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## **Report of the in-depth review of the fifth national communication of Belarus**

Parties included in Annex I to the Convention are requested, in accordance with decision 10/CP.13, to submit a fifth national communication to the secretariat by 1 January 2010. This report presents the results of the in-depth review of the fifth national communication of Belarus conducted by an expert review team in accordance with the relevant provisions of the Convention and Article 8 of the Kyoto Protocol.

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## I. Introduction and summary

### A. Introduction

1. For Belarus, the Convention entered into force on 9 August 2000 and the Kyoto Protocol on 24 November 2005. Under the Kyoto Protocol, Belarus does not yet have a binding target for reducing its greenhouse gas (GHG) emissions during the first commitment period from 2008 to 2012. The Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP), by its decision 10/CMP.2, adopted the amendment to Annex B to the Kyoto Protocol, which states Belarus's commitment to reducing its GHG emissions by 8 per cent in relation to the base year level over the period 2008–2012. In accordance with the provisions of Article 20 of the Kyoto Protocol, the amendment will enter into force on the ninetieth day after the date of receipt by the Depositary of an instrument of acceptance by at least three fourths of the Parties to the Protocol. At the time of the in-depth review (IDR) of the fifth national communication (NC5) of Belarus, this had not yet been achieved.

2. This report covers the in-country IDR of the NC5 of Belarus, coordinated by the UNFCCC secretariat, in accordance with the guidelines for review under Article 8 of the Kyoto Protocol (decision 22/CMP.1). The review took place from 6 to 12 February 2012 in Minsk, Belarus, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: Mr. Michael Gytarsky (Russian Federation), Ms. Baasansuren Jamsranjav (Mongolia), Mr. Brian Mantlana (South Africa) and Mr. Koen Smekens (Belgium). Mr. Gytarsky and Ms. Jamsranjav were the lead reviewers. The review was coordinated by Ms. Ruta Bubniene (UNFCCC secretariat).

3. During the IDR, the expert review team (ERT) examined each section of the NC5. The ERT also evaluated the supplementary information provided by Belarus as a part of the NC5 under Article 7, paragraph 2, of the Kyoto Protocol.<sup>1</sup>

4. In accordance with decision 22/CMP.1, a draft version of this report was communicated to the Government of Belarus, which made no comment on it.

### B. Summary

5. The ERT noted that Belarus's NC5 complies, in general, 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). As required by decision 15/CMP.1, some of the supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol has been provided in the NC5. Belarus considered some of the recommendations provided in the report of the centralized in-depth review of the second, third and fourth national communication of Belarus.<sup>2</sup>

#### 1. Completeness

6. The NC5 covers all sections required by the UNFCCC reporting guidelines, including an executive summary and a chapter on research and systematic observation that were not reported in the previous national communication. The ERT commends the Party for this improvement in the completeness of its reporting. Belarus also provided some of

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<sup>1</sup> Decision 15/CMP.1, annex, chapter II.

<sup>2</sup> FCCC/IDR.4/BLR.

the supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol, including a description of the national system in accordance with Article 5, paragraph 1, of the Kyoto Protocol and a description of the national registry.

7. The ERT considers that the completeness of the Party's reporting can be improved by providing GHG emissions trend tables (see para. 14 below); by providing a description of its policies and measures (PaMs) that address GHG emissions from industry (see paras. 44 and 47 below); by providing a description of how its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals (see paras. 22 and 23 below); by providing further information on the steps taken to promote and/or implement decisions of the International Civil Aviation Organization (ICAO) (see para. 43) and, as appropriate, on how it strives to implement PaMs under Article 2 of the Kyoto Protocol in such a way as to minimize adverse effects (see para. 60 below); by providing a projection of emissions from aviation bunker fuels (see para. 43 below); by providing a projection of methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) emissions in the energy sector and a projection of fluorinated gases (F-gases) (see paras. 64 and 65 below); by providing a description of the factors and activities influencing GHG projections in non-energy sectors (see para. 69 below); by enhancing its reporting on the total effect of PaMs (see para. 64 below); by further enhancing its reporting on the vulnerability and impact assessment (see para. 90 below); by enhancing the information provided under Article 10 of the Kyoto Protocol on cooperation in research and capacity-building (see para. 92 below); and by providing additional information on Global Climate Observing System (GCOS) activities (see para. 93 below). Belarus provided all required mandatory information to the ERT during the review and expressed its intention to include it in its next national communication.

## **2. Transparency**

8. The ERT acknowledged that Belarus's NC5, including some of the supplementary information provided under Article 7, paragraph 2, of the Kyoto Protocol, is broadly transparent. However, the transparency of the Party's reporting could be further improved by enhancing coordination among the institutions involved in the collection and provision of data and information; by ensuring cross-linkages among the sections of the national communication and between the current and previous national communications; and by providing more focused information on each section of the national communication. In the course of the review, the ERT formulated a number of recommendations that could help Belarus to further enhance the transparency of its reporting with regard to national circumstances (see para. 11 below); PaMs (see paras. 21, 23, 24, 36, 43, 47, 52, 56 and 59 below); projections and the total effect of PaMs (see paras. 62 and 86–67 below); vulnerability, climate change impacts and adaptation (see para. 91 below); research and systematic observation (see paras. 93, 95 and 97 below); and education, training and public awareness (see para. 99 below).

## **3. Timeliness**

9. The NC5 was submitted in Russian on 30 December 2009, before the deadline of 1 January 2010 mandated by decision 10/CP.13. The NC5 was submitted in English on 3 May 2010.

## **II. Technical assessment of the reviewed elements**

### **A. National circumstances relevant to greenhouse gas emissions and removals, including legislative arrangements and administrative procedures**

10. In its NC5, Belarus has provided a description of its national circumstances and has elaborated on the framework legislation and key policy documents on climate change. Further technical assessment of the institutional and legislative arrangements for the coordination and implementation of PaMs is provided in chapter II.B.1 of this report.

#### **1. National circumstances**

11. In its NC5, Belarus has provided a description of its national circumstances, and information on how these national circumstances affect GHG emissions and removals and how changes in the national circumstances affect GHG emissions and removals over time. The NC5 includes all of the required elements as outlined in the UNFCCC reporting guidelines, except for a description of the building stock and urban structure. The ERT noted that the main drivers of emission trends in Belarus include the transition of the economy from a planned to a market economy, the change in the structure of primary energy supply and use, increased energy efficiency and the change in agricultural activities. They also include the substantial growth in the economy after the decline in the early 1990s and structural changes in the economy towards an increased share of the services sector and a decline in the industry sector, but the effect of this driver was partly offset by the decline in the population. The ERT noted that the information on how the national circumstances affect GHG emissions and removals is not fully transparent and encourages Belarus to improve the transparency and completeness of its reporting in its next national communication. Table 1 illustrates the national circumstances of Belarus by providing some indicators relevant to GHG emissions and removals.

12. The main policy documents on climate change mitigation and the reduction of GHG emissions include the National Programme for Mitigation of Climate Change Consequences for 2008–2012, the Strategy for Reducing Emissions by Sources and Enhancing Removals by Sinks of the Greenhouse Gases in the Republic of Belarus for 2007–2012, the National Plan for the Implementation of the Kyoto Protocol to the United Nations Framework Convention on Climate Change (2005–2012) and the National Law on Climate Protection (2009). During the review, the Party informed the ERT that, since the completion of the NC5, several strategic documents have been adopted aimed at enhancing energy security and economic and social development and at facilitating the implementation of existing PaMs. The key documents include the National Programme for Social and Economic Development (2011–2015), the National Environmental Protection Strategy up to 2025 and the Presidential Decrees on the National Safety Concept (2010) and on Some GHG Emission Reduction Issues (2010).

13. Responsibility for climate change policymaking lies with the Ministry of Natural Resources and Environment Protection (MNREP) of Belarus, and a number of national institutions are involved in the implementation of this policy. The Belarus Scientific Research Centre “Ecology” is responsible for the compilation of the Party’s national communications. Further legislative arrangements and administrative procedures, including those for the national system and the national registry, are presented in paragraphs 17–19 below and in chapter II.B of this report.

Table 1  
Indicators relevant to greenhouse gas emissions and removals for Belarus

	1990	1995	2000	2005	2009	Change 1990–2009 (%)	Change 2000–2009 (%)	Change 2008–2009 (%)
Population (million)	10.19	10.19	10.01	9.78	9.66	-5.2	-3.4	-0.2
GDP (2000 USD billion using PPP)	54.19	35.38	48.05	67.99	93.18	72.0	93.9	1.4
TPES (Mtoe)	45.55	24.75	24.68	26.87	26.76	-41.3	8.4	-4.9
GDP per capita (2000 USD thousand using PPP)	5.32	3.47	4.80	6.96	9.64	81.2	100.8	1.6
TPES per capita (toe)	4.47	2.43	2.47	2.75	2.77	-38.0	12.2	-4.8
GHG emissions without LULUCF (Tg CO <sub>2</sub> eq)	139.18	82.85	79.17	84.18	87.89	-36.9	11.0	-3.0
GHG emissions with LULUCF (Tg CO <sub>2</sub> eq)	110.60	51.63	48.27	57.97	57.84	-47.7	19.8	-8.9
CO <sub>2</sub> emissions per capita (Mg)	10.19	5.65	5.33	5.80	5.88	-42.3	10.4	-5.6
CO <sub>2</sub> emissions per GDP unit (kg per 2000 USD using PPP)	1.92	1.63	1.11	0.83	0.61	-68.2	-45.0	-7.6
GHG emissions per capita (Mg CO <sub>2</sub> eq)	13.66	8.13	7.91	8.61	9.10	-33.4	14.9	-2.8
GHG emissions per GDP unit (kg CO <sub>2</sub> eq per 2000 USD using PPP)	2.57	2.34	1.65	1.24	0.94	-63.4	-42.8	-5.1

Sources: (1) GHG emissions data: Belarus's 2011 greenhouse gas inventory submission; (2) Population, GDP and TPES data: International Energy Agency.

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

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

14. Belarus has provided a summary of information on GHG emission trends for the period 1990–2007 in the NC5. The carbon dioxide equivalent (CO<sub>2</sub> eq) and emission trend tables (given in the common reporting format (CRF)) have not been provided in the NC5 and the ERT recommends that Belarus provide these tables in its next national communication. During the review, the ERT assessed the recently submitted 2011 annual submission and has reflected the findings in this report.

15. Total GHG emissions excluding net emissions and removals from land use, land-use change and forestry (LULUCF)<sup>3</sup> in 2009 amounted to 87,887 Gg CO<sub>2</sub> eq; the energy sector accounted for 62.4 per cent of total GHG emissions, followed by the agriculture sector (25.9 per cent), the waste sector (7.1 per cent), the industrial processes sector (4.5 per cent), and the solvent and other product use sector (0.1 per cent). Total GHG emissions decreased by 36.9 per cent between 1990 and 2009, whereas total GHG emissions including net emissions and removals from LULUCF decreased by 47.7 per cent. This trend was mainly attributed to CO<sub>2</sub> emissions, which decreased by 64.4 per cent over this period. Emissions of N<sub>2</sub>O and CH<sub>4</sub> also decreased by 20.3 per cent and 1.6 per cent, respectively. A major part of these decreases was experienced between 1990 and 1995. The decreases in total GHG

<sup>3</sup> In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO<sub>2</sub> eq excluding LULUCF, unless otherwise specified.

emissions were mostly underpinned by the decreases in GHG emissions in the energy and agriculture sectors, driven by changes in primary energy supply and use (reduced use of oil and coal and increased use of natural gas and biomass), the employment of energy-efficient technologies in the energy sector, and the reduced use of mineral fertilizer and a decrease in the livestock population in the agriculture sector. It is worth noting that, during 1990–2009, GHG emissions per capita have decreased by 33.4 per cent and GHG emissions per GDP have decreased by 63.4 per cent, reflecting demographics and the economic development of the country.

16. In 2009, the LULUCF sector offset 34.2 per cent of the total GHG emissions of Belarus. Net removals increased by 5.1 per cent during the period 1990–2009 and increased by 10.7 per cent between 2008 and 2009. The main drivers for the rise in net removals are the increase in forest areas and the decrease in the area of peat extraction in wetlands. An analysis of the drivers of the GHG emission trends in each sector is provided in chapter II.B of this report. Table 2 provides an overview of GHG emissions by sector from the base year to 2009.

Table 2  
Greenhouse gas emissions by sector in Belarus, 1990–2009

Sector	GHG emissions (Tg CO <sub>2</sub> eq)						Change <sup>a</sup> (%)	Shares <sup>b</sup> by sector (%)		
	1990	1995	2000	2005	2008	2009		2008–2009	1990	2009
1. Energy	102.24	57.26	52.68	55.31	58.66	54.83	-46.4	-6.5	73.5	62.4
A1. Energy industries	65.31	33.57	30.75	32.12	31.54	30.34	-53.5	-3.8	46.9	34.5
A2. Manufacturing industries and construction	7.24	6.45	6.77	8.14	8.74	8.24	20.7	-5.7	5.2	9.4
A3. Transport	13.07	4.84	3.13	4.49	6.40	5.35	-59.1	-16.5	9.4	6.1
A4.–A5. Other	15.38	11.17	10.57	8.97	10.22	9.42	-38.7	-7.8	11.1	10.7
B. Fugitive emissions	1.24	1.24	1.46	1.59	1.75	1.48	19.2	-15.7	0.9	1.7
2. Industrial processes	3.61	2.04	2.60	3.48	3.97	4.00	10.6	0.6	2.6	4.5
3. Solvent and other product use	0.07	0.06	0.08	0.07	0.06	0.06	-13.9	0.0	0.1	0.1
4. Agriculture	30.67	21.35	20.85	20.70	22.28	22.79	-25.7	2.3	22.0	25.9
5. LULUCF	-28.57	-31.22	-30.90	-26.21	-27.14	-30.04	5.1	10.7	-20.5	-34.2
6. Waste	2.57	2.14	2.96	4.62	5.63	6.21	141.0	10.1	1.8	7.1
7. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<b>GHG total with LULUCF</b>	<b>110.60</b>	<b>51.63</b>	<b>48.27</b>	<b>57.97</b>	<b>63.47</b>	<b>57.84</b>	<b>-47.7</b>	<b>-8.9</b>	<b>NA</b>	<b>NA</b>
<b>GHG total without LULUCF</b>	<b>139.18</b>	<b>82.85</b>	<b>79.17</b>	<b>84.18</b>	<b>90.61</b>	<b>87.89</b>	<b>-36.9</b>	<b>-3.0</b>	<b>100.0</b>	<b>100.0</b>

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

<sup>a</sup> The changes in emissions and the shares 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.

<sup>b</sup> 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.

**2. National system**

17. Although Belarus, as a Party included in Annex I to the Convention (Annex I Party) with no commitments inscribed yet in Annex B to the Kyoto Protocol, has no obligation to report supplementary information on its national system under Article 5, paragraph 1, of the Kyoto Protocol, the country has provided in its NC5 some information on the national system. In accordance with decision 15/CMP.1, the Party has provided in its NC5 information on the institutional and legal arrangements for inventory preparation, on the process for the collection of activity data and on recalculations and quality assurance/quality control (QA/QC) activities.

18. During the review, the Party provided additional information on the capacity of the national system. Belarus informed the ERT that the GHG inventory team temporarily lacks an energy expert. The ERT encourages Belarus to facilitate the transfer of the know-how to the expert who will be compiling the inventory for the energy sector for the next inventory submissions and to ensure that the GHG inventory submission is prepared in a timely manner.

**3. National registry**

19. Although Belarus, as an Annex I Party with no commitments inscribed yet in Annex B to the Kyoto Protocol, has no obligation to report supplementary information on its national registry, in its NC5 the Party has provided information on the national registry system, including a detailed description of the hardware and software used. The ERT commends Belarus for reporting this information.

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

20. In its NC5, Belarus has provided well-organized and broadly complete information on its package of PaMs implemented, adopted and planned in order to fulfil its commitments under the Convention and its Kyoto Protocol. Each sector has its own textual description of the principal PaMs, supplemented by summary tables on PaMs by sector and by gas, which are broadly consistent with the UNFCCC reporting guidelines.

21. The ERT acknowledged the advancements in the NC5 in reporting on PaMs compared with the previous national communication in terms of completeness, transparency and consistency with the UNFCCC reporting guidelines. Most of the recommendations from previous reviews in relation to the improvement of the Party's reporting were implemented in the NC5. The NC5 contains a set of new PaMs in addition to several PaMs under implementation described in the previous national communication. However, the ERT noted that the cross-references with the previous national communication with regard to the continuous PaMs and those that are no longer in place require further improvement. The ERT encourages Belarus to report on the PaMs implemented since the previous national communication, review their outcome and include this information in its next national communication. During the review, Belarus provided additional information on individual PaMs in different sectors, including those adopted after the submission of the NC5 and/or those planned for adoption in the near future.

22. The completeness of the NC5 has also improved, and Belarus has provided information on the GHG mitigation effects of some PaMs in several sectors. However, the ERT noted that Belarus has not provided the following reporting elements required by the UNFCCC reporting guidelines: a description of the PaMs addressing GHGs from industry; and information on how the Party believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals. Following the relevant provision of decision



15/CMP.1, Belarus has provided limited information (see para. 43) on the steps taken to implement ICAO decisions in order to reduce or mitigate GHG emissions (Article 2, paragraph 2, of the Kyoto Protocol). The ERT recommends that Belarus include this information in its next national communication.

23. The ERT noted that the NC5 includes limited information on: the status of implementation and anticipated emission reductions of individual PaMs; the PaMs that could potentially increase emissions; the non-GHG mitigation benefits of the PaMs; and the costs of PaMs. In response to the questions raised by the ERT during the review, the Party provided further relevant information. The ERT encourages Belarus to include this information in its next national communication.

24. The description of the national PaMs in the NC5 is mainly focused on the energy and waste sectors, whereas the mitigation activities in the industrial processes, agriculture and LULUCF sectors are insufficiently described. Most of the framework and sectoral PaMs (including programmes and action plans) are planned for five-year periods (e.g. 2006–2010 and 2011–2015) as a consequence of the five-year planning cycle related to the development of the national economy. The majority of the programmes have been updated for the planning period 2011–2015. During the review, the Party provided the ERT with information on the updated package of climate-related PaMs and information on the new initiatives to mitigate GHG emissions. Belarus also provided the ERT with information on regional and local activities on energy saving, the promotion of renewable energy sources, solid waste treatment and the construction of biogas plants undertaken under the framework of the national development programmes and strategies. The ERT encourages Belarus to include a description of regional and local activities in its next national communication.

25. In its NC5, Belarus has provided sector-level aggregated quantitative estimates of the effects of energy-saving PaMs and envisaged emission reductions from the renewable energy sources. The cumulative five-year mitigation effect of the energy-saving PaMs implemented during the period 2006–2010 was estimated at 12.8 Mt CO<sub>2</sub> eq.

26. Although the emission reduction target under the Kyoto Protocol is not yet in force for Belarus, the Party has established a domestic policy framework and the legislative and institutional arrangements required for the implementation of relevant provisions of the Kyoto Protocol (see paras. 17–19 above). Belarus has set a national longer-term conditional target to reduce GHG emissions by 10 per cent by 2020 compared with the 1990 level (see para. 83 below). In addition to this national GHG emission reduction target, Belarus has also established several targets in the energy sector that are directly linked to the overall GHG emission reduction target, for example: an energy intensity target that could be expressed as TPES per unit of gross domestic product (GDP) (hereinafter referred as GDP energy-intensity target) of 60 per cent by 2020 compared with the 2005 level (see para. 84 below) and an increase in the share of domestic energy low-carbon and carbon-free sources<sup>4</sup> in primary energy supply to 32.0 per cent by 2020 (see para. 36 below). Table 3 provides a summary of the reported information on the PaMs of Belarus.

## **1. Policy framework and cross-sectoral measures**

27. MNREP has overall responsibility for the development of climate policy at the national and international levels. During the review, the ERT learned that the National Commission on Climate Change (2006) coordinates climate change related activities among the national implementing agencies. The scientific community and the key ministries, businesses and municipal communities associated with national climate policy also participate in the work of the Commission.

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<sup>4</sup> In this context, domestic energy sources include renewable energy sources (including peat), nuclear energy and waste.

Table 3  
Summary of information on policies and measures

<i>Major policies and measures</i>	<i>Examples/comments</i>
<i>Policy framework and cross-sectoral measures</i>	
Integrated climate change related policies and measures	<p>National Programme for the Mitigation of Climate Change Consequences for 2008–2012 (2008)</p> <p>Strategy for Reducing Emissions by Sources and Enhancing Removals by Sinks of the Greenhouse Gases in the Republic of Belarus for 2007–2012 (2006)</p> <p>National Plan for the Implementation of the Kyoto Protocol to the United Nations Framework Convention on Climate Change for 2005–2012 (2005)</p> <p>National Law on Climate Protection (2009)</p> <p>National Strategy for Sustainable Development until 2020 (2004)</p> <p>National Programme for Social and Economic Development for 2011–2015 (2010)</p> <p>National Programme for Innovative Development for 2011–2015 (2010)</p> <p>National Environmental Protection Strategy up to 2025</p> <p>Presidential Decrees on the National Safety Concept (2010) and on Some GHG Emission Reduction Issues (2010)</p> <p>Package of climate-relevant decrees of the Council of Ministers of the Republic of Belarus (adopted in 2005, 2006, 2007 and 2009)</p> <p>Code of Practice on the Submission, Review and Monitoring of the Voluntary GHG Reduction Projects (2009)</p>
<i>Policies and measures by sector</i>	
<i>Energy</i>	
Energy supply, including heat and power production and transmission	<p>National Strategy for the Development of the Energy Potential of the Republic of Belarus (2010)</p> <p>Concept of Energy Security of the Republic of Belarus (2007)</p> <p>Main Directions of the Energy Policy of Belarus for 2001–2005 and until 2015 (2000)</p> <p>National Programme for Energy Sector Development until 2016 (draft, 2012)</p> <p>Programme to ensure that at least 25 per cent of domestic energy production comes from domestic fuels and alternative energy sources for the period until 2012 (2004)</p> <p>National Law on Nuclear Power Utilization (2008) and National Law on Renewable Energy Sources (2010) (estimated reduction of 6.5 Mt CO<sub>2</sub> eq through these two PaMs during the period 2008–2012)</p>
Renewable energy sources	<p>National Programme for the Development of Domestic and Renewable Energy Sources for 2011–2015 (2011)</p> <p>National Programme for Building Energy Sources Powered by Domestic Fuels for 2010–2015 (2010)</p> <p>National Programme for Building Hydroelectric Power Stations in the Republic of Belarus for 2011–2015 (2010) (estimated reduction of 2.2 kt CO<sub>2</sub> eq per year)</p> <p>National Strategy for the Development of Wind Energy Potential for 2011–2015 (2010)</p>
Energy efficiency and energy saving	<p>National Law on Energy Conservation (1998, five amendments until 2009)</p> <p>National Energy Conservation Programme for 2006–2010 (2005) (estimated reduction of 12.8 Mt CO<sub>2</sub> eq for the period 2006–2010); for 2011–2015 (2010) (estimated reduction of 2.3 Mt CO<sub>2</sub> eq for the period 2011–2015)</p> <p>National Comprehensive Innovation Programme for the Fixed Assets of the Belarusian Energy System, Energy Saving and Increased Share of Domestic Fuel and Energy Resources in Belarus for 2007–2011 (2007) (estimated reduction of 0.6 Mt CO<sub>2</sub> eq per year<sup>a</sup> for the period 2006–2010)</p> <p>Council of Ministers resolution on measures to increase the efficiency of using fuel and energy resources for the period until 2012 (2010) (estimated reduction of 56 kt CO<sub>2</sub> eq per year, due to the construction of new small combined heat and power plants)</p> <p>Programme for Restructuring the Industrial Sector for 1998–2015 (1997)</p>

<i>Major policies and measures</i>	<i>Examples/comments</i>
Residential and commercial sectors	<p>Concept for Building Sector Development for 2011–2020 (2010)</p> <p>National Programme for the Conversion of Boiler Houses into Small Combined Heat and Power Plants for 2007–2010 (2007) (estimated reduction of 85 kt CO<sub>2</sub> eq<sup>a</sup> per year for 2007–2010)</p> <p>National Programme for the Design, Construction and Reconstruction of Energy-Efficient Dwellings until 2020 (2009)</p>
Transport	<p>National Programme for Biodiesel Production for 2007–2010 (2007)</p> <p>National Programme for the Development of Civil Aviation 2006–2010 (2006)</p> <p>National Programme for the Development of Automobile Transport for 2011–2015 (2010)</p> <p>National Programme on the Supply of Urban Areas with Electric-Powered Transport for 2009–2013 (2009)</p> <p>National Programme on Biodiesel Production in the Republic of Belarus for 2007–2010 (2007)</p> <p>National Programme for the Development of Railway Transport for 2011–2015 (2010)</p> <p>A set of measures on the use of cars equipped with a compression ignition engine in line with the EURO 4 and 5 standards</p> <p>Automobile Industry Development Programme of the Republic of Belarus for 2007–2010 (the promotion of the production of passenger cars in line with the EURO 4 standard and of trucks and buses in line with the EURO 1, 2 and 3 standards)</p>
Industry	<p>Only information on the PaMs related to energy efficiency in industrial plants has been provided in the NC5 (see the PaMs under energy efficiency above)</p> <p>National Comprehensive Programme on the Development of a Material and Technical Basis for the Building Sector (2006)</p> <p>National Programme on Technical Retrofitting and Modernization (2007)</p>
Agriculture	<p>Programme on Agricultural Production (2010)<sup>a</sup></p>
Forestry	<p>Programme for the Development of Forestry in the Republic of Belarus for 2007–2011 (2006)</p> <p>Forest Management and Rational Forest Use Programme (2009)</p> <p>Regulation on the monitoring of forests and the use of monitoring data as part of the National Environment Monitoring System in the Republic of Belarus (2007)</p> <p>Renaturalization and Sustainable Management of Peatlands (2008)</p> <p>National Programme on the Conservation and Use of Reclaimed Lands in 2006–2010 (2005)</p>
Waste	<p>Law on Waste Management (2007)</p> <p>National Programme for Waste Collection, Treatment and Recycling for 2009–2012 (2009) (estimated reduction of 505 kt CO<sub>2</sub> eq per year)</p> <p>Strategy for the Collection, Disposal and Recycling of Municipal Waste for 2011–2015 (2011)</p> <p>National Programme for the Construction of Biogas Plants for 2010–2015 (2010) (estimated reduction of 238 kt CO<sub>2</sub> eq per year)</p> <p>National Programme for the Construction of Municipal Waste Facilities for 2008–2014 (2008)</p>

*Abbreviation:* GHG = greenhouse gas.

<sup>a</sup> Policies and measures targeted at reducing GHG emissions from the agriculture sector are included in the integrated programmes, such as the Strategy for Reducing Emissions by Sources and Enhancing Removals by Sinks of the Greenhouse Gases in the Republic of Belarus for 2007–2012 (2006), the National Programme for the Mitigation of Climate Change Consequences for 2008–2012 (2008) and the National Programme for Social and Economic Development for 2011–2015 (2010).

28. Several executive institutions undertake the monitoring of the implementation of PaMs at the national and regional levels. The National Statistical Agency collects annual statistical data, including those on energy-efficiency improvements. The State Committee for Standards, through its Energy Efficiency Department, supervises the implementation of the national programmes on the use of fuel and energy saving, whereas its regional branches control energy efficiency and fuel consumption programmes at the regional level. Some monitoring activities are performed by the ministries and agencies responsible for the implementation of the respective national or sectoral programmes and plans. For example,

the Ministry of Energy develops strategic PaMs for the energy sector and is responsible for their implementation and monitoring. The ERT encourages Belarus to enhance monitoring of effects of individual PaMs and reporting thereof in its next national communication.

29. The ERT noted that information on the specific responsibilities of the agencies, as well as on the monitoring and assessment of the effects of the individual PaMs, is not transparently presented in the NC5 and that synergies and overlaps of the effects of individual PaMs may occur. The ERT encourages Belarus to specify the responsibilities of the institutions involved in the coordination and implementation of individual PaMs as well as in the monitoring and assessing the effects of individual PaMs at the national and regional levels, taking into account synergies and overlaps, in the next national communication.

30. Belarus has a package of energy and climate change related PaMs, with key focus on energy-efficiency improvements and the promotion of domestic energy sources, in particular renewables. Strategies and plans dominate the package of PaMs; however, some steps have been taken to introduce economic incentives for the diversification of energy sources and the increase of energy security. Those measures are likely to result in GHG emission reductions as a co-benefit.

31. The framework of climate change related policy is based on three key strategic documents: the National Strategy for Sustainable Development until 2020, the National Programme for Social and Economic Development for 2011–2015 and the National Programme for Innovative Development for 2011–2015. These documents prioritize the modernization of energy and industrial facilities, with the aim of securing energy demand (by substituting conventional fossil fuels with domestic and renewable energy resources) and increasing energy-efficiency gains with the reduction in GHG emissions as an important co-benefit. Security of energy demand is to be achieved through diversification of energy supply and increased share of domestic energy resources. The ERT noted that Belarus attaches significant importance to climate change issues due to the vulnerability of its agriculture and LULUCF; the need to enhance efficiency and to diversify the energy supply; and the possible economic benefits from the implementation of economic mechanisms established under the Kyoto Protocol.

## 2. Policies and measures in the energy sector

32. Between 1990 and 2009, GHG emissions from the energy sector decreased by 46.4 per cent (47.4 Tg CO<sub>2</sub> eq), mainly driven by the decrease in emissions from energy industries, but also from decreases in the energy end-use sectors. The overall trend in GHG emissions from fuel combustion showed a notable decrease in the energy industries (by 53.5 per cent, or 35.0 Tg CO<sub>2</sub> eq), in transport (by 59.1 per cent, or 7.7 Tg CO<sub>2</sub> eq) and in energy use in other sectors (by 38.7 per cent, or 6.0 Tg CO<sub>2</sub> eq), which was partially compensated by the increase in GHG emissions from manufacturing industries (by 20.7 per cent, or 1.0 Tg CO<sub>2</sub> eq) and fugitive emissions (by 19.2 per cent, or 0.2 Tg CO<sub>2</sub> eq) during the period 1990–2009. During this period, the total primary energy supply (TPES) in Belarus decreased by 41.3 per cent, driven by the decrease in the energy consumption in the end-use sectors. This decrease was accompanied by a shift in fuel use, including the reduced consumption of coal (by 105.5 per cent) and oil (by 67.7 per cent) and the increased consumption of gas (by 17.5 per cent), which altogether contributed to a decrease in carbon intensity of the TPES.

33. **Energy supply.** In 2009, energy industries were the main source of GHG emissions, accounting for almost 34.5 per cent of the total GHG emissions of Belarus. The priorities in terms of energy supply are on ensuring energy security through the enhancing of energy efficiency and implementing energy-saving measures, and on increasing the share of nuclear and domestic energy resources, including renewable resources. Belarus has set a

target to ensure that at least 25 per cent of heat and power is produced through the use of domestic fuels and alternative energy resources by 2012. It is further envisaged that by 2020 nuclear power will provide up to 14–16 per cent of electricity in the national energy balance, while the share of natural gas will decrease to 50–60 per cent (from about 80 per cent in 2009).

34. The Party's energy supply related PaMs include six programmes, supplemented by several cross-sectoral measures. These PaMs focus on the reduction of fuel-specific consumption per unit of energy produced through the retrofitting of old, inefficient power generation capacities and the introduction of combined heat and power (CHP) production, with the aim of reducing energy intensity by 29–32 per cent by 2015 and increasing the use of domestic energy resources by 25–28 per cent by 2015 compared to the levels in 2005. The estimated annual effects of the implementation of these PaMs are a reduction of 0.9 Mt CO<sub>2</sub> eq in 2010, which increases gradually to a reduction of 2.3 Mt CO<sub>2</sub> eq by 2020.

35. During the review, Belarus provided additional information on the PaMs aimed at the renovation of heat and power transmission networks. The ERT recommends that Belarus enhance the description of specific PaMs on heat and power production and transmission in its next national communication.

36. During the review the ERT learned that, aiming to ensure a secure energy supply, Belarus is planning construction of a nuclear power plant. One reactor is planned to begin operation in 2016 and the other reactor is planned for 2018. The electricity provided by the nuclear power plant will replace a share of the imported natural gas and will thus drive the reduction of total GHG emissions beyond 2016. Further, Belarus intends to increase the share of domestic energy resources in its TPES from 23.0 per cent in 2009 (including peat) to at least 25.0 per cent by 2012, 28.0 per cent by 2015 and up to 32.0 per cent by 2020. This increase will mainly occur due to the increased use of peat, waste, hydropower and wind power. The ERT encourages Belarus to further elaborate on the diversification of the energy supply in its next national communication.

37. **Renewable energy sources.** The NC5 contains limited information on the possible options for the use of renewable energy sources. During the review, the Party informed the ERT about the adopted National Law on Renewable Energy Sources (2010) and the package of PaMs underpinning this law for the period 2011–2015. These include a provision for the construction of hydropower plants (with an expected mitigation effect of 2.2 Gg CO<sub>2</sub> eq/year) and the installation of wind turbines (with a total capacity of up to 300 MW) in the period 2011–2015. The ERT noted that the Law on Renewable Energy Sources provides economic incentives for renewable energy investors and producers through the introduction of feed-in tariffs and green certificates as well as by removing institutional barriers for the supply of the electricity produced to the national power grid. However, the ERT further noted that the technical and economic potential of the renewable energy sources, the level of implementation of the related PaMs and the effect of those PaMs on the mitigation of GHG emissions remain unclear. The ERT recommends that Belarus include a complete description of its PaMs related to renewable energy sources in its next national communication.

38. **Energy efficiency.** The NC5 describes several PaMs that appear to target both energy-efficiency improvements in energy supply and the promotion of the use of domestic energy resources (namely the National Law on Nuclear Power Utilization) and renewable energy sources (namely the Law on Renewable Energy Sources). Those PaMs are expected to result in a cumulative emissions reduction of up to 6.5 Mt CO<sub>2</sub> eq during the period 2008–2012.

39. During the review, Belarus informed the ERT about other PaMs under implementation and PaMs that are no longer in place and those that have replaced them.

The Party also informed the ERT about the institutional framework and about mandatory and voluntary financing instruments for promoting energy efficiency. These policy instruments include subsidies, tax remissions, soft loans and the allocation of special funds (e.g. the Innovation Fund of the Ministry of Energy and the Departmental Innovation Fund). The ERT learned about the institutional and financial barriers for the enhancement of energy efficiency, including an insufficient regulatory base, low social and economic motivation and a lack of relevant knowledge and experience.

40. Based on the updated information provided by the Party during the review, Belarus has estimated the mitigation effect of the PaMs targeted at energy efficiency that are no longer in place as 15.8 Mt CO<sub>2</sub> eq for the period 2006–2010. The Party envisages that the new PaMs will result in an annual reduction of 2.3 Mt CO<sub>2</sub> eq for the period 2011–2015. The ERT encourages Belarus to include, in its next national communication, complete and transparent information on cross-cutting and sectoral energy-efficiency and energy-saving measures and a description of the methodologies used to estimate the effect of the individual PaMs.

41. **Residential and commercial sectors.** The NC5 does not include information on the PaMs in the residential and commercial sectors, nor does it include an overview of the building and residential stock in the country. During the review, Belarus informed the ERT about the national programmes aimed at enhancing energy efficiency in the residential sector through the introduction of more energy-efficient materials and building standards (Concept for Building Sector Development for 2011–2015) and guidelines for the operation and maintenance of new buildings. Further, the Party informed the ERT that the conversion of boiler houses into small CHPs has resulted in an annual emission reduction of 85 kt CO<sub>2</sub> eq during the period 2007–2010. The ERT recommends that Belarus include complete information on the PaMs for the residential and commercial sectors in its next national communication.

42. **Transport sector.** According to the NC5, the PaMs in the transport sector are mainly focused on the modernization of the car fleet in order to meet international emission standards. These measures are implemented under the relevant national programmes (see table 3). For private vehicles, the measures also include increasing the custom taxes on imported second-hand vehicles and reducing the permitted age for second-hand vehicles. Additional efforts have been made by Belarus to encourage a shift from the use of gasoline to compressed gas in public transport and biodiesel production during the period 2007–2010. During the review, the ERT was informed about the intentions of Belarus to promote electric railway through implementation of the National Programme for the Development of Electric Railway Transport. The ERT noted that the mitigation effects of the PaMs in the transport sector were not reported in the NC5 and encourages Belarus to improve the completeness of its reporting of the PaMs in the transport sector in its next national communication.

43. With respect to aviation bunkers, the NC5 indicates the Party's intention to fully comply with the ICAO emission standards through the adoption of the new Air Code (2006) and the National Programme for the Development of Civil Aviation for 2006–2010 (2006), which envisages the upgrading and renovation of the national air fleet. During the review, Belarus informed the ERT that its aviation companies Belavia National Airline and Transaviaexport Airline, which operate international flights, in implementing the decisions of ICAO have implemented technical and operational measures for the fleet in order to reduce their consumption of aviation fuel. The ERT recommends that Belarus provide further and more detailed information on this matter in its next national communication.

44. **Industrial sector.** The NC5 does not provide information on the energy consumption of industrial plants, including building industry. Additional information provided by the Party during the review included a limited description of the two administrative sectoral

PaMs related to energy efficiency in industry. However, their level of implementation and mitigation effect remain unclear. The ERT recommends that Belarus include a description of the PaMs that address energy use in industry, in particular in the growing building industry, in its next national communication.

### 3. Policies and measures in other sectors

45. Between 1990 and 2009, total GHG emissions from other sectors, namely industrial processes (including solvent and other product use), agriculture and waste decreased by 10.5 per cent (3.9 Tg CO<sub>2</sub> eq), mainly driven by the decrease in emissions from the agriculture sector, which were partially compensated by an increase in emissions from the waste and industrial processes sectors.

46. **Industrial processes.** Between 1990 and 2009, GHG emissions from the industrial processes sector increased by 10.6 per cent (0.38 Gg CO<sub>2</sub> eq), mainly driven by the increase in CO<sub>2</sub> emissions from cement and lime carbonate production, which constituted 65 per cent of the sectoral emissions. The NC5 does not include information on the PaMs in the industrial processes sector.

47. During the review, the ERT learned that 88 foundries, 120 thermal facilities and 24 galvanic installations were renovated between 2007 and 2010 within the framework of the National Programme on Technical Retrofitting and Modernization (2007). Further, the ERT learned that, in order to reduce the emissions from cement and lime carbonate production, a number of measures to produce building materials with a lower content of clinker in cement mixtures have been envisaged under the ongoing National Comprehensive Programme on the Development of a Material and Technical Basis for the Building Sector (2006). The ERT recommends that Belarus include a complete description and analysis of the PaMs in the industrial processes sector in its next national communication, including those targeted at reducing GHGs from cement and lime carbonate production.

48. **Agriculture.** Between 1990 and 2009, GHG emissions from the agriculture sector decreased by 25.7 per cent (7.9 Tg CO<sub>2</sub> eq), mainly driven by the decrease in fertilizer use and the decrease in the livestock population.

49. Compared with the information provided in the NC4, the description of the PaMs in the NC5 in the agriculture sector is more oriented towards GHG mitigation. The main PaMs to reduce GHG emissions from the agriculture sector address the research and modernization of agricultural industries. For example, the Programme on Agricultural Production includes scientific and research activities related to economic development and food security (including animal breeding and increasing the yield) and aim, inter alia, at reducing the N<sub>2</sub>O and CH<sub>4</sub> emissions from agricultural activities.

50. During the review, Belarus informed the ERT about the National Programme for Social and Economic Development for 2011–2015, which promotes the development of technology in agriculture, the optimization of livestock feeding and the more efficient use of mineral nitrogen fertilizers. This programme includes several subprogrammes focused on sustainable rural development, the development of the dairy industry, livestock breeding and the modernization of swine production and of potato, vegetable and fruit production.

51. Also during the review, Belarus informed the ERT that the National Programme for the Construction of Biogas Plants for 2010–2015 aims to promote the use of biogas from agricultural residues, livestock waste, wastewater treatment plants and landfills in order to generate electricity and heat. This programme also aims at producing high-quality organic fertilizer, thus reducing the use of mineral fertilizers, and envisages the construction of 32 plants with a total capacity of 18.6 MW, resulting in an annual emission reduction of 0.2 Mt CO<sub>2</sub> eq. The ERT noted that two biogas facilities were put into operation in 2008,

with a total generation capacity of 5.4 Mm<sup>3</sup> landfill gas, which will be further utilized at the biogas power plants. The ERT further noted that the implementation of this ambitious plan requires the securing of considerable financial resources (the total expected budget is USD 108 million).

52. The ERT encourages Belarus to further elaborate on the PaMs in the agriculture sector and their effects, and to report on the non-GHG benefits of the PaMs, which may include enhancing food security.

53. **LULUCF.** The LULUCF sector was a net removal of GHG emissions of 30.04 Tg CO<sub>2</sub> eq in Belarus in 2009, and net GHG removals have increased by 5.1 per cent since 1990. The trend was mainly driven by afforestation and forest management activities.

54. The information on the PaMs in the LULUCF sector is more detailed than in the NC4 and additional information has been provided on the same PaMs that were reported in the NC4. For example, the information on the PaMs addressing natural ecosystems outlines the PaMs that are being implemented in this sector, the effect of those PaMs on GHG emissions and the authorities responsible for the implementation of the PaMs. The Forest Management and Rational Forest Use Programme (2009) aims to increase the resistance of forests to the effects of climate change, maintain forest biodiversity and simultaneously increase the economic value of forest plantations.

55. During the review, the ERT learned that, within the framework of the development of the adaptation strategy for the LULUCF sector (see table 6), the Institute of Experimental Botany, the Institute of Forest and the Institute of Nature Management have conducted significant research on reforestation and the impacts of climate change on forests, and steps have been made towards more efficient forest management. The outcome from this research is expected to lead to adaptation measures that could increase resilience of forests to a changing climate, improve the maintenance of forest biodiversity and increase the economic value of forest plantations. In addition, this type of forest management will also lead to considerable change in the future formation and typological structure of forests, with implications for mitigation. For example, the overall area occupied by coniferous trees may increase by 3.1 per cent by 2025 and by 12.4 per cent by 2050 in comparison with the accounting period, while the areas under oak tree forests may increase to 7.7 per cent in 2025 and to 11.6 per cent in 2050.

56. One programme that may make a considerable impact, beyond addressing GHG mitigation, is that aimed at the rewetting of degraded wetlands and reforestation. During the review, Belarus informed the ERT about an ongoing project on rewetting (the Belarus Peatland Rewetting Project). This project aims to rewet an area of 9,440 ha during the period 2011–2015, with an estimated 0.26 Tg CO<sub>2</sub> eq sequestered during this period. Further, this project has the potential to deliver non-GHG reduction co-benefits, including the enhancement of the biodiversity of the restored wetlands and the creation of employment in the management of the wetlands. The ERT encourages Belarus to analyse and report on the effect of the rewetting of degraded wetlands on biodiversity.

57. **Waste management.** Between 1990 and 2009, GHG emissions from the waste sector increased by 141.1 per cent (3.6 Gg CO<sub>2</sub> eq), mainly driven by the increase in CH<sub>4</sub> emissions from solid waste disposal on land. This in turn was due to the notable growth in municipal solid waste in Belarus from 0,485 kg/capita/day in 1999 to 0,877 kg/capita/day in 2009 that resulted from changes in lifestyle and packaging.

58. The PaMs in the waste sector are focused on the reduction of the total amount of industrial and municipal waste, solid waste management and treatment (the separate collection and sorting of municipal waste), biogas recovery and waste recycling. The Party informed the ERT about its plans to install five waste sorting plants by 2015. These plans are supported by a package of legal, administrative, technical and voluntary measures, such



as the introduction of municipal solid waste separation and separate collection and the promotion of recycling of municipal solid waste (see table 3). The Party also informed the ERT that there are several legal and economic barriers that are limiting progress in the implementation of the PaMs.

59. The ERT noted a lack of specific information on the effect of PaMs under implementation and on planned PaMs on the GHG emissions from the waste sector. The ERT further noted that the description of solid waste management is combined with sludge and sewage sediment treatment, thereby making a specific distinction between the measures on solid waste and wastewater treatment unclear. The ERT encourages Belarus to enhance the completeness and transparency of its reporting on specific sectoral measures and to include quantitative estimates of their objectives in the description of the waste sector PaMs in its next national communication.

#### **4. Minimization of adverse effects in accordance with Article 2, paragraph 3, of the Kyoto Protocol**

60. In its NC5, Belarus did not report information, as appropriate, 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 the review, Belarus informed the ERT that it considers that most PaMs related to climate change will have no direct or indirect negative effects on other Parties and explained that it participates in the discussions on aviation bunkers under the auspices of ICAO. The ERT recommends that Belarus elaborate on this matter in its next national communication.

### **C. Projections and the total effect of policies and measures, and supplementarity relating to the Kyoto Protocol mechanisms**

61. In its NC5, Belarus has provided GHG emission projections that include a ‘without measures’, a ‘with measures’ (three variants) and a ‘with additional measures’ scenario from 1990 until 2020. During the review, Belarus provided updated scenarios that reflect the most recent inventory data for 1990–2009 contained in the 2011 inventory submission. The updated projections were considered by the ERT in conjunction with the review of the projections reported in the NC5.

62. The ERT noted that, compared with the NC4, the completeness and the level of detail of reporting of the GHG projections has improved significantly, as the NC5 includes all three scenarios required by the UNFCCC reporting guidelines. The projection estimates are prepared by a team of Belarusian experts from the Institute of Electricity Systems of the Academy of Sciences and the Joint Institute of Electricity and Nuclear Research Sosny. The ERT noted the professionalism and efficiency with which the experts provided responses to the requests of the ERT during the review and encourages Belarus to maintain the experience gained by the team and to continue to further enhance the development of the projections. The ERT also encourages the Party to continue its annual update of projections, including an update of the assumptions and taking into account recent economic developments and newly adopted national strategies. The ERT noted that the transparency of reporting of the methodology of the projections could be improved by applying the same structure to describe methodologies as was presented in the NC4, while covering the scenarios as reported in the NC5 and elaborated during the review.

## 1. Projections overview, key assumptions and methodology

63. Compared with the NC4, the NC5 provides more detail and a more transparent description of the projection scenarios. In the NC5, the projections are presented in absolute values for the years 1990–2020; in an aggregated format for each sector as well as for a national total, using global warming potential values for the gases covered; in graphical format covering all sectors (including the LULUCF sector); and on a sectoral basis, using the same categories as those in the PaMs section (i.e. energy, industrial processes, agriculture, LULUCF and waste).

64. The ERT noted that Belarus did not provide in its NC5 the following reporting elements required by the UNFCCC reporting guidelines: projections presented on a gas-by-gas basis; projections of hydrofluorocarbon (HFC) and sulphur hexafluoride (SF<sub>6</sub>)<sup>5</sup> emissions; projections of emissions from fuel sold to aircraft<sup>6</sup> engaged in international transport; the estimated and expected total effect of implemented and adopted PaMs in non-energy sectors; and the estimated and expected total effect of the PaMs, in accordance with the ‘with measures’ definition, compared with a situation without such PaMs, presented in terms of GHG emissions avoided or sequestered, by gas (on a CO<sub>2</sub> eq basis) in 1995 and 2000. The ERT recommends that Belarus include this information in its next national communication.

65. In response to the ERT request during the review, Belarus presented projections for the energy, industrial processes, agriculture, LULUCF and waste sectors on a gas-by-gas basis for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions for the ‘without measures’, ‘with measures’ and ‘with additional measures’ scenarios for the years 2010, 2015 and 2020. The Party presented detailed projections data for CH<sub>4</sub> emissions (mostly fugitive emissions from natural gas transportation) and N<sub>2</sub>O emissions (minor source) in the energy sector. The ERT commends Belarus for the provision of this detailed information. The ERT recommends that Belarus complete the coverage of its projections by including projections for all gases and all sectors, including projections for aviation bunker fuels.

66. The ERT noted some inconsistencies between the actual inventory data reported in the CRF and the projections data for the period 1995–2007 (e.g. the CRF reports fugitive CH<sub>4</sub> emissions of 1.8 Tg CO<sub>2</sub> eq (1.B.2) for 2007, while the ‘with measures’ scenario reports only 0.076 Tg CO<sub>2</sub> eq. The ERT encourages Belarus to ensure the consistency between the inventory data submitted to the UNFCCC secretariat and the inventory data used for the preparation of GHG projections by strengthening QA/QC procedures.

67. The ERT recommends that Belarus improve the transparency of its reporting of the projections in its next national communications by providing a streamlined description of the assumptions and methodologies used to estimate the projections by sector and by gas, especially for the non-energy sectors and non-CO<sub>2</sub> gases. The ERT encourages Belarus to provide quantified data on assumptions made for the projections in a tabular format by sector and by gas, to further enhance the development of GHG emission scenarios and variants thereof and to reflect the results of relevant national studies in the projections (e.g. the adaptation strategy for the LULUCF sector and domestic transport) in its next national communication.

68. In its NC5, Belarus has reported three projection scenarios: ‘without measures’, ‘with measures’ and ‘with additional measures’. The ‘without measures’ scenario starts in

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<sup>5</sup> The ERT noted that in Belarus’s 2011 inventory submission, perfluorocarbon (PFC) emissions are reported as not applicable, not occurring and not estimated and that HFC and SF<sub>6</sub> emissions do not exceed annually 0.04 per cent of the national total GHG emissions over the period 1990–2009.

<sup>6</sup> Emission projections related to fuel sold to ships for international transport are not relevant for Belarus as it is a land-locked country.

1995 and does not include any PaMs that have been adopted since 1995. The year 1995 marks the end of the Party's economic downturn after the collapse of the former Soviet Union, the beginning of the transition from a centrally planned and closed economy to an open market economy and the introduction of PaMs aimed at increasing energy efficiency and the use of renewable energy resources.

69. For the 'without measures' scenario, elaborated assumptions were provided for the GDP growth rate and for various options for the energy supply in the energy sector. The main driver of this scenario was the GDP growth rate: for the period 1995–2008 the rate was based on statistical data, and for the period 2008–2020 it was based on GDP projections from the Concept of Energy Security of the Republic of Belarus. The fuel intensity and fuel supply mix for energy-consuming sectors was assumed to remain constant at the 1995 level for 2008–2020. To avoid shortages in electricity and heat supply, Belarus assumed extended lifetimes for the existing heat- and electricity-producing plants, as well as additional natural gas combined cycle (NGCC) capacities to be put in operation in 2015 and in 2020. For the non-energy sectors, however, descriptions of the factors influencing GHG emission projections were not provided in the NC5. During the review, Belarus explained that emissions related to fuel combustion in the industry and agriculture sectors are included in the energy sector emissions. The ERT recommends that Belarus, in its next national communication, provide clear descriptions of the assumptions for all sectors and gases covered in the projections, which were more clearly described in the NC4.

70. The 'with measures' projection scenario starts in 2007 and covers the effect of PaMs which have been adopted since 1995, for two five-year periods (2006–2010 and 2008–2012). At the time of the preparation of the NC5, 2007 was the year with the most recent available GHG inventory data. Although the Party has provided detailed qualitative information on the national strategies and plans, it has reported very limited quantitative information on the total effect of these PaMs. During the review, Belarus expressed its intention to estimate the total effect of these PaMs for the current five-year period (2011–2015) in its next national communication, and provided the ERT with some examples of these estimates.

71. For the 'with measures' scenario, the GDP growth rate used is the same as for the 'without measures' scenario. The GDP structure in 2007 has been kept constant for the entire modelling horizon (2007–2020) since little change in the GDP structure was observed between 2000 and 2007. Compared with the 'without measures' scenario, major differences in the 'with measures' scenario include the PaMs aimed at the reduction of GDP energy-intensity (see paras. 26 and 34 above). The following assumptions were also made: the decrease in energy intensity in all sectors is proportional to the reduction in the overall GDP energy-intensity; and the expansion of electricity production capacity from NGCC is 2,000 megawatt-electric (MWe), from hydro is 40 MWe and from wind is 5 MWe. However, the Party has not provided in its NC5 a description of how these energy-intensity targets will be achieved.

72. For non-energy sectors, Belarus foresees a considerable increase in output of the industrial processes sector, chiefly expansion of its cement production capacity (an increase of 2.5 times, to 10,000 t/year by 2015), driven equally by domestic demand for construction and by export. For the LULUCF sector, Belarus, in its NC5, presented a long-term projection for wood stand increments, and, during the review, a very detailed adaptation strategy for the LULUCF sector. However, the outcomes of these studies were not included in the projections. For other non-energy sectors, little information was provided regarding the assumptions used. The ERT recommends that Belarus elaborate on the assumptions applied for projections of the non-energy sectors, expand the research carried out on LULUCF adaptation scenarios, including an uncertainty analysis of the outcomes, and report thereon in its next national communication.

73. The ‘with additional measures’ scenario encompasses the effects of all PaMs included in the ‘with measures’ scenario, complemented by the impacts of the following assumptions that reflect expected policy developments: an increased use of renewable electricity production capacity by 2020 from wind (150 MWe), hydro (250 MWe) and biogas (5 MWe); the introduction of mandatory building standards for new buildings after 2012; and a ban on incandescent light bulbs from 2015 onwards. The ERT notes that the amount of new building stock in the overall building stock is rather small, thus the effects of the mandatory building standards will be limited. Also, the ERT notes that the renewable energy capacity assumed corresponds to the current estimates of the economic potential. The ERT encourages Belarus to assess, in addition to the economic potential, the technical potential of various renewable energy sources and the related GHG emission reduction effect and include this information in its next national communication.

74. In its NC5, Belarus has reported very concise information on the methodology used for the preparation of the projections, mentioning only the Long-range Energy Alternatives Planning System (LEAP) model. During the review, the Party explained that the LEAP model was used for the emission projections in the energy sector, which comprises, according to the definition used by Belarus, electricity and heat production and other energy-consuming sectors. For the non-energy sectors and non-CO<sub>2</sub> emissions, expert judgement was used, but no explanation for doing so was provided in the NC5. The ERT recommends that Belarus elaborate further on the methodologies applied for the estimation of the projections in its next national communication.

75. The rationale for the change in models for estimating projections since the NC4 (BALANCE model) was not explained in the NC5; however, during the review, Belarus explained that the LEAP model was chosen due to its strengths, such as: LEAP directly models the influence of individual PaMs; and, as LEAP is a simulation model rather than a general equilibrium model such as BALANCE, the results obtained from LEAP do not depend on the prices of different energy sources and the ratios between these prices. Belarus informed the ERT that, for its next national communication, it is planning to estimate the projections using three different modelling tools (ENPEP/BALANCE, LEAP and MESSAGE) and will compare the results. The ERT recommends that Belarus, in its next national communication, report on the rationale for and possible implications of the change of methodologies used for the preparation of the projections.

## **2. Results of projections**

76. In its projections reported in the NC5 and further elaborated during the review, Belarus has applied the assumptions used and plans adopted in its national strategies, which focus on energy-efficiency improvement and the enhanced use of domestic energy sources, including peat and renewables. The main energy-efficiency improvements and technological developments are envisaged in the electricity sector, namely: the shift from the currently dominant gas-fired open cycle electricity plants towards combined cycle plants; the shift from heat production from boilers to decentralized CHP plants; and the application of building standards.

77. In its NC5, Belarus has presented three variants of the ‘with measures’ scenario: two technological ones and one economic one: (a) a ‘with measures – coal’ scenario, which assumes the operation of additional coal-fired electricity plants instead of natural gas fired plants; (b) a ‘with measures – nuclear’ scenario, which assumes the operation of two new nuclear power reactors by 2020; and (c) a ‘with measures – crisis’ scenario, which assumes a lower GDP growth rate for 2009–2015, reflecting the economic slowdown.

78. The ‘without measures’ scenario results in a decrease in GHG emissions of 2.1 per cent in 2010, but an increase of 50.6 per cent in 2020 compared with the base year (1990). The ‘with measures’ scenario results in a decrease in GHG emissions of 26.7 per cent in

2010 and 8.9 per cent on average in 2020 compared with 1990. The ‘with additional measures’ scenario results in no additional GHG emission reductions for 2010, due to the timescale of these measures, and in an additional reduction of 1.5 per cent in 2020 only, compared with the ‘with measures’ scenario, due to the limited additional PaMs included therein. Table 4 summarizes GHG projections in Belarus for 2010 and 2020.

Table 4  
Summary of greenhouse gas emission projections for Belarus

	<i>Greenhouse gas emissions (Tg CO<sub>2</sub> eq per year) in 2010</i>	<i>Changes in relation to 1990 level (%) in 2010</i>	<i>Greenhouse gas emissions (Tg CO<sub>2</sub> eq per year) in 2020</i>	<i>Changes in relation to 1990 level (%) in 2020</i>
Inventory data 1990 <sup>a</sup>	139.2	NA	NA	NA
Inventory data 2009 <sup>a</sup>	87.9	-36.9	NA	NA
Kyoto Protocol target	128.1	-8.0	NA	NA
‘Without measures’ projections <sup>b</sup>	136.3	-2.1	209.6	50.6
‘With measures’ projections <sup>b</sup>	102.0	-26.7	126.8 (120.3 to 130.1)	-8.9 (-13.5 to -6.5)
‘With measures – crisis’ projections <sup>b</sup>	93.0	-33.2	105.7	-24.1
Updated ‘with measures’ projections <sup>c</sup>	87.7	-35.7	118.7	-14.7
Updated ‘with measures’ (CCP + coal + nuclear) projections <sup>c</sup>	87.7	-35.7	114.0	-19.1
‘With additional measures’ projections <sup>b</sup>	102.0	-26.7	124.7	-10.4
Updated ‘with additional measures’ projections <sup>c</sup>	87.7	-35.7	116.5	-16.3

*Abbreviations:* CCP = combined cycle plant, NA = not applicable.

<sup>a</sup> *Data source:* Belarus’s 2011 greenhouse gas (GHG) inventory submission; the emissions are without land use, land-use change and forestry.

<sup>b</sup> *Data source:* Belarus’s fifth national communication; the figures in brackets indicate the range in GHG emissions of the different technological ‘with measures’ scenario variants, namely ‘with measures – coal’ and ‘with measures – nuclear’.

<sup>c</sup> *Data source:* Updated projections provided to the expert review team during the review. Belarus has updated the ‘with measures’ scenario for two variants (CCP and CCP + coal + nuclear) and the ‘with additional measures’ scenario, augmented with the ERT’s own estimate for omitted methane emissions from energy industries (1.8 Mt CO<sub>2</sub> eq/year for the period 2010–2020).

*Note:* The Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol, by its decision 10/CMP.2, adopted the amendment to Annex B to the Kyoto Protocol, which states Belarus’s commitment to reducing its GHG emissions by 8 per cent in relation to the base year level over the period 2008–2012. In accordance with the provisions of Article 20 of the Kyoto Protocol, the amendment will enter into force on the ninetieth day after the date of receipt by the Depository of an instrument of acceptance by at least three fourths of the Parties to the Protocol. At the time of the in-depth review of the fifth national communication of Belarus, this had not yet been achieved.

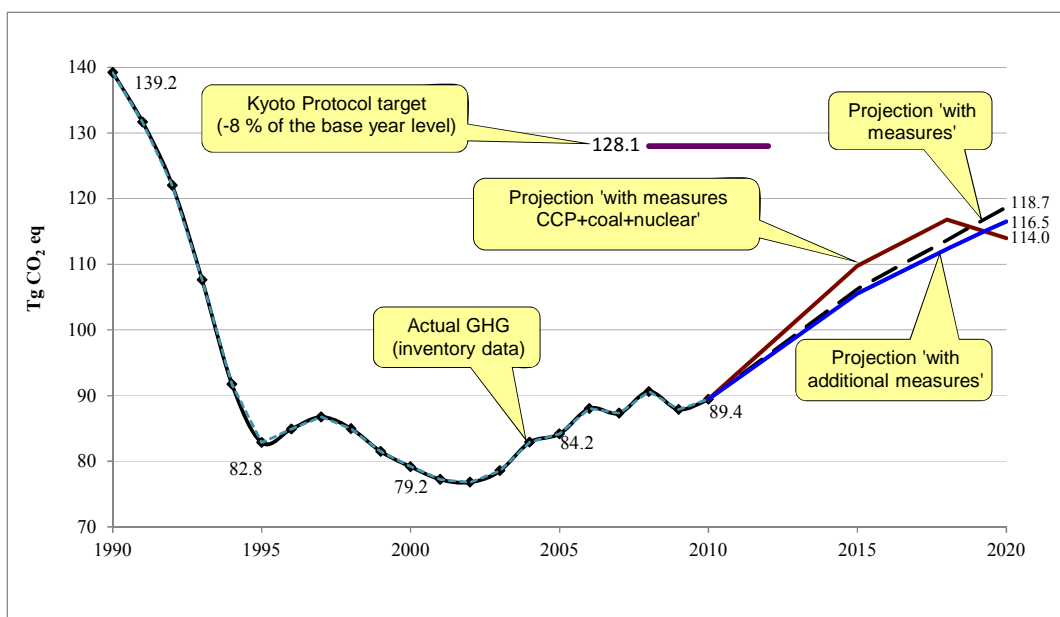
79. Also, according to the ‘with measures’ projections the following trends in GHG emissions have been estimated for 2020 compared to 1990: an increase in GHG emissions by 3.3 Mt CO<sub>2</sub> eq for the ‘with measures – coal’ scenario (or a total GHG reduction of 6.5 per cent); a decrease in GHG emissions by 6.5 Mt CO<sub>2</sub> eq for the ‘with measures – nuclear’ scenario (or a total GHG reduction of 13.5 per cent); and, for the ‘with measures – crisis’ scenario, a decrease in GHG emissions by 21.1 Mt CO<sub>2</sub> eq compared with the ‘with measures’ scenario, or a decrease of 24.1 per cent.

80. The energy sector is expected to remain the largest emitter of GHGs, followed by the agriculture sector. The energy sector’s share decreases from 73.0 per cent in 1990 to 71.0 per cent in 2020, the agriculture sector’s share decreases from 22.0 per cent to 18.0 per

cent, while the industrial processes sector’s share increases from 3.0 per cent to 6.0 per cent and the waste sector’s share increases from 2.0 per cent to 5.0 per cent over the same time period. The share of CO<sub>2</sub> in total GHG emissions will increase (from 75.0 per cent in 1990 to 77.0 per cent in 2020); the share of N<sub>2</sub>O will decrease (from 14.0 per cent in 1990 to 12.0 per cent in 2020); and the share of CH<sub>4</sub> will remain relatively stable (about 11.0 per cent). The ERT recommends that Belarus further assess the gas-by-gas projections in its next national communication.

81. The updated scenarios that were developed in 2011 are based on the most recent updated economic drivers and the adopted national strategies and plans for the period 2011–2015. The updated ‘with measures’ scenario includes the PaMs adopted under the national strategies and plans for the period 2011–2015 and reflects the decrease in the GDP growth rate during the period 2009–2015 compared with the scenario reported in the NC5. The ‘with measures – coal’ and ‘with measures – nuclear’ variants in the NC5 have been combined and have resulted in the ‘with measures – coal and nuclear’ scenario, which assumes energy sources diversification through a shift from gas to coal and nuclear: NGCC plants are replaced by coal in 2015 and nuclear in 2018 and 2019. These updated scenarios result in a GHG emission reduction in the range of 14.7 to 19.1 per cent by 2020 compared with 1990. The updated ‘with additional measures’ scenario results in a reduction in GHG emissions of 16.3 per cent in 2020, which is smaller than the ‘with measures’ reduction (14.7 per cent), due to the larger emission reduction from nuclear power plants. The figure below presents the updated scenarios for the period 2010–2020 as provided by Belarus during the review.

**Greenhouse gas emission projections for Belarus**



Abbreviations: CCP = combined cycle plant, GHG = greenhouse gas.

Sources: (1) Data for the years 1990–2009: Belarus’s 2011 greenhouse gas inventory submission; (2) Data for the years 2010–2020: updated scenarios provided during the review; the emissions are without land use, land-use change and forestry.

Note: The Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol, by its decision 10/CMP.2, adopted the amendment to Annex B to the Kyoto Protocol, which states Belarus’s commitment to reducing its GHG emissions by 8 per cent in relation to the base year level over the period 2008–2012. In accordance with the provisions of Article 20 of the Kyoto Protocol, the amendment will enter into force on the ninetieth day after the date of receipt by the Depository of an instrument of acceptance by at least three fourths of the Parties to the Protocol. At the time of the in-depth review of the NC5 of Belarus, this had not yet been achieved.

82. The ERT noted that between 2000 and 2009 GDP, which is one of the major drivers for emissions, increased by 93.9 per cent and total GHG emissions grew by 11.0 per cent (see table 1). Between 2010 and 2020, GDP is expected to grow by 86.0 per cent,<sup>7</sup> while GHG emissions are projected to grow by 24.0 per cent (according to the ‘with measures’ scenario reported in the NC5) and by 34.1 per cent (according to the updated ‘with measures’ scenario). Assumed changes in the energy supply mix presented in the variants of the ‘with measures’ scenario and the planned PaMs aimed at reducing GDP energy-intensity cannot sufficiently explain such large differences between the past and future GHG emission trends.

83. The ERT concludes that Belarus could meet by far its national conditional target under the Kyoto Protocol to reduce its GHG emissions by 10 per cent by 2020 compared with the 1990 level with domestic measures alone. As indicated in the updated ‘with measures’ projections, the possible GHG reductions to be achieved in 2020 range from –14.7 per cent to –19.1 per cent, while, according to the ‘with measures’ scenarios from the NC5, they range from –6.5 per cent to –13.5 per cent (see table 4 and the figure below).

84. During the review, Belarus presented further information on its longer-term climate change related policy, which remains linked to the energy sector goals for enhancing the security of energy supply and improving energy efficiency. The most important indicator used by Belarus to assess the effects of its PaMs is GDP energy-intensity. For this indicator, the national strategies contain well-defined targets, such as a reduction in GDP energy-intensity by 31 per cent by 2010, 50 per cent by 2015 and 60 per cent by 2020, compared with the level in 2005. However, the Party informed the ERT that only a 1.1 per cent reduction in GDP energy-intensity was actually achieved in 2010. Taking this into account, the ERT notes that the full implementation of the PaMs included in the ‘with measures’ scenario remains uncertain. The ERT recommends that Belarus enhance the regular monitoring of the progress made towards the targets and the effects of its PaMs.

### 3. Total effect of policies and measures

85. In the NC5, Belarus has presented the estimated and expected total effect of implemented and adopted PaMs in one sector (energy) only and only for the period 2006–2010, in accordance with the ‘with measures’ definition, subdivided into energy savings, renewable and domestic energy sources and use of CHP. Information has been presented in terms of GHG emissions avoided, by gas (GHGs and air pollutants), by source or by responsible entity, and on the amount of energy saved through the same PaMs. The national communication also contains some information on the effect of the PaMs in 2020 under the different ‘with measures’ scenario variants compared with the ‘with measures’ scenario, which includes emission reductions, mainly due to reduced energy consumption. Table 5 provides an overview of the effects of the PaMs reported in the NC5 and elaborated during the review.

86. The ERT recommends that Belarus improve the transparency of its reporting of the total effect of PaMs in its next national communications by enhancing the assessment of the total effect of PaMs.

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<sup>7</sup> According to the NC5, GDP is assumed to increase by 147 per cent between 2010 and 2015 and by 139 per cent between 2016 and 2020.

Table 5  
**Projected effects of planned, implemented and adopted policies and measures in 2010 and 2020**

Sector	Effect of implemented and adopted measures (Tg CO <sub>2</sub> eq) <sup>a</sup>		Effect of planned measures (Tg CO <sub>2</sub> eq)		Relative value (% of 1990 emissions)		Effect of implemented and adopted measures (Tg CO <sub>2</sub> eq) <sup>a</sup>		Effect of planned measures (Tg CO <sub>2</sub> eq)		Relative value (% of 1990 emissions)	
	2010	Relative value (% of 1990 emissions)	2010	Relative value (% of 1990 emissions)	2020	Relative value (% of 1990 emissions)	2020	Relative value (% of 1990 emissions)	2020	Relative value (% of 1990 emissions)		
Energy savings <sup>a</sup>	-12.8	-9.2			NA	NA	NA	NA	NA	NA	NA	NA
Renewable and domestic energy sources <sup>a</sup>	-6.0	-4.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
The use of CHP <sup>a</sup>	-0.2	-0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total in energy sector as reported in the NC5 <sup>b</sup>	-34.2 (WM)	-24.6 (WM)	-34.3	-24.7	-82.7 (WM)	-59.4 (WM)	-84.7	-60.9	-79.9 (WM + coal)	-57.4 (WM + coal)	-89.2 (WM + nuclear)	-64.1 (WM + nuclear)
	-42.3 (WM-crisis)	-31.0 (WM-crisis)			-102.7 (WM-crisis)	-73.8 (WM-crisis)						
Total in energy sector as reported in updated projections <sup>c</sup>	-46.8	-33.7	-46.8	-33.7	-90.9 (WM)	-65.3 (WM)	-93.1	-61.0	-95.6 (WM + coal + nuclear)	-68.7 (WM + coal + nuclear)		

Abbreviations: NA = not available, WM = with measures.

<sup>a</sup> Information reported in Belarus's fifth national communication (NC5).

<sup>b</sup> Estimates calculated by the expert review team (ERT) as the difference between the scenarios 'without measures' and 'with measures' (for the effects of implemented and adopted policies and measures (PaMs)) and as the difference between the scenarios 'without measures' and 'with additional measures' (for the effects of planned PaMs), as reported in Belarus' NC5. For 2010, different variants of the 'with measures' scenario are reported to have the same effect.

<sup>c</sup> Estimates calculated by the ERT as the difference between the scenarios 'without measures' and 'with measures' (for the effect of implemented and adopted PaMs) and as the difference between the scenarios 'without measures' and 'with additional measures' (for the effects of planned PaMs), based on the updated information provided by Belarus during the review. The effects are given for the energy sector only, as no effects in the other sectors have been reported. For 2010, different variants of the 'with measures' scenario are reported to have the same effect.

Note: In its NC5, Belarus reported the effects for PaMs for three subcategories in the energy sector for 2010. No total effect of all PaMs was provided. The total effect calculated by the ERT is bigger than the sum of the effects of individual PaMs due to the different scenarios and information sources used in estimating the effects.

#### D. Vulnerability assessment, climate change impacts and adaptation measures

87. In its NC5, Belarus has provided the required information on the expected impacts of climate change and on adaptation measures. The NC5 adequately reflects the research that has been carried out to determine the vulnerability to, and impacts of, climate change; it focuses on vulnerability and impact assessments compared with adaptation measures. In particular, the NC5 focuses on agriculture, forestry, water resources and human health, which are considered to be the most important sectors in the context of adaptation, and



provides an extensive description of the socio-economic and ecological impacts of climate change in these sectors.

88. The information provided by Belarus is considerably more detailed (in particular for the forestry, agriculture and water resources sectors) than in the NC4 and the scope of the information provided is also slightly broader. Specifically, an assessment of the vulnerability of natural ecosystems (e.g. bottomland meadows, low-ground marshes) has been included in the NC5. During the review, the Party further clarified how the vulnerability and impact assessments were carried out in the forestry sector.

89. The NC5 indicates that Belarus can secure supply of food, fodder and grains for technical use, provided that grain and leguminous crops are sown on all types of farm throughout Belarus. The effective implementation of the existing plans and strategies for the agriculture sector in Belarus would considerably reduce the risk to food production and to the economy. Table 6 summarizes the information on vulnerability and adaptation to climate change presented in the NC5.

Table 6  
**Summary of information on vulnerability and adaptation to climate change**

<i>Vulnerable area</i>	<i>Examples/comments/adaptation measures reported</i>
Agriculture and food security	<p><i>Vulnerability:</i> The Party has identified the 14 most dangerous natural phenomena in relation to its agriculture sector, including adverse extreme winter conditions, which will have the most devastating effect on the crop yield, and increased precipitation in October and November, leading to the reduction of the yield due to nitrogen fertilizers being washed away</p> <p><i>Adaptation:</i> Local governments have been identified as playing an important role in adaptation. The NC5 envisages future adaptation measures, including the change of land use towards an increase in the area of land for fodder crops, spinning flax and agricultural crops, the elaboration of a strategy on agricultural production, and the training of staff</p>
Natural ecosystems and biodiversity	<p><i>Vulnerability:</i> Generally, the response of grass vegetation to climate change impacts is expected to be quicker and more pronounced than that of woody species. Specifically, the growth of natural grass stands in dry valleys is projected to closely follow the climate variation patterns. Vegetation communities on low-ground marshes are reported to be particularly vulnerable to late spring frosts. The vulnerability of flora and fauna is associated with changes in water resources in the Gomel and Mogilev regions</p> <p><i>Adaptation:</i> Adaptation measures have not been included in the report</p>
Forests	<p><i>Vulnerability:</i> With the exception of northern Belarus, the quantity of precipitation and the temperature index (drought) of the summer months are reported to be the determining factors for forest growth. Drought has resulted in a decrease in the share of boreal in the taiga and sub-taiga zones. Oak trees are particularly vulnerable to drought and also to winter and spring frosts. The spruce tree areas have already diminished and will be the most vulnerable beyond 2020</p> <p><i>Adaptation:</i> The Forest Management and Rational Forest Use Programme</p>
Human health	<p><i>Vulnerability:</i> The elderly, the disabled and people with low incomes have been identified as the most vulnerable to high temperatures during summer. Chronic diseases could worsen as a result of more frequent temperature extremes</p> <p><i>Adaptation:</i> Human health prevention measures</p>
Water resources	<p><i>Vulnerability:</i> Belarus has undertaken a risk analysis study with respect to flooded territories, hydroelectric engineering and water transport. The study showed that Belarus is highly vulnerable to floods. This is especially true for the Polesie region due to its flat relief and low river banks</p> <p><i>Adaptation:</i> The development of an adaptation strategy for water resources is planned. Flood protection measures are also envisaged, especially for the Polesie region, including the installation of a hydrometeorological monitoring system</p>

90. Similarly to the NC4, the NC5 does not include information on the vulnerability and impact assessment and adaptation measures for infrastructure (e.g. the vulnerability of transport networks) and gives little consideration to biodiversity issues (e.g. observed or projected shifts in species in geographic ranges, the impact of alien invasive species). The ERT encourages Belarus to enhance the completeness of its reporting by providing relevant information on the assessment of vulnerability and the implementation of adaptation measures for infrastructure and for biodiversity preservation.

91. Belarus has described the vulnerability and impact assessment using mainly qualitative information, whereas the NC4 contained concise descriptions of the scientific basis (models, scenarios and tools) for determining the vulnerability and impact assessment. During the review, the Party informed the ERT that the results reported in the NC5 are based on the models and tools that were used in the NC4. The ERT encourages Belarus to provide a description of the tools used or the references to such a description in its next national communication.

### **E. Information under Article 10 of the Kyoto Protocol**

92. In its NC5, Belarus has provided limited information on activities, actions and programmes undertaken to fulfil its commitments under Article 10 of the Kyoto Protocol. During the review, the Party informed the ERT that more than 300 students from developing countries (including China, Nigeria, Turkmenistan and Viet Nam) have been studying climate-related courses at the universities of Belarus. The courses cover hydrometeorology, climatology, energy efficiency and the economics of natural resources. The ERT recommends that Belarus include this information in its next national communication and elaborate on cooperation on capacity-building and on scientific and technical research.

### **F. Research and systematic observation**

93. Belarus has provided information on its actions relating to research and systematic observation and has addressed both domestic and international activities. However, the Party has not included information on cooperation with developing country Parties in research and capacity-building and provided very limited information on Belarus' involvement in GCOS.

94. During the review, Belarus provided the ERT with a list of developing countries that have nationals enrolled in Belarus tertiary education in courses of study related to climate change. Also, Belarus explained how the hydrometeorological data of Belarus are used in the programmes of the World Meteorological Organization and, thus, are a part of GCOS. The ERT recommends that Belarus include relevant information on these matters in its next national communication and encourages the Party to provide, in its next national communication, information on the extent to which experts from Belarus participate in international scientific activities, for example in the activities of the Intergovernmental Panel on Climate Change.

95. With respect to research activities, Belarus has extensively reported in its NC5 on activities that track climate change variables that affect agriculture, forestry and water resources, but has not provided information on research activities that enhance the capacity to measure and monitor GHG emissions or the adaptive capacity in other sectors. The ERT encourages Belarus, in its next national communication, to broaden the scope of the research activities reported by including a description of research and development and information on GHG inventory methodologies, for example on energy efficiency. During

the review, the Party presented the results of ongoing research activities to quantify the GHG removals achieved through the rewetting of some previously degraded wetlands of Belarus. The ERT encourages the Party to elaborate on the roles of the different types of forest and wetlands in the socio-economy of Belarus in its next national communication.

96. The NC5 provides details of an extensive network of ongoing gathering and management of hydrometeorological data and details of how this information feeds into the regional network of monitoring/observation stations. International collaboration projects and programmes include joint programmes involving the Belarus National Hydrometeorological Centre and the Russian Hydrometeorological Centre, the BALTRAD project, which seeks to improve the network of meteorological radar stations in the Baltic Sea region, and the radar network NORDRAD, which combines data on the meteorological radars of Finland, Norway and Sweden.

97. During the review, the ERT learned that a number of different stakeholders are involved in research and systematic observation in Belarus. However, the role of these stakeholders is not elaborated in the NC5. The ERT encourages the Party, in its next national communication, to explicitly mention the institutions and agencies that are involved in conducting research in the different sectors that would assist in understanding the knowledge management patterns of climate change related data in Belarus.

## **G. Education, training and public awareness**

98. In the NC5, Belarus has provided more comprehensive information on its actions relating to education, training and public awareness compared with previous national communications. Education on environment matters is a mandatory component of vocational, secondary specialized and higher education in Belarus. The principles of education on environment matters are set out in Article 1 of the Law on Education. The Party has provided information on several initiatives at schools and universities, including activities within the framework of the SPARE (School Project for Application of Energy Resources) project, and on courses and training programmes in several universities.

99. Belarus has provided information on a number of environment-related activities (e.g. environmental forums, public discussions and public participation) and on the use of the mass media to raise public awareness. However, the ERT noted that these activities are not specifically targeted to address the implementation of Article 6 of the Convention, including in the area of education, training and public awareness of climate change. During the review, the Party provided additional information on international workshops and conferences organized in Belarus on climate change and on the number of international students studying climate change related courses in Belarus. The ERT encourages Belarus to include additional information on education, training and public awareness of climate change, including the information provided to the ERT during the review, in its next national communication.

## **H. Evaluation of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol**

100. Belarus has provided some of the supplementary information under Article 7, paragraph 2, of the Kyoto Protocol in its NC5. The supplementary information is placed in different sections of the NC5. Table 7 provides an overview of the supplementary information under Article 7, paragraph 2, of the Kyoto Protocol as well as references to the NC5 chapters in which this information is provided.

101. Belarus has not reported in the NC5 the following elements of the supplementary information relevant to Belarus under Article 7, paragraph 2, of the Kyoto Protocol, taking into account its status under the Kyoto Protocol: the identification of steps taken to promote and/or implement any ICAO decisions in order to limit or reduce GHG emissions not controlled by the Montreal Protocol from aviation bunker fuels; information on the steps Belarus is taking to implement PaMs in such a way as to minimize adverse effects, including the effects of climate change, effects on international trade, and social, environmental and economic impacts on other Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention; and information required under Article 10 of the Kyoto Protocol (all required information was provided during the review). The ERT considered that the additional information provided during the review sufficiently covered the elements of reporting under Article 7, paragraph 2, that are relevant to the status of Belarus under the Kyoto Protocol as a Party with no commitments inscribed in Annex B to the Kyoto Protocol yet. The technical assessment of the information reported under Article 7, paragraph 2, is contained in the relevant sections of this report. The ERT recommends that Belarus include these reporting elements in its next national communication.

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

<i>Supplementary information</i>	<i>Reference</i>
National registry	NC5, chapter 2, pages 66–70
National system	NC5, chapter 2, pages 60–66
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 <sup>a</sup>	NA
Policies and measures in accordance with Article 2	
Steps taken to promote and/or implement any ICAO decisions in order to limit or reduce GHG emissions from aviation bunker fuels	Limited information in the NC5, chapter 3.3.3.2, page 91, additional information provided during the review week
Information on how the Party strives to implement PaMs in such a way as to minimize adverse effects	Provided during the review week
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	NC5, chapter 3, pages 71–101
Information under Article 10	Provided during the review week
Financial resources <sup>b</sup>	NA

*Abbreviations:* GHG = greenhouse gas, ICAO = International Civil Aviation Organization, NA= not applicable, NC5 = fifth national communication, PaMs = policies and measures.

<sup>a</sup> The requirements of Article 8 of the Kyoto Protocol are applicable to the national communications of Belarus insofar as the review is undertaken on issues related to its commitments under the Kyoto Protocol which are not dependent on the quantified emission limitation and reduction commitments inscribed in Annex B in accordance with the provisions of Article 3 of the Kyoto Protocol. The relevance of the specific provisions of the annex to decision 15/CMP.1 should be determined based on whether or not they relate to the substantive obligations undertaken by Belarus under the Convention or its Kyoto Protocol. In this regard, the provisions related to the fulfilment by a Party of its commitments inscribed in Annex B, including those related to participation in the Kyoto Protocol mechanisms, would not be applicable to the national communications of Belarus until the relevant amendment to Annex B enters into force.

<sup>b</sup> As a country with an economy in transition, Belarus does not have to report on the implementation of Article 11 of the Kyoto Protocol, including on the provision of new and additional resources.

### III. Conclusions and recommendations

102. The ERT concludes that the NC5 generally provides a good overview of the national climate policy of Belarus. The information provided in the NC5 is broadly transparent, includes most of the mandatory information required by the UNFCCC reporting guidelines and covers some of the required supplementary information under Article 7, paragraph 2, of the Kyoto Protocol. During the review, Belarus provided information on most elements that were not reported in the NC5. This information includes: GHG projections on a gas-by-gas basis; information on GCOS activities; the steps the Party has taken to promote and/or implement any decisions of ICAO in order to limit or reduce GHG emissions from aviation bunker fuels; and actions and programmes undertaken to fulfil the Party's commitments under Article 10 of the Kyoto Protocol, namely cooperation in research and capacity-building.

103. Belarus's GHG emissions for 2009 were estimated to be 36.9 per cent below its 1990 level excluding LULUCF and 47.7 per cent below its 1990 level including LULUCF. The decreases in total GHG emissions were mostly underpinned by the reductions in GHG emissions in the energy and agriculture sectors. For the energy sector, the reductions were driven by changes in primary energy supply and use (reduced use of oil and coal and increased use of natural gas and biomass) and the employment of more efficient technologies, while for the agriculture sector, the reductions were driven by reduced use of mineral fertilizer and a decrease in the livestock population. In 2009, the LULUCF sector offset 34.2 per cent of the total GHG emissions of Belarus and removals have increased by 5.1 per cent since 1990, driven by the decrease in emissions from cropland and wetlands and due to forest management policies.

104. Belarus has a package of climate change related PaMs, with key PaMs focused on enhancing energy-efficiency and promoting of domestic energy sources, in particular renewables. Regulatory PaMs dominate the package of PaMs; however, some steps have been taken to introduce economic incentives for the diversification of energy sources and the increase of energy security. Those measures are likely to result in GHG emission reductions as a co-benefit.

105. In its NC5, Belarus has presented GHG projections for the period 1990–2020. The three GHG emission scenarios ('without measures', 'with measures' and 'with additional measures') are mainly based on national energy policy. Full implementation of the adopted domestic PaMs would result in a reduction in GHG emissions within a range of –6 per cent to –13 per cent and, when taking fully into account the effects of the recent global economic crisis, in a reduction of 24 per cent in 2020 compared with 1990. Thus, the projections indicate that Belarus can meet its national target (which is a 10 per cent reduction in 2020 compared with 1990) with domestic measures alone. During the review, Belarus provided updated projections that indicate the further decline of emissions by 2020, ranging between –15 per cent and –19 per cent compared with 1990. Overall, projections show a much faster growth in emissions between 2010 and 2020 compared with the growth observed in the past, for example between 2000 and 2009.

106. The vulnerability assessment and adaptation measures are focused on three sectors: agriculture, forestry and water resources. Limited information is provided on other sectors, such as biodiversity and natural ecosystems (e.g. meadows and grassland). The information reported by the Party on research is also focused on agriculture, forestry and water resources. It is evident that more research is being carried out in other sectors, but this is not reflected in the NC5.

107. The Party has reported in its NC5 a number of initiatives and activities related to environmental education and public awareness in Belarus, including information on several

initiatives in schools and universities, and environmental forums. However, the ERT noted that these activities are not specifically targeted at addressing the implementation of Article 6 of the Convention, including education, training and public awareness of climate change.

108. Belarus, as an Annex I Party with no commitments yet inscribed in Annex B to the Kyoto Protocol, has no obligation to report supplementary information on its national system under Article 5, paragraph 1, of the Kyoto Protocol and on its national registry. However, the Party has provided information on the institutional and legal arrangements for GHG inventory preparation and management, the process for the collection of activity data, recalculations and QA/QC procedures. The ERT noted that some preparations for the implementation of the national registry have been made. The ERT commends Belarus for reporting under these provisions.

109. In the course of the review, the ERT formulated several recommendations relating to the completeness and transparency of the Party's reporting under the Convention and its Kyoto Protocol. The key recommendations<sup>8</sup> are that Belarus:

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

- (i) A description of the PaMs that address GHG emissions from industry and a more complete description of the PaMs in non-energy sectors;
- (ii) A description of how PaMs are modifying longer-term trends in anthropogenic GHG emissions;
- (iii) A description of the factors and activities influencing GHG projections in non-energy sectors (e.g. agriculture, LULUCF, waste and industrial processes);
- (iv) A projection of GHG emissions from aviation bunker fuels, of CH<sub>4</sub> and N<sub>2</sub>O emissions from the energy sector and of F-gas emissions;
- (v) The total effect of its PaMs;
- (vi) A better description of GCOS activities;
- (vii) A description of cooperation in research and capacity-building with developing country Parties;
- (viii) A description of the steps taken to promote and/or implement ICAO decisions, including the minimization of adverse effects on developing countries;

(b) Improve the transparency of its reporting by:

- (i) Strengthening inter-agency coordination for the preparation of the national communication (e.g. the provision of data and information);
- (ii) Ensuring consistency across the sections of the national communication and the continuity of information across its national communications;
- (iii) Streamlining and better structuring information on each section of the national communication.

110. The ERT encourages Belarus to undertake a number of improvements regarding the transparency and completeness of its reporting; the most important of these are:

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<sup>8</sup> The recommendations are given in full in the relevant sections of this report.

- (a) Improving its reporting on how the national circumstances affect GHG emissions and removals;
- (b) Improving the monitoring and reporting of the effects of individual PaMs;
- (c) Continuing to enhance the development of projection scenario variants;
- (d) Broadening the scope of the vulnerability assessment and adaptation measures to other vulnerable sectors (e.g. biodiversity, natural ecosystems and infrastructure);
- (e) Broadening the scope of information reported in the national communication, including information on the roles of the different institutions involved in research;
- (f) Including more information on education, training and the raising of public awareness of climate change.

#### **IV. Questions of implementation**

111. During the review the ERT assessed the NC5, including supplementary information provided under Article 7, paragraph 2, of the Kyoto Protocol with regard to timeliness, completeness and transparency. 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>>.

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/2009/BLR. Report of the individual review of the annual submission of Belarus submitted in 2009. Available at <<http://unfccc.int/resource/docs/2010/arr/blr.pdf>>.

FCCC/IDR.4/BLR. Report of the centralized in-depth review of the second, third and fourth national communication of Belarus. Available at <<http://unfccc.int/resource/docs/2009/idr/blr04.pdf>>.

Second, third and fourth national communication of Belarus. Available at <<http://unfccc.int/resource/docs/natc/blrnc02.pdf>>.

2010 greenhouse gas inventory submission of Belarus. Available at <[http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/5270.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php)>.

2011 greenhouse gas inventory submission of Belarus. Available at <[http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/5888.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5888.php)>.



**B. Additional information provided by the Party**

Responses to questions during the review were received from Ms. A. Ratnikova, Mr. V. Melnik (Department of Hydrometeorology, Ministry of Natural Resources and Environmental Protection of the Republic of Belarus), Mr. A. Grebenkov (United Nations Development Programme – Project Energy Efficiency in Belarus), Ms. E. Bertosh, Ms. M. Germenchuk, Ms. K. Gonchar, Mr. I. Narkevitch, Ms. O. Vavilonskaya and Ms. O. Zakharova (Belarus Scientific Research Centre “Ecology”), Mr. S. Nikitin (State Enterprise Institute of Power Engineering) and Ms. I. Voitekhovitch (APB Birdlife Belarus Ahova Ptushak Belarusi), which included additional material on updated policies and measures, greenhouse gas projections and recent climate policy developments in Belarus.

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