member States by 20.0 per cent by 2020 below the 1990 level. For the period 2013–2020, this package established the scope and approach to the EU ETS and individual GHG emission reduction targets for the sectors not included in the EU ETS (non-ETS sectors), which were disaggregated for each member State via the EU effort-sharing decision (ESD) (see para. 54 below).

53. The EU ETS is the most important cross-cutting PaM in terms of coverage of total GHGs. Bulgaria joined the EU ETS in 2007, and it covers 132 installations in Bulgaria. For

the period 2013–2020, an EU-wide cap is in place for reducing emissions by 21.0 per cent by 2020 compared with 2005, including by 1.74 per cent annually over the period. In the period 2013–2020, at least 50 per cent of allowances will be auctioned in contrast to 3 per cent in 2008–2012, thus reducing the number of 'free' allowances to installations in Bulgaria. As of 1 January 2013, the free allocation for installations covered by the EU ETS will be performed on the basis of ex ante parameters valid for the entire EU that are set on the basis of the 10.0 per cent most efficient installations in the EU in terms of GHG emissions. The mitigation impact of EU ETS has not been quantified in the NC6.

54. For sectors outside the EU ETS, EU member States have differentiated emission reduction targets ranging from –20.0 per cent to +20.0 per cent under the ESD. Bulgaria has a legally binding target for the non-ETS sectors by 2020 that limits the increase in its emissions for the non-ETS sectors by 20.0 per cent by 2020 compared with the 2005 level. TNAPCC is the main instrument for implementing the EU policies on climate change at the national level. The newly adopted Climate Change Mitigation Act will seek to integrate government policy on climate change with other sectoral and cross-sectoral policies.

55. Bulgaria also has in place a range of other instruments, including the National Energy Strategy till 2020, the National Action Plan for Renewable Energy till 2015 and the National Energy Efficiency Programme till 2020, which will serve to implement the binding and non-binding targets on renewable energy and energy efficiency as set out in the EU 2020 climate and energy package.

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

Sectors affected	*List of key policies and measures*	*Estimate of mitigation impact (kt CO_2 eq)*
Policy framework and cross-sectoral measures		
	Third National Action Plan on Climate Change	NE
	Climate Change Mitigation Act	NE
	EU ETS	NE
Energy		
Energy supply	National Energy Strategy	NE
	Energy Act	NE
	Improvement of operation of Kozloduy nuclear power plant	1 000 (2030) 1 000 (2025) 1 000 (2020) 1 150 (2015)
	Decrease in losses in electricity distribution and transmission networks	1 000 (2030) 1 100 (2025) 1 100 (2020) 1 000 (2015)
	Decrease in losses in heat transmission networks	1 000 (2030) 1 000 (2025) 1 000 (2020) 950 (2015)
Renewable energy	National Action Plan for Renewable	NE

Sectors affected	*List of key policies and measures*	*Estimate of mitigation impact (kt CO_2 eq)*
	Energy	
	Renewable Energy Act	NE
	Increasing the share of heating and cooling based on renewable energy sources	70 (2030) 66 (2025) 61 (2020) 41 (2015)
Energy efficiency	National Energy Efficiency Strategy	NE
	National Energy Efficiency Programme	NE
	Energy Efficiency Act	NE
	Energy efficiency audits and implementation of prescribed measures	119 (2030) 119 (2025) 119 (2025) 140 (2015)
Residential and commercial sectors	Gas supply to households	2 500 (2030) 2 500 (2025) 2 500 (2020) 2 000 (2015)
Transport	National Programme for Promotion of the Biofuels Use in the Transport Sector	NE
	Design and construction of new road infrastructure and rehabilitation and modernization of existing roads	170 (2030) 170 (2025) 170 (2020) NE (2015)
Industrial sectors	Energy Efficiency for Competitive Industry	NE
	Use of biomass in combustion units of installations	554 (2030) 554 (2025) 554 (2020) NE (2015)
Agriculture	Agricultural Land Protection Act	NE
	Improved fertilization and irrigation practices	170 (2030) 170 (2025) 170 (2020) 170 (2015)
Forestry	National Strategy for Development of Forestry Sector	NE
	Strategic Plan for Forest Development	NE

Sectors affected	*List of key policies and measures*	*Estimate of mitigation impact (kt CO_2 eq)*
	Afforestation of abandoned agricultural land, barren and deforested areas, eroded and threatened by erosion land outside forest areas	5 (2030) 5 (2025) 4 (2020) 4 (2015)
Waste management	National Waste Management Programme	NE
	Waste Management Act	NE
	Capture and burning of biogas in all new and existing regional landfills	634 (2030) 634 (2025) 634 (2020) 634 (2015)
	Construction of installations for mechanical and biological treatment and installations for treatment and recovery of compost and biogas	728 (2030) 728 (2025) 728 (2020) 728 (2015)

Note: The greenhouse gas reduction estimates given for some measures are reductions in carbon dioxide or carbon dioxide equivalent for 2015, 2020, 2025 and 2030.

Abbreviations: EU ETS = European Union Emissions Trading System, NE = not estimated.

3. Policies and measures in the energy sector

56. Between 1990 and 2012, GHG emissions from the energy sector decreased by 37.6 per cent (28,370.71 kt CO_2 eq), mainly owing to the changes stemming from transition from a centrally planned economy to a market-based economy. The trend in GHG emissions from fuel combustion showed notable decreases in energy industries (18.6 per cent or 7230.45 kt CO_2 eq), energy use in manufacturing industries and construction (82.9 per cent or 16,258.27 kt CO_2 eq) and in other sectors (71.1 per cent or 5,530.31 kt CO_2 eq). This was attenuated to some extent by a significant increase in emissions from fuel combustion in transport (23.9 per cent or 1,626.07 kt CO_2 eq).

57. The main drivers of the decrease in emissions from the energy sector are: decreases in power production from thermal power plants, accompanied by increases in the share of power production from RES; structural changes in industry, including declines in production by energy-intensive enterprises and improvements in energy efficiency; and the introduction of energy efficiency measures and shifts from solid and liquid fuels to natural gas in fuel consumption in the residential sector.

58. ***Energy supply***. Coal has the dominant share (37.8 per cent) in the primary energy supply in Bulgaria, followed by nuclear energy (22.6 per cent), oil (21.2 per cent) and natural gas (13.4 per cent). RES comprise 8.9 per cent of the primary energy supply (1.5 per cent from hydropower, 6.2 per cent from combustible renewables and waste, and 1.2 per cent from non-combustible renewables). Total energy imports have remained stable at about two thirds of the total primary energy supply between 1990 and 2012. Since 1990, the shares of coal, nuclear energy and RES in the total primary energy supply have increased, while the shares of oil and natural gas have decreased. The gross energy consumption per capita has also decreased by about 22 per cent between 1990 and 2011.

59. PaMs in energy supply include those aimed at cleaner production of electricity from coal-fired plants, reduction of the carbon intensity of the electricity generation mix,

modernization of district heating systems, accelerated penetration of decentralized energy production, and development of low carbon networks for transmission and distribution of electricity and natural gas. The main policy instrument in this area is the Energy Strategy, which seeks to promote energy security for the Bulgarian industry and population, together with reduction of GHG emissions. The Energy Strategy envisages diversification of the sources and routes for supply of natural gas and monitoring and provision of institutional support to projects of strategic significance to energy security. It aims to develop and improve the power system by constructing new installations using highly efficient and low-emission carbon capture and storage technologies, as well as replacing obsolete technologies. The Energy Act lays down the rules and principles of energy pricing. It regulates the production of electricity from thermal power plants using highly efficient cogeneration of heat and electricity by mandating preferential pricing for the purchase of electricity.

60. ***Renewable energy sources***. The National Action Plan for Renewable Energy till 2020 aims to remove the barriers to integration of RES into the electricity and gas networks by implementing a package of measures for promotion of investments in RES technologies. The plan seeks to promote generation and consumption of energy from RES through finance and scientific research, including in systems for storage of energy. The production of electricity from renewable energy is expected to increase to 7.5 TWh or 15 per cent of the electricity generation of the country as a result.

61. The Renewable Energy Act promotes and supports the production and consumption of energy and fuels from renewable sources through the introduction of support schemes, raising awareness and encouraging research. The main focus is on joint projects and schemes for production of energy from renewable sources with other EU member States. The municipal councils approve long- and short-term programmes to promote the use of energy from RES and biofuels.

62. ***Energy efficiency***. The Bulgarian National Energy Efficiency Strategy till 2020 places emphasis on the promotion of measures for energy efficiency in the residential sector, public buildings, transport and industry. It aims at a reduction of primary energy intensity by 50.0 per cent by 2020 compared with 2005.

63. The Energy Efficiency Act regulates the state policy for improving the energy efficiency of final energy consumption and provision of energy services in line with the EU energy efficiency directive (2012/27/EU), which requires annual improvements of 1.5 per cent in energy efficiency across EU member States.

64. ***Residential and commercial sectors***. PaMs in residential and commercial buildings are largely focused on enforcing energy efficiency standards, promotion of increased use of RES in buildings and commercial enterprises, and increased use of gas in district heating systems. The Energy Efficiency Act determines national indicative targets for energy efficiency for energy traders and owners of buildings with a total floor area over 1000 m^2 and of industrial systems with annual energy consumption greater than 3000 MWh, subjecting them to mandatory certification and energy efficiency audits.

65. The Energy Strategy aims at ensuring access to the gas distribution system for 30.0 per cent of households by 2020 in order to replace the electricity used for heating. Retrofitting of old buildings with built-up areas over 250 m^2 as mandated by the EU energy efficiency directive (2012/27/EU) is expected to yield emission reductions of 26 kt CO_2 eq by 2020. Several PaMs involving voluntary participation, such as the national plan to increase the number of zero-energy buildings and the introduction of standards for sustainable buildings and energy buildings, are also planned.

66. ***Transport sector***. The most significant contributor to the increase in transport sector emissions is road transport, and the key driver is the growth in the number of passenger

cars. Therefore, the PaMs in the transport sector primarily target emissions from road transport. One of the biggest challenges is to reduce the dependence of the transport system on oil. The PaMs seek to promote better fuel efficiency by modernization of road infrastructures and introduction of intelligent transport systems into the national and urban road network. Promoting a modal shift from passenger cars to public electric transport and increased use of biofuels in transport are some of the other focus areas of the PaMs. Introduction of intelligent transport systems along the national and urban road networks and increasing the share of public electrical transport will yield 170 kt CO_2 eq and 127 kt CO_2 eq of emission reductions by 2020, respectively.

67. The National Programme for Promotion of the Biofuels Use in the Transport Sector for 2008–2020 seeks to promote diversification of energy supplies by promoting production and use of biofuels in transport towards meeting the national indicative targets on biofuel consumption. The Renewable Energy Sources Act introduces stages for the introduction of certain percentages of biodiesel and bioethanol content in fuels, as well as requirements for the types of biofuels and sustainability criteria. Increasing the share of biofuels is expected to deliver 101 kt CO_2 eq of emission reductions in 2020.

68. ***Industrial sector***. Energy use in industry is covered mostly under the EU ETS (see paras. 53 and 54 above). The other PaMs in this sector seek to address industrial energy use by mandatory audits, funding industrial energy projects and promotion of alternative fuels such as biomass and waste. The establishment of technology parks and business incubators is another PaM with an indirect impact on industrial energy use.

69. As in the case of the residential and commercial subsector, industrial energy use is covered by the Energy Efficiency Act that mandates energy efficiency audits, conducted at least once every three years, for industrial systems with annual energy consumption greater than 3000 MWh. The act provides for the implementation of energy efficiency management, which is the responsibility of the owners of the audited industrial systems and the installations inspected for energy efficiency.

70. Energy Efficiency for Competitive Industry is a new programme that provides low-interest loans to small- and medium-sized enterprises for projects related to industrial energy use. The total amount of funds under the programme is EUR 300 million.

4. Policies and measures in other sectors

71. Between 1990 and 2012, GHG emissions from the industrial processes (including solvent and other product use), agriculture and waste sectors decreased by 58.9 per cent (20,194.30 kt CO_2 eq), mainly owing to changes stemming from transition from a centrally planned to a market-based economy.

72. ***Industrial processes***. Between 1990 and 2012, GHG emissions from the industrial processes sector (excluding solvent and other product use) decreased by 56.0 per cent (4,951.3 kt CO_2 eq), with emissions from the solvent and other product use sector decreasing by 95.4 per cent (8,5675 kt CO_2 eq) over the same period. The main driver for the decrease in the emissions was the decrease in industrial output following privatization and the economic crises of 1997–1999 and 2008, as well as the restructuring and modernization of industrial production. Metal production accounted for the biggest reduction in emissions in the industrial processes sector.

73. In its NC6, Bulgaria has not reported on any PaMs addressing industrial processes and F-gases. During the review, Bulgaria informed the ERT that no PaMs are in place for the industrial processes sector. Bulgaria provided additional information on how it implements the EU regulations on F-gases (842/2006 and 517/2014) on avoidance and containment of F-gases in products and equipment.

74. ***Agriculture***. Between 1990 and 2012, GHG emissions from the agriculture sector decreased by 64.6 per cent (11,919.85 kt CO_2 eq), mainly owing to reduced production and structural changes in the sector following Bulgaria joining the EU, such as the reduction in the number of farms, the increase in their average size and the decrease in the number of livestock. However, going forwards, Bulgaria has to face the challenge of increasing agricultural production while preventing GHG emissions from increasing.

75. Bulgaria has formulated 25 PaMs in the agricultural sector that are consistent with the priorities of the EU Common Agricultural Policy for the period 2014–2020. The PaMs relate to reduction of emissions from agricultural land, reduction of emissions from livestock, and optimal management of agricultural residues and rice cultivation. The Agricultural Land Protection Act contains the legal framework covering some of the PaMs in the agriculture sector included in TNAPCC and regulates land-use change of agricultural land. It also prohibits burning of stubbles and other plant residues in agricultural lands and provides the owners and the users of agricultural land with tax and credit incentives for implementing land-use restrictions and projects to restore and improve the fertility of agricultural land.

76. ***LULUCF***. The LULUCF sector had a net removal of 8,207.49 kt CO_2 eq in 2012, and the net GHG removal has decreased by 39.2 per cent) (5300.34 kt CO_2 eq) since 1990. The trend was mainly driven by a decrease in the biomass stocks in forests. Bulgaria has reported PaMs in the LULUCF sector for the first time in the NC6, in response to a recommendation in the in-depth review report of the NC5.

77. The most important PaMs in the LULUCF sector are afforestation of abandoned agricultural land, barren and deforested areas, eroded land and land threatened by erosion outside forest areas, and increasing density in natural and artificial plantations. Forestry activities are subject to planning. Forest planning is carried out at three levels, and includes the National Strategy for Development of Forestry Sector, the Strategic Plan for Forest Development, regional development plans for woodlands, and forestry plans and programmes. The forestry management plans and programmes determine the permissible level of use of forest resources and provide guidelines to achieve the goals of forest management for a period of 10 years. The Forestry Act contains the legal framework covering some of the PaMs included in TNAPCC. It prohibits reduction of the total percentage of forest land in the country.

78. ***Waste management***. Between 1990 and 2012, GHG emissions from the waste sector decreased by 40.6 per cent (2,466.40 kt CO_2eq), mainly driven by the economic slowdown and decrease in population. The PaMs in the waste sector focus on reduction of waste generated, as well as treatment, recovery and burning of biogas in landfills and urban wastewater treatment plants. The National Waste Management Programme 2009–2013 envisages differentiated charges for different types of land-filled waste to reduce waste generation. The Waste Management Act lays down the requirements for the establishment of regional waste management systems, which are set up by municipalities on a regional basis and consist of regional landfill and/or other waste treatment facilities.

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

79. Bulgaria reported on its package of PaMs adopted, implemented and elaborated in achieving its commitment under the Kyoto Protocol.

80. The NC6 includes information on how Bulgaria promotes and implements the International Civil Aviation Organization (ICAO)/International Maritime Organization (IMO) decisions to limit emissions from aviation and marine bunker fuels, citing the efforts of the EU only; the NC6 does not provide transparent information on any such steps taken

by Bulgaria. During the review, Bulgaria informed the ERT that Bulgaria also participates in the EU actions as an active member of ICAO/IMO, and agreed to include additional information on its own actions as an active member of ICAO/IMO in the next NC. The ERT thus recommends that Bulgaria include transparent descriptions on this element in the next NC.

81. In its NC6, Bulgaria 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. During 2011–2012, Bulgaria implemented the project *Bulgarian contribution to the short-term financing 2011–2012: sharing Bulgarian experience of monitoring, reporting and verification of greenhouse gas in the former Yugoslav Republic of Macedonia for participation in the European Union Emission Trading Scheme of greenhouse gases*. This project aims to support the implementation of EU directives on emissions trading[9] in the former Yugoslav Republic of Macedonia by utilizing Bulgarian expertise in the field of monitoring, reporting and verification of GHG emissions and emissions trading, and, as such, Bulgaria considers that this project fulfils its obligations in this regard.

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

82. Bulgaria provided information on projections in the NC6 and the first biennial report (BR1). No updated projections were available at the time of the review.

1. Projections overview, methodology and key assumptions

83. The GHG emission projections provided by Bulgaria in the NC6 include a 'with measures' and a 'with additional measures' scenario until 2030, presented relative to actual inventory data for 1988 (base year for Bulgaria), 2000, 2005, 2010 and 2011. Projections are presented on a sectoral and on a gas-by-gas basis only for the following sectors: CO_2, CH_4 and N_2O for the energy sector; CH_4 and N_2O for the agriculture sector; and CH_4 and N_2O for the waste sector. Projections are also provided in an aggregated format for each sector, as well as for a national total.

84. In its NC6, Bulgaria has not presented projections on a gas-by-gas basis for the transport, industry and LULUCF sectors. Emission projections have also not been provided for the industrial processes and solvent and other product use sectors. Emission projections for F-gases (PFCs, HFCs and SF_6; treating PFCs and HFCs collectively in each case) have also not been included. The ERT reiterates the recommendation made in the in-depth review report of the NC5 that Bulgaria present its projections on a gas-by-gas basis and that it provide projections in an aggregated format for each sector. The NC6 does not include information on how the emissions have been aggregated on the sectoral and national levels including how the global warming potential (GWP) values have been applied. During the review, Bulgaria clarified that GWP values from the Second Assessment Report of the Intergovernmental Panel on Climate Change have been used in providing aggregated emissions. Acknowledging the issue during the review, Bulgaria agreed to make improvements in providing information on this in the next NC. The ERT recommends that Bulgaria include this information in the next submission for improving the transparency of its reporting.

[9] EU directives 2003/87/EC and 2009/29/EC.

85. Emission projections related to fuel sold to ships and aircraft engaged in international transport have not been reported separately. It is also not clearly mentioned whether these emissions have been included in the totals. During the review, Bulgaria explained that the emission projections related to fuel sold to ships and aircraft engaged in international transport have not been included in the totals and agreed to make improvements in reporting them separately in the next NC. The ERT reiterates the recommendation made in the in-depth review report of the NC5 that Bulgaria separate emissions related to fuel sold to ships and aircraft engaged in international transport projections, to the extent possible, in the next NC.

86. In the NC6, the sectoral categories used in the projections are not fully consistent with those used in the PaMs section. For example, the manufacturing industries and construction sector in the section on projections has not been mentioned in the section on PaMs and it is also not clear whether it is the same as the industry sector in the PaMs section. The ERT reiterates the recommendation made in the in-depth review report of the NC5 that Bulgaria use, to the extent possible, the same sectoral categories in the projections section as in the PaMs section. The NC6 also does not include information on GHG emission projections for the 'without measures' scenario, as well as projections of indirect GHGs including carbon monoxide (CO), nitrogen oxides (NOx), non-methane volatile organic compounds and sulphur dioxide (SO_2). During the review, Bulgaria acknowledged the issue and agreed to take further actions in order to provide information on these elements in the next NC. The ERT encourages Bulgaria to include this information in the next NC.

87. Bulgaria has also not included transparent information on the model or approach used on the following elements: type of model or approach used and its characteristics; original purpose that the model or approach was designed for and how it has been modified for climate change purposes; and summary of the strengths and weaknesses of the model or approach used and how the model or approach used accounts for any overlaps or synergies that may exist between different PaMs. During the review, Bulgaria provided additional information, elaborating on the modelling approach, including on the spreadsheet-based modelling tool. The spreadsheet provided during the review contains projections on a gas-by-gas basis for all the relevant years. The ERT encourages Bulgaria to provide transparent information on the modelling approach, including the information provided during the review, in the next NC to improve the transparency of its reporting.

88. In the NC6, the 'with measures' scenario includes all PaMs implemented and adopted by the end of 2011, while the 'with additional measures' scenario takes into account the PaMs planned for the period after 2011, which have a realistic chance of being implemented in the future. However, Bulgaria does not include in the 'with measures' scenario the PaMs for which either a legislation has been enacted or a government decision has been made, and which according to the UNFCCC reporting guidelines on NCs, should be categorized as "implemented" and "adopted" PaMs, respectively, and hence included in the 'with measures' scenario'. Bulgaria considers these PaMs as "planned" measures and as such includes them in the 'with additional measures' scenario. In its NC6, Bulgaria has explained that this is because it is a common practice in Bulgaria to postpone or cancel implementation of legal enactments or government decisions.

89. The emission projections for each sector have been developed using a spreadsheet-based top-down model based on projections of key macroeconomic, technological, demographic and other indicators and the possibility to undertake mitigation measures. The baseline scenario for the economic development by 2030 is based on the key indicators used by the Ministry of Finance in the budget of 2012 extended up to 2030. Thus, the scenario for economic development is consistent with the main official document of the Bulgarian Government for the duration of TNAPCC.

90. For the energy sector, emission projections were made using a methodology based on interrelationships between macroeconomic development, sectoral development and GHG emissions. Three parameters were used in the projection analysis: level and structure of GDP, total population, and level and structure of final energy consumption. The macroeconomic forecasts, including GDP and population growth, were provided by the Bulgarian Agency for Economic Analysis and Forecasts in the Ministry of Finance. The main software used is the ENPEP package that has been used for projecting GHG emissions in all the previous NCs of Bulgaria. The following program modules of ENPEP were used: MACRO, DEMAND, BALANCE, WASP and IMPACTS. The macroeconomic data are key inputs to the MACRO module in the ENPEP complex. The DEMAND module estimates the useful and final energy demand by sector, including households, industry, services and transport.

91. In its NC6, Bulgaria did not report on any changes to the projection methodology compared to its NC5. However, based on additional information provided during the review, the ERT concluded that there were no substantial changes in the modelling approaches used between the NC5 and the NC6. The ERT encourages Bulgaria to include this information in the next NC.

92. The NC6 reports key assumptions regarding macroeconomic indicators for the years 2015, 2020, 2025 and 2030 covering GDP, gross value added (GVA), population, population rate, GDP per capita and GVA per employee. Growths rates of consumption, consumption by households, exports and imports, as well as growth rates of shares of different sectors in the GDP, are also presented for these years. In addition, in its NC6, Bulgaria has reported assumptions regarding projected final energy demand and energy intensity of GDP for the energy sector for 2015 and 2020.

93. In its NC6, Bulgaria has reported limited information on the sensitivity analysis of assumptions used only for the energy sector. Bulgaria has listed the major economic factors influencing the development of the energy sector, but has not presented the quantitative results of sensitivity analysis for them. For the energy sector, Bulgaria reports two sensitivity scenarios based on the energy intensity of GDP: an optimistic ('max') scenario and a pessimistic ('min') scenario. The 'with measures' scenario projection used the 'max' scenario corresponding to Bulgaria's maximum expected energy demand. However, the ERT notes that this is not a sensitivity scenario because it is an actual scenario used in the projections. The ERT encourages Bulgaria to undertake further analysis of the sensitivity of projections with regard to important parameters used in the projections and present it in the next submission.

2. Results of projections

94. For the first commitment period under the Kyoto Protocol (2008–2012), Bulgaria committed to reducing GHG emissions on average by 8.0 per cent below the base year (1988) emission level. Based on the 2014 inventory submission, Bulgaria's total cumulative emissions for the period 2008–2012 amounted to 312,859.91 kt CO_2 eq, while its assigned amount, agreed in the initial review report under the Kyoto Protocol, is equal to 610,045.83 kt CO_2 eq, which is 48.7 per cent above the cumulative total emissions for the same period.

95. The ERT noted that Bulgaria does not plan to use units from the Kyoto Protocol market-based mechanisms to meet its Kyoto Protocol target. The ERT also noted that when accounting for emissions in relation to its target for this period, Bulgaria needs to take into account any emissions or removals from activities under Article 3, paragraph 3, of the Kyoto Protocol[10] that may result in the issuance of removal units. Bulgaria expects that it

[10] Bulgaria did not elect any activities under Article 3, paragraph 4, of the Kyoto Protocol.

will meet its target largely through emission reductions in sectors listed in Annex A to the Kyoto Protocol.

96. For the second commitment period of the Kyoto Protocol, in accordance with decision 1/CMP.8, Bulgaria has committed to reducing, jointly with the EU, GHG emissions by 20.0 per cent by 2020 compared with the 1990 level. This target will be fulfilled jointly by the EU and its member States, through the implementation of the EU 2020 climate and energy package, which sets the target of emission reductions by 2020 compared with the 2005 level of 21.0 per cent of emissions from installations covered by the EU ETS and of 10.0 per cent of emissions in the non-ETS sectors (primarily transport, buildings, some industrial processes, agriculture and waste) through its ESD. Under the ESD, Bulgaria is committed to limiting the growth in its non-ETS emissions to 20.0 per cent by 2020 compared with the 2005 level.

97. According to the NC6, GHG emissions by 2020 are projected to decrease by 44.5 per cent below the 1990 level under the 'with measures' scenario and by 51.1 per cent below the 1990 level under the 'with additional measures' scenario. For the 'with measures' scenario and the 'with additional measures' scenario, GHG emissions are projected to decrease by 4.5 per cent and 15.9 per cent by 2020, respectively, compared with the 2005 level. However, Bulgaria did not provide separate projections for the EU ETS and non-ETS sectors for demonstrating its progress towards the target for the second commitment period of the Kyoto Protocol. The ERT noted that separate reporting of projected emissions for EU ETS and non-ETS sectors could greatly enhance the transparency of information provided by Bulgaria and enable assessment of Bulgaria's progress towards its emission reduction target.

98. Bulgaria informed the ERT that it does not intend to use units from the Kyoto Protocol mechanisms in the second commitment period. The ERT noted that when accounting for emissions in relation to its target for this period, Bulgaria needs to take into account any emissions or removals from activities under Article 3, paragraph 3 and Article 3, paragraph 4, of the Kyoto Protocol that may result in the issuance of removal units. However, Bulgaria expects that it will reach its target largely through emission reductions in sectors listed in Annex A to the Kyoto Protocol.

99. In its NC6, Bulgaria reported that the GHG emissions are projected to decrease further by 2.3 per cent to 59,580 kt CO_2 eq in 2030 in the 'with measures' scenario compared to the 2020 emissions. In the 'with additional measures' scenario, GHG emissions are projected to decrease by 3.5 per cent to 51,824 kt CO_2 eq in 2030 relative to 2020.

100. According to the NC6, in the 'with measures' scenario, emissions from the energy supply are projected to decrease by 11.2 per cent in 2020 and by 56 per cent in 2030 compared with the 2005 levels. In the 'with additional measures' scenario, they are projected to decrease by 23.4 per cent in 2020 and 68.3 per cent in 2030 relative to the 2005 levels. This is largely due to a range of PaMs both implemented/adopted and planned in the energy sector. There is a significant increase in the projected level of emission reductions in the 'with additional measures' scenario, which includes PaMs planned under Bulgaria's Energy Strategy adopted in 2011. These include PaMs relating to cleaner electricity from coal-fired power plants, including building new plants with highly efficient and modern low-emission technologies and incorporating such technologies into existing plants that use local coal, as well those aimed at reducing the carbon intensity of the energy mix by promoting renewable energy, nuclear energy, cogeneration, and carbon capture and storage. This highlights the importance of implementation of the Energy Strategy for achieving greater levels of emission reductions by Bulgaria.

101. Emissions from manufacturing industries and construction are also projected to decrease significantly in both the 'with measures' and 'with additional measures' scenarios. However, in this case, emissions are projected to decrease, largely because of the after-effects of the domestic economic crisis and the global financial crisis. Emissions from the transport sector present the biggest challenge to Bulgaria as they are projected to increase at an increasing rate in 2020 and 2030 in both the 'with measures' and 'with additional measures' scenarios. This underscores the fact that PaMs envisaged by Bulgaria in the transport sector are not sufficient to curb the rapid increase in emissions from road transport that are driven mainly by the growth in the number of passenger cars. Emissions from the household and services sector are projected to decrease slightly in 2020, but increase substantially in 2030 in the 'with measures' scenario. While they do decrease in both 2020 and 2030 relative to 2005, in the 'with additional measures' scenario, there is an upward trend in transport emissions since 2010 in both the scenarios. This underscores the need to undertake more ambitious PaMs by Bulgaria to reduce commercial and household energy consumption.

102. Emissions from the waste sector show a steadily decreasing trend throughout the time series and are projected to reduce significantly in both the 'with measures' and 'with additional measures' scenarios in 2020 and 2030. The emissions in the agriculture sector, however, are projected to increase in both the 'with measures' and 'with additional measures' scenarios. The removals from the LULUCF sector decreased steadily until 2001, but have remained stable since then. However, removals from the LULUCF sector show an increasing trend in recent years and are projected to increase in 2020 and 2030 in both the 'with measures' and 'with additional measures' scenarios, mainly owing to PaMs focusing on afforestation.

103. The projected 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.

Table 5
Summary of greenhouse gas emission projections for Bulgaria

	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 (%)*
Kyoto Protocol base year[b]	132 618.66	NA	20.8
Kyoto Protocol target for the first commitment period (2008–2012)	122 009.17	–8.0	11.1
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]	109 824.08	–20.8	–
Inventory data 2012[e]	61 259.08	–53.8	–44.2
Average annual emissions for 2008–2012[e]	62 571.98	–52.8	–43.0
'With measures' projections for 2020[f]	60 982.00	–54.02	–44.5
'With additional measures' projections for 2020[f]	53 710.00	–59.5	–51.1
'With measures' projections for 2030[f]	59 580.00	–55.0	–45.8
'With additional measures' projections for 2030[f]	51 824.00	–60.9	–52.8

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

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

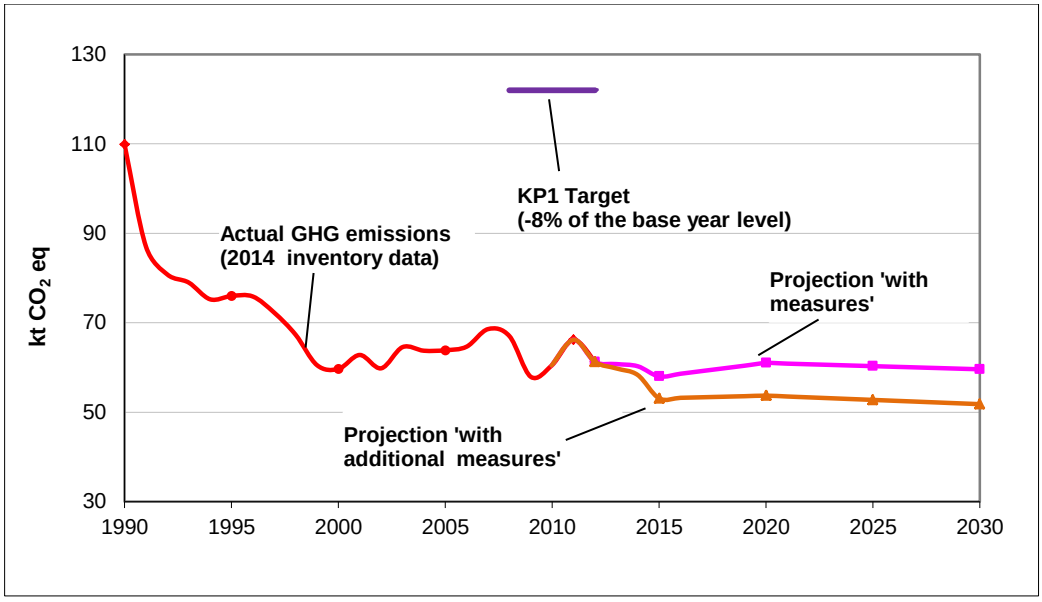
[c] The Kyoto Protocol target for the second commitment period (2013–2020) is a joint target for the European Union and its 28 member States and Iceland. The target is to reduce emissions by 20.0 per cent by 2020 compared with the 1990 level. The target for sectors not covered by the European Union Emissions Trading System is 20.0 per cent for Bulgaria 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 20.0 per cent by 2020 compared with the 1990 level.

[e] Bulgaria's 2014 greenhouse gas inventory submission; the emissions are without land use, land-use change and forestry (LULUCF).

[f] Bulgaria's sixth national communication.

Greenhouse gas emission projections



Sources: (1) Data for the years 1990–2012: Bulgaria's 2014 greenhouse gas inventory submission; the emissions are without land use, land-use change and forestry (LULUCF); (2) Data for the years 2012–2030: Bulgaria's sixth national communication; the emissions are without LULUCF.

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

3. Total effect of policies and measures

104. In the NC6, Bulgaria has not presented the estimated and expected total effect of implemented and adopted PaMs, in accordance with the 'with measures' scenario definition, compared with a situation without such PaMs. During the review, Bulgaria acknowledged this issue and agreed to take further actions in order to provide this information in the next NC. The ERT recommends that Bulgaria provide the total effect of implemented and adopted PaMs by gas (on a CO_2 eq basis) in the next NC.

105. Bulgaria has provided the estimated and expected total effect of planned PaMs by gas (on a CO_2 eq basis) by comparison of aggregate GHG emissions in the 'with measures' and 'with additional measures' scenarios for different sectors and the national total emissions for 2015, 2020 and 2030 on a CO_2 eq. basis. According to the NC6, the total effect of planned PaMs is 4,836 kt CO_2 eq in 2015, 7,273 kt CO_2 eq in 2020 and 7,756 kt

CO_2 eq in 2030. Additional PaMs implemented in the energy supply sector will deliver the largest emission reductions by 2020, followed by the effect of additional PaMs implemented in waste and transport. 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 Austria.

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)	NE	–	4 268	6.2	NE	–	4 576	6.7
Transport	NE	–	1 436	21.1	NE	–	2 227	32.8
Industrial processes	NE	–	NA	–	NE	–	NA	–
Agriculture	NE	–	3	0.0	NE	–	4	0.0
Land-use change and forestry	NE	–	11	0.1	NE	–	11	0.1
Waste management	NE	–	1 565	25.7	NE	–	1 481	24.4
Total (excluding LULUCF)	**NE**	**–**	**7 273**	**6.6**	**NE**	**–**	**7 756**	**7.1**

Source: Bulgaria's sixth national communication.

Note: The total effect of implemented and adopted policies and measures, defined as the difference between the 'without measures' and 'with measures' scenarios, was not calculated in Bulgaria's sixth national communication. The total effect of planned policies and measures is defined as the difference between the 'with measures' and 'with additional measures' scenarios.

Abbreviation: NE = not estimated.

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

106. Bulgaria in its NC6 provided information 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 noted that Bulgaria does not plan to use the market-based mechanisms to meet its targets under the first and second commitment periods of the Kyoto Protocol.

107. Bulgaria participates in two of the Kyoto Protocol mechanisms: the JI mechanism and the international emissions trading mechanism. As a Party included in Annex I to the Convention with an economy in transition, Bulgaria receives financial and technological support within the framework of the projects under the JI mechanism. A total of 28 JI projects were approved in Bulgaria, of which 21 have delivered verified emission reductions. Bulgaria estimates that until 2012, the JI programme as a whole led to a total emission reduction of about 10,000 kt CO_2 eq. During the second trading period (2008–2012) of the EU ETS, the maximum share of emission reduction units and certified emission reductions, which can be used to fulfil the operators' obligations, was limited to 12.5 per cent of their allocated allowances for the entire period.

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

108. As a Party not included in Annex II to the Convention, Bulgaria is not obliged to adopt measures on provision of financial resources to developing countries under Article 4, paragraphs 3, 4 and 5, of the Convention including on the provision of "new and additional" financial resources under Article 11 of the Kyoto Protocol. However, in its NC6, as well as during the review, Bulgaria provided some relevant information on provision of financial resources and technology transfer. Bulgaria has also included some information on this in common tabular format (CTF) table 7. The ERT commends Bulgaria for providing this information.

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

109. In its NC6, Bulgaria has not reported on financial resources related to implementation of the Convention. However, during the review week, Bulgaria provided information on its contribution to fast-start finance that has been made through the project *Bulgarian fast start finance contribution 2011–2012: utilizing Bulgarian experience in the development of administrative capacity for the conduct of monitoring, reporting and verification of greenhouse gas emissions.* Additional information on financial support has been presented in CTF table 7. Table 7 below summarizes information on financial resources as provided in the BR1.

Table 7
Summary of information on financial resources for 2011–2012
(United States dollars)

	Years of disbursement	
Allocation channel of public financial support	*2011*	*2012*
Contributions through multilateral channels including regional development banks	25 231.95	25 231.65
Contributions through bilateral and regional channels	–	–

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

110. Bulgaria has provided support to a project on capacity-building in the former Yugoslav Republic of Macedonia in monitoring, reporting and verification of GHG emissions and emissions trading (see paras. 81 and 109 above). The main aim of the project is to support the implementation of the EU directives (2003/87/EC and 2009/29/EC) in the former Yugoslav Republic of Macedonia by utilizing Bulgarian expertise in the field of monitoring, reporting and verification of GHG emissions and emissions trading. This is to be achieved through direct interaction between the ministries of environment in the two countries and information exchange between their institutions and experts.

E. Vulnerability assessment, climate change impacts and adaptation measures

111. In its NC6, Bulgaria has provided the required information on the expected impacts of climate change in the country and on adaptation options. The information covered expected climate change impacts, vulnerability assessment and adaptation measures, mainly for the agriculture and forestry sectors. As compared with the NC5, the NC6

provides more information on adaptation plans and measures including information on the National Adaptation Strategy.

112. During the review, Bulgaria provided additional information that a call for proposals is being opened under the Norwegian cooperation programme for integrated marine and inland water management whose main objective is to provide support for development of an integrated maritime and coastal zone management policy and measures for climate change adaptation. The ERT noted the usefulness of the information provided, and encourages Bulgaria to include it in the next NC. The ERT also noted that the completeness of the information provided on vulnerability assessment and adaptation plans could be greatly enhanced if it covers more sectors such as coastal zone management, fisheries, biodiversity, the natural ecosystem, infrastructure and human health.

113. Bulgaria reported on expected impacts and vulnerability assessment based on projected changes in mean surface air temperature, precipitation and extreme weather events in 2050, 2080 and at the end of the twenty-first century. The climate scenarios were developed by global and regional climate model simulations as part of the *Climate change and variability: impact on central and eastern Europe* (CLAVIER) project. Climate scenarios reveal significant warming from the middle to the end of the twenty-first century, with warmer summers, milder winters and an increase in ice-free days. There is increased risk and vulnerability to soil droughts in Bulgaria in the twenty-first century, with soils with low moisture retention and regions in south-east Bulgaria with low precipitation during the warm season being the most vulnerable. 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

Vulnerable area	*Examples/comments/adaptation measures reported*
Agriculture and food security	*Vulnerability*: the agriculture sector will be vulnerable due to the projected increase in drought severity that will affect soil water balance, leading to decreases in agricultural production in some cases; spring agricultural crops, crops cultivated on infertile soils and crops cultivated on non-irrigated areas and arable lands in south-east Bulgaria will be the most vulnerable
	Adaptation: adaptation measures are meant to support and sustain agricultural production by reducing the vulnerability of agricultural crops; measures include improvement of water management efficiency in the irrigation systems, new zoning of agro-climatic resources and agricultural crops, development of new cultivars and hybrids better adapted to climate change, and measures for optimization of soil treatment by optimizing sowing dates, soil monitoring and improvement of water, mineral content and structure of soils
Forests	*Vulnerability*: the forestry sector will be vulnerable mainly due to a worsening moisture deficit, especially at lower altitudes above sea level; this will affect the productivity and sustainability of the forest ecosystems and watersheds; there will also be increased incidences of forest fires
	Adaptation: the main measures include planned felling of young plantations and establishment of new forests and plantations
Water resources	*Vulnerability*: water resources will be vulnerable due to the likelihood of decreased annual river run-off during this century, arising from the observed trends of warming and rainfall deficit
	Adaptation: the water sector is included in the National Adaptation Strategy

Vulnerable area	*Examples/comments/adaptation measures reported*
Soil	*Vulnerability*: soil will be highly vulnerable due to increased water deficit caused by temperature rises; soils with low moisture preservation capacity in south-east Bulgaria will be the most vulnerable *Adaptation*: measures include choice of optimal dates for collection of various crops, monitoring of soils and improvement of soil moisture content and structure through implementation of erosion control measures and soil treatment methods

114. In its NC6, as well as during the review week, Bulgaria provided some information on the ongoing development of the National Adaptation Strategy for the period up to 2030. The development of the National Adaptation Strategy is to be completed in two steps. As the first step, a framework document, *National Climate Change Risk and Vulnerability Assessment for the Sectors of the Bulgarian Economy*, was finalized in early June 2014. This document assesses the risk of climate change related natural disasters in Bulgaria on the basis of various climate models and scenarios. The economic sectors included are agriculture, water, urban environment, energy, transport, construction and infrastructure, ecosystems and biodiversity, human health and tourism. The ERT noted the importance of speedy development and implementation of the National Adaptation Strategy to Bulgaria's adaptation to climate change.

F. Research and systematic observation

115. Bulgaria has provided information on its actions relating to research and systematic observation, and addressed both domestic and international activities including the Global Climate Observing System (GCOS). In accordance with UNFCCC reporting guidelines on NCs, Bulgaria has provided a summary of information on GCOS activities.

116. In its NC6, Bulgaria did not report on actions taken to support capacity-building related to research and systematic observation in developing countries. The ERT reiterates the recommendation in the in-depth review report of NC5 that Bulgaria provides this information in its next NC.

117. Bulgaria did not provide information on the barriers to free and open international exchange of data and actions taken to overcome these barriers. During the review, Bulgaria provided additional information elaborating on this element. The ERT encourages Bulgaria to include this information in the next NC. Bulgaria also did not report on support for developing countries to establish and maintain observing systems, and related data and monitoring systems. The ERT encourages Bulgaria to provide this information in its next submission. During the review, Bulgaria agreed to take further actions in order to include more information on research and systematic observation in the next NC.

118. BAS carries out climate change research activities, both nationally and in cooperation with research organizations from other countries. The National Institute of Meteorology and Hydrology is the main unit focusing on climate change research within BAS. The Scientific Coordination Centre for Global Change of BAS, a consultative/advisory body of the Steering Committee of BAS, coordinates both national and international research work related to global change. The main topics of research include: climate variability and change; vulnerability assessment and adaptation of individual sectors to climate change; solar–terrestrial influences; meteorology, climatology and hydrology; air pollution; climate-related technologies; territorial structure; and transport. Approximately two thirds of research funding in Bulgaria comes from the state budget, and the rest is provided by the private sector. The ERT noted that funding for

research is a major constraint in Bulgaria, with Bulgaria having one of the lowest total expenditures on research and development within the EU at about 0.45 per cent of the GDP.

119. Systematic observation in Bulgaria is linked closely with its general commitments in the field of meteorology. There are no global surface network stations or global upper air network stations located in Bulgaria, and there is only one global atmosphere watch station in the country (located in Rojen). The National Institute of Meteorology and Hydrology in Sofia has several weather stations included within the Regional Basic Synoptic Network (RBSN) and the Regional Basic Climatological Network (RBCN) in the Regional Association (RA) VI (Europe). The 'Acad. L. Krastanov', an important part of the Geophysical Institute, is involved in registration, processing, analysis and interpretation of the seismicity, geomagnetic field, ionosphere and ultraviolet radiation level above the country and region. The Institute of Oceanology carries out studies on the physical, chemical and biological parameters of seawater and the seabed in the western part of the Black Sea. The Bulgarian Institute for Space Research participates in national and international space-based observation programmes.

G. Education, training and public awareness

120. In the NC6, Bulgaria has provided information on its actions relating to education, training and public awareness. The information provided covers environmental education in schools, training programmes for teachers and lecturers, and awareness-raising activities. The NC6 presents essentially the same information on education, training and public awareness as the NC5.

121. The NC6 does not include information on participation in international activities related to education, training and public awareness. During the review, Bulgaria provided additional information about some international projects on education training and awareness-raising in cooperation with countries such as Belgium, Greece, Kazakhstan and Serbia. The ERT encourages Bulgaria to include this information in its next NC. The NC6 also does not include information on participation of public organizations and non-governmental organizations (NGOs) in training and public-awareness actions and plans. The ERT encourages Bulgaria to include this information in its next NC.

122. During the review, Bulgaria provided additional information on participation in international activities related to education, training and public awareness, measures for enhancement of climate change education according to TNAPCC 2013–2020 and initiatives to raise public awareness about TNAPCC and the National Adaptation Strategy.

123. The national policy in the field of education is governed by the Ministry of Education and Science. The topics of environmental protection and climate change are included in school syllabuses in subjects such as natural science and environment, geography, environmental chemistry and biology. A specialized course in vocational training of chemistry teachers on environment protection was given in 2005. There are also university courses on climate change, ecology, environmental protection, biomanagement, sustainable development and eco-economy. TNAPCC includes measures for enhancement of climate change education on the basis of two main state documents: *The National Strategy for Scientific Researches until 2020* and *The Programme for Development of the Education, Science and Youth Policies in Republic of Bulgaria*. In 2012, Bulgaria completed the project *Environmental management for sustainable living in Bulgarian primary schools* under the Bulgaria–Flanders cooperation programme for training ministry officials, teachers and municipalities in environmental management. Project *Click* was implemented under a cross-border cooperation programme between Bulgaria and Serbia in

2007–2013, with the aims of raising public awareness of the impact of climate change and developing the capacity of NGOs to participate actively in adaptation.

III. Summary of reviewed supplementary information under the Kyoto Protocol

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

124. Supplementary information provided by Bulgaria 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 sections in which this information is provided.

125. 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.

Table 9
Overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

Supplementary information	*Reference to the sixth national communication*
National registry	Section 3.8
National system	Section 3.1
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Section 5.4
Policies and measures in accordance with Article 2	Section 4.5
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	Section 4.2
Information under Article 10	Sections 3.3, 4.2, 6.4, 7.4, 7.5, 8 and 9
Financial resources	Not applicable

Note: Reporting on financial resources under the Kyoto Protocol is relevant for developed country Parties and other developed Parties that are included in Annex II to the Convention (Annex II Parties). As Bulgaria 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.

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

126. Bulgaria 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 2014 annual submission. The information in the 2014 annual submission is in line with the supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol (decision 15/CMP.1). During the review, Bulgaria provided the ERT with additional information on how it 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, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention. The ERT considers the

reported information to be complete and transparent. The ERT commends Bulgaria for the additional information provided. The ERT notes that the information provided in the annual submissions of 2013 and 2014 is nearly the same. The ERT encourages Bulgaria to continue exploring ways to report updated information on minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, focusing clearly on any changes in the information in its next NC submission.

127. As an EU member State, Bulgaria has developed a number of legislative measures implementing EU legislations for progressive reduction or phasing out of market imperfections, fiscal incentives, tax and duty exemptions and subsidies in all GHG-emitting sectors (e.g. the Environmental Protection Act, Clean Air Act, Energy Act, Renewable Energy Sources Act, Energy Efficiency Law and Law on Waste Management). Bulgaria participates in international trade through the liberalization of trade in environmental goods and services.

IV. Conclusions and recommendations

128. The ERT conducted a technical review of the information reported in the NC6 of Bulgaria according to the UNFCCC reporting guidelines on NCs. The ERT concludes that the NC6 provides a general overview of the national climate policy of Bulgaria. The information provided in the NC6 includes all elements of the supplementary information under Article 7 of the Kyoto Protocol. During the review, Bulgaria provided additional information such as the Climate Change Mitigation Act, TNAPCC and the 2014 version of the model used for projections.

129. Bulgaria's emissions for 2012 were estimated to be 44.2 per cent below the 1990 level excluding LULUCF and 44.9 per cent above the 1990 level including LULUCF. Emission decreases were driven by economic changes due to transition from a centrally planned economy to a market-based economy, including: decreases in power production from thermal power plants, accompanied by increases in the share of power production from RES; declines in production by energy-intensive enterprises; improvements in energy efficiency measures; and shifts from solid and liquid fuels to natural gas in fuel consumption in the residential sector; declines in the cattle and sheep population and reductions in fertilizer use in the agriculture sector. The decrease in emissions due to these factors more than offset the growth in the transport sector emissions.

130. In the NC6, Bulgaria presents GHG projections for the period 2010–2030. Two scenarios are included: 'with measures' and 'with additional measures'. The projected reductions in GHG emissions without LULUCF, in relation to the 1990 level, under the 'with measures' and 'with additional measures' scenarios, are 44.9 and 51.1 per cent, respectively.

131. Based on the comparison of the target and the average annual emissions for the first commitment period of the Kyoto Protocol (2008–2012), Bulgaria is in a position to meet its Kyoto Protocol target for the first commitment period (8.0 per cent reduction). Based on the 2014 national GHG inventory submission, Bulgaria's total cumulative emissions for the period 2008–2012 amounted to 312,859.91 kt CO_2 eq, while its assigned amount agreed in the initial review report under the Kyoto Protocol is equal to 610,045.83 kt CO_2 eq, which is 48.7 per cent above the cumulative total emissions for the same period. Bulgaria does not plan to use units from the Kyoto Protocol mechanisms for meeting its target for the first commitment period of the Kyoto Protocol.

132. For the second commitment period of the Kyoto Protocol, in accordance with decision 1/CMP.8, Bulgaria has committed to reducing, jointly with the EU, GHG emissions by 20.0 per cent by 2020, compared with the 1990 level. This target will be

fulfilled jointly by the EU and its member States through the implementation of the EU 2020 climate and energy package, which sets the target of emission reduction by 2020 compared with the 2005 level of 21.0 per cent of emissions from installations covered by the EU ETS and of 10.0 per cent of emissions in the non-ETS sectors through its ESD. Bulgaria's emissions (covering both EU ETS and non-ETS sectors) are projected to decrease by 4.5 and 15.9 per cent by 2020 respectively, compared with the 2005 level in the 'with measures' and 'with additional measures' scenarios..

133. The NC6 contains information on how its use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action. Bulgaria is not planning to make use of the Kyoto Protocol mechanisms to meet its Kyoto Protocol target. Bulgaria has hosted several JI projects, but has not participated in the clean development mechanism.

134. The national climate change policy of Bulgaria is underpinned by PaMs developed and implemented by MoEW supported by other national ministries, agencies and interministerial groups. The key climate and energy policy instrument is TNAPCC, which is supplemented by various other cross-sectoral and sectoral policies and programmes, the EU ETS and NGIS.

135. The EU ETS is the most important cross-cutting PaM in terms of coverage of total GHGs. Bulgaria joined the EU ETS in 2007, and it covers 132 installations in Bulgaria. Bulgaria has also put in place many other PaMs, including the National Energy Strategy till 2020, the National Energy Efficiency Programme till 2015, the National Action Plan for Renewable Energy and the National Programme for Promotion of the Biofuels Use in Transport Sector 2008–2020. These instruments outline Bulgaria's actions towards meeting its legally binding commitments under the EU 2020 climate and energy package.

136. As a Party not included in Annex II to the Convention, Bulgaria is not obliged to adopt measures and fulfil obligations as defined in Article 4, paragraphs 3, 4 and 5, of the Convention. However, in its NC6, Bulgaria has included some relevant information on provision of financial resources and technology transfer. The ERT commends Bulgaria for the information provided.

137. Bulgaria reported on expected impacts and vulnerability assessment based on projected changes in mean surface air temperature, precipitation and extreme weather events in 2050, 2080 and at the end of the twenty-first century. The climate scenarios developed as part of the CLAVIER project reveal significant warming from the middle to the end of the twenty-first century, with warmer summers, milder winters and an increase in ice-free days. There is an increased risk and vulnerability to soil droughts in Bulgaria in the twenty-first century, with soils with low moisture retention and regions in south-east Bulgaria with low precipitation during the warm season being the most vulnerable. Bulgaria reported on the National Adaptation Strategy for the period up to 2030 that is currently under development.

138. Bulgaria has provided information on its actions relating to research and systematic observation. BAS carries out climate change research activities, both nationally and in cooperation with research organizations from other countries. The main topics of research include: climate variability and change; vulnerability assessment and adaptation of individual sectors (e.g. water resources, agriculture, forests, etc.) under climate change; solar–terrestrial influences; meteorology, climatology and hydrology; air pollution; climate-related technologies; territorial structure; and transport. Systematic observation in Bulgaria is linked closely with its general commitments in the field of meteorology. The National Institute of Meteorology and Hydrology in Sofia has several weather stations included within the RBSN and RBCN in RA VI (Europe).

139. In the NC6, Bulgaria has provided information on its actions relating to education, training and public awareness. The information provided covers environmental education in schools, training programmes for teachers and lecturers, and awareness-raising activities. The national policy in the field of education is governed by the Ministry of Education and Science. TNAPCC includes measures for enhancement of climate change education. An important international training initiative project *Click* was implemented under a cross-border cooperation programme between Bulgaria and Serbia in 2007–2013, with the aim of raising public awareness of the impact of climate change and developing the capacity of NGOs to participate actively in adaptation.

140. 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 is provided by Bulgaria in its 2013 annual submission.

141. In the course of the review, the ERT formulated several recommendations relating to the completeness and transparency of Bulgaria's reporting under the Convention and its Kyoto Protocol. The key recommendations[11] are that Bulgaria:

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

(i) A description of the processes of key source identification and recalculation in the information on national systems;

(ii) A description of enforcement procedures for addressing cases of non-compliance under domestic law, under domestic and regional legislative arrangements, and enforcement and administrative procedures that it has in place to meet its commitments under the Kyoto Protocol;

(iii) How it believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals in accordance with the objective of the Convention;

(iv) PaMs in the industrial processes sector and those aimed at reducing F-gas emissions;

(v) The implementing entities for each PaM and separate textual descriptions of each PaM, subdivided by gas, or gases, affected;

(vi) Information on PaMs in the sectoral summary tables;

(vii) Descriptions of its own actions as an active member in ICAO/IMO activities in order to reduce the emissions of marine bunker fuels;

(viii) Emission projections in an aggregated format for each sector, including industrial processes and solvent and other product use and F-gases;

(ix) Estimated and expected total effects of implemented and adopted PaMs by gas;

(x) Action taken to support related capacity-building in developing countries in the area of research and systematic observation;

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

(i) Clear analysis of how its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals consistent with the objective of the Convention;

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

(ii) Consistent details on PaMs between the textual descriptions and the sectoral summary tables;

(iii) Descriptions of how the emissions have been aggregated on the sectoral and national levels, including how the GWP values have been applied;

(iv) Separate, to the extent possible, projections of emissions related to fuel sold to ships and aircraft engaged in international transport;

(v) Projections using, to the extent possible, the same sectoral categories as those used in the section on PaMs in the NC6;

(vi) Projections on a gas-by-gas basis for the transport, industrial and LULUCF sectors.

V. Questions of implementation

142. 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 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>.

"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 23/CP.19. 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/SBI/2011/INF.2. Compilation and synthesis of supplementary information incorporated in fifth national communications submitted in accordance with Article 7, paragraph 2, of the Kyoto Protocol. Note by the secretariat. Available at <http://unfccc.int/resource/docs/2011/sbi/eng/inf02.pdf>.

FCCC/ARR/2013/BGR. Report of the individual review of the annual submission of Bulgaria submitted in 2013. Available at <http://unfccc.int/resource/docs/2014/arr/bgr.pdf>.

FCCC/IRR/2007/BGR. Report of the review of the initial report of Bulgaria. Available at <http://unfccc.int/resource/docs/2008/irr/bgr.pdf>.

FCCC/IDR.5/BGR. Report of the in-depth review of the fifth national communication of Bulgaria. Available at <http://unfccc.int/resource/docs/2011/idr/bgr05.pdf>.

Sixth national communication of Bulgaria. Available at <http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/vi_nc_bulgaria_2013_22102014_final_-_resubmission.pdf>.

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

2014 GHG inventory submission of Bulgaria. 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. Veneta Borikova, Head of International Emission Trading Department, Climate Change Policy Directorate, Ministry of Environment and Water, including additional material on updated policies and measures, greenhouse gas projections, the national registry and recent climate policy developments in Bulgaria. The following documents[1] were also provided by Bulgaria:

Ministry of Environment and Water. Republic of Bulgaria. 2012. *Third National Action Plan on Climate Change for the Period 2013-2020.* Available at <http://www3.moew.government.bg/files/file/Climate/Climate_Change_Policy_Directorate/THIRD_NATIONAL_ACTION_PLAN.pdf>.

Climate Change Mitigation Act of Republic of Bulgaria. Available at: <http://dv.parliament.bg/DVWeb/index.faces/>.

Projection model for the sixth national communication (2014 version).

[1] Reproduced as received from the Party.