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Report of the in-depth review of the fifth national communication of Ukraine

Parties included in Annex I to the Convention are requested, in accordance with decision 10/CP.13, to submit a fifth national communication to the secretariat by 1 January 2010. In accordance with decision 8/CMP.3, Parties included in Annex I to the Convention that are also Parties to the Kyoto Protocol shall include in their fifth national communications supplementary information under Article 7, paragraph 2, of the Kyoto Protocol. In accordance with decision 15/CMP.1, these Parties shall start reporting the information under Article 7, paragraph 1, of the Kyoto Protocol with the inventory submission due under the Convention for the first year of the commitment period. This includes supplementary information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. This report presents the results of the in-depth review of the fifth national communication of Ukraine 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 Ukraine the Convention entered into force on 11 August 1997 and the Kyoto Protocol on 16 February 2005. Under the Kyoto Protocol, Ukraine committed itself to keeping its greenhouse gas (GHG) emissions at the base year[1] level during the first commitment period from 2008 to 2012.

2. This report covers the in-country in-depth review (IDR) of the third, fourth and fifth national communications (hereinafter referred to as the NC5) of Ukraine, 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 14 to 19 March 2011 in Kiev, Ukraine, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: Ms. Irina Atamuradova (Turkmenistan), Mr. David Lesolle (Botswana), Ms. Inga Valuntiene (Lithuania) and Ms. Anna Romanovskaya (Russian Federation). Mr. Lesolle and Ms. Valuntiene 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 Ukraine as a part of the NC5 in accordance with Article 7, paragraph 2, of the Kyoto Protocol. In addition, the ERT reviewed the information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, which was provided by Ukraine in its 2010 annual submission under Article 7, paragraph 1, of the Kyoto Protocol.

4. In accordance with decision 22/CMP.1, a draft version of this report was communicated to the Government of Ukraine, which provided comments that were considered and incorporated, as appropriate, in this final version of the report.

B. Summary

5. The ERT noted that Ukraine'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, supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol[2] is provided in the NC5. Ukraine considered some of the recommendations provided in the report of the centralized in-depth review of the second national communication of Ukraine.[3] The overall structure of Ukraine's national communication has been improved in the NC5 compared with that of the Party's second national communication (NC2). Also, the NC5 provided much more information than the NC2, which significantly facilitated the review. The ERT acknowledges the improved reporting of Ukraine.

6. The supplementary information on the minimization of adverse impacts referred to in paragraph 3 above is partly complete and partly transparent. The information was not provided in the Party's original 2010 annual submission (submitted on 22 May 2010) and

[1] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The base year emissions include emissions from sectors/source categories listed in Annex A to the Kyoto Protocol.

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

[3] FCCC/IDR.2/UKR.

was included only in the resubmitted national inventory report, which was submitted on 16 August 2010. During the review, Ukraine provided further relevant information (see paras. 123–125 below for further assessment of the information).

1. Completeness

7. The NC5 covers all sections and contains most of the information required by the UNFCCC reporting guidelines, except for the following:

(a) With regard to policies and measures (PaMs), information on objective, type of policy or measure, status of implementation and implementing entity (see para. 33 below), and information on PaMs targeted at reducing fluorinated gases (F-gases) and emissions from the solvent and other product use sector;

(b) Information on how Ukraine's PaMs are modifying longer-term trends in GHG emissions and removals (see para. 33);

(c) The total effect of adopted and implemented PaMs (see para. 89 below);

(d) Projections related to fuel sold to ships and aircraft engaged in international transport, which is reported separately and is not included in the national totals (see para. 89 below).

8. Ukraine provided most of the supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol, except for:

(a) Information under Article 2, paragraph 3, of the Kyoto Protocol (see para. 87 below);

(b) Information on steps it has taken to promote and/or implement any decisions of the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO) in order to limit or reduce emissions of GHGs from international aviation and marine bunker fuels (see para. 121 below);

(c) Information on national legislative arrangements and administrative procedures that seek to ensure that the implementation of activities under Article 3, paragraph 3, and Article 3, paragraph 4, of the Kyoto Protocol (afforestation, reforestation and deforestation) contributes to the conservation of biodiversity and the sustainable use of natural resources (see para. 121 below).

9. During the review, Ukraine provided information on the issues listed in paragraphs 7 and 8 above. The ERT recommends that Ukraine enhance the completeness of its reporting by providing that information in its next national communication.

2. Transparency

10. The ERT acknowledged that Ukraine's NC5, including supplementary information provided under Article 7, paragraph 2, of the Kyoto Protocol, is broadly transparent. However, the ERT noted that the NC5 does not provide clear information on all aspects of the implementation of the Convention and its Kyoto Protocol. In particular, the ERT recommends that the Party improve the transparency of the description of the national system, the information on the implementation of PaMs and their effect actually achieved, and the description of the assumptions and methodologies used to develop projections for all sectors. The NC5 is structured generally following the outline contained in the annex to the UNFCCC reporting guidelines and supplementary information submitted under Article 7, paragraph 2, of the Kyoto Protocol is easily identifiable.

11. In the course of the review, the ERT formulated a number of recommendations that could help Ukraine to further increase the transparency of its reporting with regard to the

following: the description of the national system (see paras. 22 and 26 below); PaMs (see paras. 33–35 below); and assumptions and methodologies used to develop projections and adherence to definitions of scenarios (see paras. 90 and 93 below). The ERT encourages Ukraine to provide more detailed information on the following: synergies and overlap among PaMs, information on PaMs in the building sector (see para 59) and information on those PaMs that can increase emissions (see para. 39 below); information on vulnerability and adaptation (see para. 107 below); and the description of research (see para. 119 below).

3. Timeliness

12. The ERT noted with concern that the timeline for the submission of the previous national communications was not followed and that the third and fourth national communications were submitted in conjunction with the fifth. The NC5 was submitted on 29 December 2009, before the deadline of 1 January 2010 mandated by decision 10/CP.13, and was resubmitted on 8 February 2010. The ERT acknowledges the timely submission of the NC5 by Ukraine.

II. Technical assessment of the reviewed elements

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

13. In its NC5, Ukraine has provided a concise description of the 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.

1. National circumstances

14. In its NC5, Ukraine has provided a description of its national circumstances, and information on how these national circumstances affect GHG emissions and removals in Ukraine and how changes in national circumstances affect GHG emissions and removals over time. Information was provided on the government structure, population, geography, climate, economy as a whole and relevant economic sectors. The ERT welcomes the transparent reporting of the Party on these issues.

15. The main drivers of emission trends in Ukraine are the transition from a centrally planned economy to a market-based economy, structural changes in the economy (from energy-intensive production sectors towards services, such as financial and communication services and retail trading) and the decrease in energy consumption, as well as the changes in the structure of primary energy use (reduced use of coal and increased use of natural gas). The ERT notes that the dynamics of the primary energy use is an important aspect for the security of energy supply, as Ukraine relies extensively on the import of energy resources.

16. The largest fall in emissions occurred between 1990 and 1999, when total GHG emissions dropped by 57.6 per cent. Trends in total GHG emissions[4] were mostly underpinned by GHG emissions from the energy sector, which comprise 68.4 per cent of total national emissions. Overall, the total GHG emissions in Ukraine decreased by 53.9 per

[4] In this report, the term “total GHG emissions” refers to the aggregated national GHG emissions expressed in terms of carbon dioxide equivalent excluding land use, land-use change and forestry, unless otherwise specified.

cent between 1990 and 2008. This was followed by an increase in emissions from 2001 onward, which was driven by the growing demand for energy to meet the needs of the growing economy, in particular the demand of the recovered mining, metal production and chemical industries and the growing number of vehicles. Recently, the drop in the output of export-related industries resulting from the financial and economic downturn in the second half of 2008 resulted in a slowdown in the growth of gross domestic product (GDP) from 7.9 per cent in 2007 to 2.3 per cent in 2008. This financial and economic downturn led to a decrease in GHG emissions, mainly from the manufacturing industry and construction sector (by 12.8 per cent) and the industrial processes sector (by 9.2 per cent) in the period 2007–2008. This drop in turn led to the overall decrease by 1.9 per cent in the period 2007–2008 in emissions from the energy sector.

17. The carbon intensity per GDP unit (carbon dioxide (CO_2) emissions/GDP unit using purchasing power parity) decreased by 47.4 per cent in the period 1996–2008 (from 1.73 to 0.91 kg/2000 USD), mainly as a result of changes in the structure of the economy (see para. 15 above). This decrease was also influenced by changes in the structure of the primary energy supply (increase in natural gas consumption and decrease in the consumption of coal and oil in the 1990s, and increase in the use of coal owing to the rise in the market price of gas since 2006). The ERT encourages Ukraine to provide an analysis of the related indicators and factors influencing the emission trends in its next national communication. An analysis of the drivers of the GHG emission trends in each sector is provided in chapter II.B. Table 1 illustrates the national circumstances of the country by providing some indicators relevant to GHG emissions and removals.

18. Ukraine has provided in its NC5 a summary of information on GHG emission trends for the period 1990–2007. This information is broadly consistent with the 2009 national GHG inventory submission, which was available at the time of the preparation of the NC5. Following the recommendation made in the Report of the centralized in-depth review of the second national communication of Ukraine[5], trend tables for GHG emissions in CO_2 eq (given in the common reporting format (CRF)) have been provided in an annex to the NC5. The ERT welcomes the improved reporting by Ukraine. During the review, the ERT had available the Party's 2010 annual submission, which is reflected the findings of its consideration of the submission in this report.

19. Total GHG emissions excluding net emissions or removals from land use, land-use change and forestry (LULUCF) decreased by 53.9 per cent between 1990 and 2008, while total GHG emissions including LULUCF decreased by 52.2 per cent in the same period. This decrease in emissions was mainly attributed to CO_2, which decreased by 54.5 per cent over that period. Emissions of methane (CH_4) decreased by 52.5 per cent and emissions of nitrous oxide (N_2O) by 50.5 per cent. Emissions of F-gases (hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively) accounted for only about 0.02 per cent of total GHG emissions in 1990 and 0.05 per cent in 2008. Table 2 provides an overview of GHG emissions by sector from 1990 to 2008.

20. The responsibility for climate change policy making lies within the Ministry of Ecology and Natural Resources (MENR). The coordination and implementation of all PaMs defined by MENR falls under the responsibility of the National Environmental Investment Agency of Ukraine (NEIA), which also has overall responsibility for ensuring the functioning of the national system under Article 5, paragraph 1, of the Kyoto Protocol. NEIA is further responsible for the implementation of the provisions of the Convention and its Kyoto Protocol, including overseeing the implementation of the Kyoto Protocol mechanisms and the annual and periodic reporting. A number of national ministries and agencies as well as regional administrations and the Ukrainian Academy of Sciences are

[5] FCCC/IDR.2/UKR.

involved in the development and implementation of climate change related policy at the national and regional levels.

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

	1990	*1995*	*2000*	*2005*	*2008*	*Change 1990–2000 (%)*	*Change 2000–2008 (%)*	*Change 1990–2008 (%)*
Population (million)	51.9	51.5	49.2	47.1	46.3	–5.2	–5.9	–10.9
GDP (2000 USD billion using PPP)	456.9	219.3	198.5	287.2	339.5	–56.6	71.0	–25.7
TPES (Mtoe)	251.7	163.8	133.8	149.0	136.0	–46.9	1.7	–46.0
GDP per capita (2000 USD thousand using PPP)	8.8	4.3	4.0	6.1	7.3	–54.2	81.8	–16.6
TPES per capita (toe)	4.9	3.2	2.7	3.2	2.9	–43.9	8.1	–39.4
GHG emissions without LULUCF (Tg CO_2 eq)	928.1	525.4	393.1	423.1	427.8	–57.6	8.8	–53.9
GHG emissions with LULUCF (Tg CO_2 eq)	859.6	478.9	341.6	383.0	411.3	–60.3	20.4	–52.2
CO_2 emissions per capita (Mg)	13.8	7.6	5.9	6.8	7.0	–57.4	19.7	–49.0
CO_2 emissions per GDP unit (kg per 2000 USD using PPP)	1.6	1.8	1.5	1.1	0.9	–7.0	–34.1	–38.8
GHG emissions per capita (Mg CO_2 eq)	17.9	10.2	8.0	9.0	9.2	–55.3	15.7	–48.3
GHG emissions per GDP unit (kg CO_2 eq per 2000 USD using PPP)	2.0	2.4	2.0	1.5	1.3	–2.5	–36.4	–38.0

Sources: (1) GHG emissions data: Ukraine's 2010 annual submission (common reporting format version 3.1, submitted on 17 October 2010); (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.

21. To strengthen the implementation of the Party's commitments under the Convention and its Kyoto Protocol, an inter-ministerial commission (IMC) was established in Ukraine in 1999. IMC undertakes the following tasks: the coordination of the implementation of the national plan of measures for the implementation of provisions of the Convention and its Kyoto Protocol (2005, revised in 2009) (hereinafter referred to as the national plan); the approval of official submissions to the UNFCCC secretariat; and the preparation of draft regulations and legislation for consideration by the Cabinet of Ministers of Ukraine.

22. During the review, Ukraine noted some overlaps in the functions of MENR, NEIA and IMC in relation to climate change related policies. The Cabinet of Ministers of Ukraine is expected to revisit the roles and responsibilities of MENR, NEIA and IMC in the context of the overall reorganization of the ministries planned for 2011. Ukraine highlighted during the review that the IMC is expected to continue its operations in the future, in particular with respect to the preparation of the draft regulations and legislation aimed at the implementation of the national plan. The ERT encourages Ukraine to elaborate on the

institutional arrangements in relation to climate change policy in its next national communication.

Table 2
Greenhouse gas emissions by sector in Ukraine, 1990–2008

	GHG emissions (Tg CO_2 eq)						*Change (%)*		*Shares[a] by sector (%)*	
	1990	*1995*	*2000*	*2005*	*2007*	*2008*	*1990–2008*	*2007–2008*	*1990*	*2008*
1. Energy	685.87	388.23	271.83	294.61	298.30	292.68	–57.3	–1.9	73.9	68.4
A1. Energy industries	272.05	NE	98.12	102.22	110.05	109.52	–59.7	–0.5	29.3	25.6
A2. Manufacturing industries and construction	143.87	NE	42.89	49.26	48.74	42.49	–66.1	–12.8	15.5	9.9
A3. Transport	87.66	NA, NE, NO	34.38	42.69	44.48	44.31	–49.4	–0.4	9.4	10.4
A4.–A5. Other	95.11	334.04	42.96	47.74	41.94	43.04	–54.7	2.6	10.2	10.1
B. Fugitive emissions	87.19	54 190.88	53.48	52.71	51.56	52.08	–40.3	1.0	9.4	12.2
2. Industrial processes	128.71	60.34	75.18	85.63	99.78	90.57	–29.6	–9.2	13.9	21.2
3. Solvent and other product use	0.38	0.37	0.35	0.34	0.34	0.33	–11.2	–0.5	0.0	0.08
4. Agriculture	104.74	67.94	37.08	33.23	32.58	34.64	–66.9	6.3	11.3	8.1
5. LULUCF	–68.54	–46.57	–51.53	–40.09	–50.15	–16.59	–75.8	–66.9	–7.4	–3.9
6. Waste	8.43	8.55	8.68	9.25	9.48	9.62	14.1	1.4	0.9	2.2
7. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GHG total with LULUCF	859.59	478.86	341.60	382.98	390.33	411.26	–52.2	5.4	NA	NA
GHG total without LULUCF	928.13	525.43	393.13	423.06	440.48	427.84	–53.9	–2.9	100.0	100.0

Source: GHG emissions data: Ukraine's 2010 annual submission (common reporting format version 3.1, submitted on 17 October 2010).
Note: 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.
Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry, NA= not applicable, NE = not estimated, NO = not occurring.
[a] The shares of sectors are calculated relative to GHG emissions without LULUCF; for the LULUCF sector, the negative values indicate the share of GHG emissions that was offset by GHG removals through LULUCF.

23. Recently Ukraine has launched a number of initiatives aimed at further implementation of climate change related policies, mainly in the context of the overall environmental policy. The key law underpinning Ukraine's climate change policy is the law "On main principles of State Environmental Policy of Ukraine for the period to 2020",

adopted by the Ukrainian Parliament in 2010.[6] In 2010, an inter-ministerial working group for the preparation of the draft national action plan for environmental protection of Ukraine for the period from 2011 to 2015 was established. Further legislative arrangements and administrative procedures, including those for the national system and the national registry, are presented in chapters II.A.2, II.A.3 and II.B.

2. National system

24. In accordance with decision 15/CMP.1, Ukraine provided in its NC5 a description of how its national system is performing the general and specific functions defined in the guidelines for national systems under Article 5, paragraph 1 (decision 19/CMP.1). The description includes broadly the elements as required in decision 15/CMP.1. The ERT notes that the description of the national system and of changes in related institutional arrangements (see para. 22 above) could be improved in the Party's next national communication.

25. The ERT notes the conclusion of the "Report of the individual review of the greenhouse gas inventory of Ukraine submitted in 2010"[7] (ARR 2010) that Ukraine's national system is not performing its required functions as set out in decision 19/CMP.1 and that at the time of preparation and publication of this report the question of implementation on the national system of Ukraine identified in the ARR 2010 remained unresolved.

26. In its NC5, Ukraine has not provided a description of national legislative arrangements and administrative procedures that seek to ensure that the implementation of activities under Article 3, paragraph 3, and elected activities under Article 3, paragraph 4, of the Kyoto Protocol also contribute to the conservation of biodiversity and the sustainable use of natural resources. During the review, in response to the request made by the ERT, Ukraine elaborated on the relevant arrangements, noting that measures included in the governmental programme on forests of Ukraine are aiming to ensure sustainable forest management and the protection of biodiversity in all national forests, including areas subject to activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol (see para. 80 below). The ERT recommends that Ukraine elaborate this information in its next national communication.

27. During the review, Ukraine provided additional information on the national system, elaborating on the structure of the national system and the allocation of responsibilities between MENR and NEIA, on institutional and legislative arrangements, including legislative arrangements and administrative procedures for the implementation of activities under Article 3, paragraphs 3 and 4, and on administrative procedures for GHG inventory planning, preparation and management. Recent work included recent developments in relation to a database for the assessment of afforestation, deforestation and reforestation, developments in assessing F-gases and improvements in archiving. The ERT was informed that annual financing for the routine functioning of the national system and the preparation of the annual submissions under the Convention and its Kyoto Protocol is available as a part of a budget programme, "Ambient air quality improvement", managed by MENR. However, any improvements to the GHG inventory would require additional financing, which depends on the available resources of the State budget. During the review, the Party informed the ERT that additional financial resources have been allocated in the State budget for 2011 for research related to the GHG inventory. The ERT encourages Ukraine to

[6] The law "On main principles of State Environmental Policy of Ukraine for the period to 2020", available in Ukrainian at <http://zakon.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=2818-17>.

[7] FCCC/ARR/2010/UKR. Available at <http://unfccc.int/resource/docs/2011/arr/ukr.pdf>.

consider possibilities for sustainable financing for the annual GHG inventory preparation, including the necessary improvements.

3. National registry

28. In its NC5, Ukraine has provided information on the national registry, including a description of how its national registry performs the functions defined in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and how it complies with the requirements of the technical standards for data exchange between registry systems.

29. During the review, Ukraine provided additional information on the following: (a) the measures put in place to safeguard, maintain and recover registry data; (b) the security measures employed in the registry to prevent unauthorized manipulations of data; (c) the measures put in place to protect the registry against security compromises; (d) the test procedures related to the performance of the current version of the national registry; and (e) the recording of changes to and discrepancies in the national registry. In response to questions raised by the ERT, Ukraine provided documents demonstrating how it records the changes related to the national registry and how it maintains those records. The ERT noted that updates of databases and applications, implemented security measures and changes to the national registry software are documented on a regular basis by nominated responsible members of staff, including five experts.

30. The ERT took note of the recommendation made in the standard independent assessment report[8] that, in its next annual submission, Ukraine should fulfil all requirements regarding publicly available information in accordance with chapter II.3.E of the annex to decision 13/CMP.1 on the website of its national registry. During the review, the ERT was informed that the Party had already addressed that recommendation. The ERT commends Ukraine for its efforts to ensure the reliable performance of its national registry. Further, during the review Ukraine reported on the readiness of the national registry to support the establishment of a planned national emissions trading system (ETS).

31. The ERT concludes that Ukraine's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1.

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

32. As required by the UNFCCC reporting guidelines, Ukraine has provided in its NC5 information on its package of PaMs adopted and planned on the basis of the theoretical, technical and economically feasible emission reduction potential. Each sector has its own textual description of the clusters of PaMs, supplemented by summary tables on those clusters by sector. The NC5 contains, with a few exceptions, a similar set of PaMs to that in the NC2. During the review, Ukraine provided further information on its PaMs reported in the NC5 and extensive information on additional PaMs adopted after the publication of the NC5.

33. The ERT acknowledges that the information provided in the NC5 is more complete and comprehensive than that provided in the NC2. Several recommendations listed in the previous IDR report to improve reporting were taken into consideration in the NC5, including the presentation of information by sector, subdivided by gas, and summarizing

[8] Standard independent assessment reports for 2010 are available at <http://unfccc.int/kyoto_protocol/registry_systems/independent_assessment_reports/items/4061.php>.

the key clusters of PaMs in a tabular format. However, the ERT noted that Ukraine has not provided the following reporting elements required by the UNFCCC reporting guidelines: a presentation of each PaM (including information on objective and/or activity affected, type of PaM, status of implementation and implementing entity or entities) nor information on how Ukraine believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals. Therefore, the ERT recommends that Ukraine include this information in its next national communication. During the review, Ukraine elaborated on its longer-term policies that influence GHG emission levels (see paras. 54, 60, 66 and 85 below).

34. To increase the completeness of its reporting, the ERT recommends that Ukraine include information on its PaMs to reduce F-gases and that it clearly identify steps taken to promote and implement decisions of ICAO and IMO. The ERT encourages Ukraine to include information on the effects of individual PaMs, provide information on how progress in PaMs to mitigate GHG emissions is monitored and evaluated over time, list PaMs that are no longer in place, and report in more detail on PaMs that are innovative and/or effectively replicable in its next national communication.

35. The ERT recommends that Ukraine improve the transparency of its reporting by providing information on the monitoring and evaluation of its PaMs, elaborating on the approach taken to distinguish between implemented and adopted measures and additional measures, and reporting the PaMs consistently in the sections of its NC5 on PaMs and on projections using the same sectoral categorization. Transparency could also be improved by Ukraine by elaborating on its PaMs in residential and commercial sectors and elaborating on the costs of its PaMs. The ERT found understanding the interlinkages among the numerous strategic documents and regulations challenging and encourages Ukraine to streamline the description of its framework PaMs in its next national communication.

36. Several national circumstances set the context for climate change policy in Ukraine and the preference for certain policy instruments. Firstly, the approaches of the former planned economy are reflected in the predominant top-down programmes in all sectors of the economy. Regulatory instruments (laws, regulations and standards) play a key role in Ukraine's climate change related policy. Secondly, Ukraine's emissions are far below the levels defined in accordance with its target inscribed in Annex B for the first commitment period of the Kyoto Protocol. Therefore, Ukraine does not urgently need an overarching national GHG emission reduction strategy and a number of its climate-related sectoral programmes and plans are mostly driven by the need for economic efficiency and development, and not solely by climate change mitigation.

37. Nevertheless, there have been some initial steps taken towards consideration of economic instruments in addition to regulations and standards in Ukraine's climate change related policy portfolio. These include recent initiatives to develop feed-in tariffs for electricity produced from renewables (see para. 52 below), tax incentives and CO_2 taxation (see para. 51 below) and the national ETS (see para. 42 below). The main driver for these steps towards consideration of economic instruments in the climate change portfolio of Ukraine is the goal to increase the security of the energy supply through enhancing energy efficiency and increasing the use of renewable energy.

38. Ukraine has significant GHG mitigation potential, mainly in the energy supply, residential and commercial sectors, primarily buildings and appliances, and in industry. However, the utilization of this potential is limited, owing to a number of existing regulatory, economic, technical and infrastructure barriers. In addition, the lack of a clear distribution of responsibilities among the institutions involved in the implementation of the Convention and its Kyoto Protocol, and a lack of systematic planning, monitoring and evaluation of the measures and programmes at the national and sectoral levels, is a challenge that needs to be addressed in order to utilize this mitigation potential.

39. The ERT noted that Ukraine did not provide information on its PaMs that lead to an increase in GHG emissions, namely on the planned shift from the use of gas to the use of coal for energy production. The ERT encourages Ukraine to report such information in its next national communication. Table 3 provides a summary of the reported information on climate change related PaMs in Ukraine.

Table 3
Summary of information on policies and measures

Major policies and measures	*Examples/comments*
Policy framework and cross-sectoral measures	
	National plan for the implementation of provisions of the Convention and its Kyoto Protocol (2005, updated 2009)
	Strategy of national policy for ecology until 2020 (2010)
	National action plan on environmental issues for 2009–2012
	State environmental monitoring programme for 2008–2012
Policies and measures by sector	
Energy	Energy strategy of Ukraine until 2030 (2006)
	National energy programme until 2010 (1996)
	Law on power industry (1997, with amendments in 2010)
Building regulations	Programme for the building sector 2009–2014
	State programme for the reform and development of housing and communal services for 2004–2010 (2004, with amendments in 2009)
	Law on heat supply (2005)
	Building codes (2007, 2010)
Renewable energy sources	Law on alternative energy sources (2003)
	Law on alternative types of liquid and gaseous fuels (2000)
	Law on green tariffs (2008)
	Decree on measures promoting the use of alternative energy sources (2009)
	Ukraine's comprehensive State programme on construction of wind farms until 2010
Energy efficiency	Comprehensive State programme on energy conservation until 2010 (1997, with amendments in 2000)
	Law on energy savings (1994, with amendments in 1999, 2005–2007 and 2011)
	Law on combined heat and power generation (2005, with amendments in 2010)
	State economic programme on energy efficiency for 2010–2015 (2010)
	Sectoral programme on energy efficiency until 2017 (2009)
	Sectoral programme on the increase of energy efficiency in buildings for 2010–2014
Transport	Plan for implementation of the governmental environmental protection policy in the transport sector for 2004–2010 (2004)
	Sectoral programme for energy conservation and for introduction of alternative fuels in transport for 2006–2010
Industrial processes	State programme on industrial development for 2003–2011 (2003)

Major policies and measures	*Examples/comments*
Agriculture	
Husbandry and crop production	The governmental programme on the development of Ukrainian village until 2015 (2007). The programme includes a number of sectoral subprogrammes, such as a sectoral dairy husbandry development programme until 2015 and a sectoral soil fertility programme for 2008–2015
Manure management systems	Governmental support for the installation of utilities for biogas use from liquid manure management systems
Promotion of efficient farming	Governmental subsidies and loans for the purchasing of modern, fuel-efficient farming equipment
Land use, land-use change and forestry	
Forestry	Governmental programme on forests of Ukraine for 2010–2015 (2009)
Waste	Governmental programme on municipal solid waste management 2004–2011 (2004)
	Conception of the State economy and scientific–technical programme for the management of municipal solid wastes for 2010–2019 (2010)
	Law on mandatory collection and sorting of solid waste (2010) Rules for solid waste management in landfills (2011)

1. Policy framework and cross-sectoral measures

40. Several governmental institutions are responsible for the design and implementation of climate change related policies in Ukraine (see para. 22 above). MENR is the key institution responsible for the coordination of climate change related policies and relevant activities and programmes. The ERT noted during the review that Ukraine has reviewed the institutional framework for the implementation of the Convention and its Kyoto Protocol, and encourages Ukraine to describe the institutional framework on climate change policymaking in its next national communication.

41. The national plan of Ukraine is an overarching strategic document that outlines the general framework and actions to implement the Convention and its Kyoto Protocol (see para. 21 above). In addition, there are some initiatives to develop a national mitigation plan, several sectoral programmes and regional initiatives. These initiatives suggest that Ukraine's climate-related PaMs are driven by the development goals of economic sectors and not necessarily by climate policy objectives.

42. The national plan includes provisions for the preparation of the annual submission of the Party's GHG inventory, the development of joint implementation (JI) infrastructure and a national ETS. In 2009, the national plan was revised to reflect the outcome of the international climate change negotiations. During the in-country review, the ERT noted that the provisions of the national plan have not been fully implemented, owing to a lack of assigned financial resources.

43. The national plan also includes provisions for the development of a national mitigation plan, which encompasses sectoral and cross-sectoral mitigation actions under the jurisdiction of relevant governmental institutions. During the review, the ERT noted that the national mitigation plan was developed in 2009 but has not yet been adopted. Although the adoption of such a plan would promote climate change in the national policy agenda, whether and when the plan will be adopted remains uncertain. The NC5 mentions some

steps taken to develop regional mitigation plans, such as initiatives in the Donetsk region to develop a regional GHG inventory (see para. 45 below).

44. Among the sectoral programmes, energy-related programmes play the key role for climate change mitigation. Ukraine highlighted in the NC5 its major focus on energy-efficiency programmes, which aim at reducing the country's dependence on energy imports while also providing some emission reductions. This is enshrined in the key energy-related policy strategies, programmes and plans at the national and regional levels, namely the energy strategy of Ukraine until 2030 (2006), the comprehensive State programme on energy conservation until 2010 (1996) and the State energy-efficiency programme for 2010–2015.

45. Implementation of climate change policy at the regional level is underpinned by the relevant energy-efficiency programmes, which were developed on the basis of the comprehensive State programme on energy conservation (1996), as well as waste management programmes. The NC5 contains descriptions of the most effective regional programmes, including the programmes in the Odessa, Kharkov, Donetsk and Lugansk regions. In addition, the NC5 mentions providing loans for energy-efficient buildings in the Lvov region. During the review, Ukraine presented regional programmes for municipal waste management that aim at the recycling, reuse and reduction of waste in the main regions.

46. Regarding the balance of policy instruments, regulations and government programmes remained at the core of climate change policy, although recently Ukraine has taken some steps to develop new policy instruments, such as feed-in tariffs (see para. 51 below), to further develop energy-efficiency programmes and to establish a regulatory framework for the implementation of the flexibility mechanisms of the Kyoto Protocol in Ukraine (see paras. 104 and 106 below). However, challenges and barriers remain for the full utilization of existing GHG mitigation potential in the industrial, transport and building sectors (see paras. 59, 63 and 65 below).

47. The NC5 does not provide information on how the Party's climate change related programmes and plans are monitored and evaluated over time. In response to the request of the ERT, Ukraine noted that the governmental institution that develops an individual PaM or programme is responsible for its monitoring and evaluation on a regular basis. For example, the Ministry of Industrial Policy is responsible for the implementation and evaluation of the sectoral programme on energy efficiency, the performance of the energy strategy of Ukraine until 2030 (2006) is being monitored by the Ministry of Energy and Coal Industry of Ukraine and the programmes on energy conservation and energy efficiency are monitored by the National Agency of Ukraine for Effective Energy Use. The evaluation reports usually include the names of the implementing agencies, the locations of implemented activities, and expected and actually achieved results (such as the cost of the implementation of the activities and the achieved reduction in energy consumption). The ERT noted that industrial associations make some effort to coordinate their own energy-efficiency programmes within the industries in question, aiming to better monitor the measures implemented in those industries. The ERT also noted that there are no arrangements in place for monitoring the progress of mitigation PaMs in a more coordinated way and outside the context of individual ministries and agencies.

48. The ERT noted that the evaluation of the status of the implementation of the energy-efficiency programmes demonstrates that only 10 per cent of their objectives have been achieved. Nevertheless, the energy intensity per unit GDP unit decreased by almost 50 per cent during the period 1996–2008, mainly as a result of major changes in the structure of the economy. A further decrease of more than 10 per cent in energy intensity per unit GDP by 2015 compared with that in 2008 is envisaged in the State programme on energy efficiency for 2010–2015 (2010).

2. Policies and measures in the energy sector

49. Between 1990 and 2008, GHG emissions from the energy sector decreased by 57.3 per cent, driven mainly by the sharp economic decline in the 1990s and the consequent decrease in primary energy consumption. The trend in GHG emissions from fuel combustion showed notable decreases in all energy subsectors: in manufacturing industries and construction (by 66.1 per cent), in energy industries (by 59.7 per cent), in energy use in other sectors (by 54.7 per cent) and in transport (by 49.4 per cent). As nearly 70 per cent (68.4 per cent in 2008) of the national GHG emissions stem from the energy sector, Ukraine is setting priorities in energy and climate-related policies on an increase in the use of renewables and nuclear and an increase of efficiency in fuel and energy consumption.

50. ***Energy supply***. During the period 1990–2008, Ukraine's annual total primary energy supply declined by 46.0 per cent, mainly as a result of the drop in industrial output. According to the energy strategy of Ukraine until 2030 (2006), by 2030 natural gas consumption will drop from the current 41 per cent to about 36 per cent in 2030, while consumption of coal products will double. In addition, during the in-country review, Ukraine informed the ERT about its plan to put in operation several new nuclear power plants by 2025, but noted that the total capacity is uncertain given that the energy strategy of Ukraine until 2030 (2006) is to be revised, with further consideration of the role of nuclear vis-à-vis renewable energy.

51. Ukraine presented a set of new regulations in the energy sector, such as the law on power industry (1997, with amendments in 2010) and the tax code (adopted in 2010, entered into force as of 1 January 2011), which include a number of instruments to promote renewable energy and energy efficiency: feed-in tariffs (green tariff), tax exemptions and reductions to stimulate the use of energy-efficient technologies and appliances, and CO_2 taxation to stimulate GHG emission reduction on the energy supply side. The planned measures for GHG emission reduction focus mainly on technological (modernization of existing and promoting new combined heat and power plants, and implementation of energy-efficiency programmes) and structural (increase of nuclear power and renewable energy sources) measures, and collecting and utilizing the CH_4 from coal mining for heat and power production.

52. ***Renewable energy sources***. The NC5 reports that, in order to strengthen Ukraine's energy security and to reduce its dependence on energy imports, a legal framework was adopted to support renewable energy. This includes the law on alternative energy sources (2003, with amendments in 2008), the law on alternative types of liquid and gaseous fuels (2003), the law on energy savings (1994, with amendments in 1999, 2005–2007 and 2011) and the law on green tariffs (2008); however, except for the law on green tariffs, there are no specific measures included therein. The NC5 only mentions that the government supports the development of wind power, including through the State programme on the construction of wind farms until 2010, which sets a 0.75 per cent premium on the current price of power for the power produced by wind farms and sold by the electricity producers on the wholesale market. The revenues received from this price premium are then invested in the construction of new wind farms.

53. Although there is a significant potential for the use of renewable energy sources in Ukraine, including wind, solar and biofuels (bioethanol), only a small part of this potential has been utilized and only 4.4 per cent of the actions from the State programme on the construction of wind farms until 2010 were implemented. The National Agency of Ukraine for Effective Energy Use, the institution responsible for the monitoring and evaluation of the national programme on renewables, noted during the review that the underestimation of the costs of the implementation of the programme was among the main reasons for the low rate of implementation of the planned actions.

54. The ERT noted that some economic PaMs to promote renewables were adopted or strengthened after the preparation of the NC5. The law on power industry (1997, with amendments in 2009) aims to provide incentives for promoting the use of renewable energy sources through feed-in tariffs, which differentiate among the types of renewables. The strategy of national policy for ecology until 2020 (2010) sets targets for the use of low-emission energy sources (which include renewables and nuclear) of 10 per cent by 2015 and 20 per cent by 2020. Moreover, the tax code (adopted in 2010, entered into force as of 1 January 2011) offers a wide range of tax incentives for suppliers of renewable energy.

55. The NC5 does not provide information on the share of renewable energy by type of source in the country's energy balance. According to the energy strategy of Ukraine until 2030 (2006), the production of hydropower is expected to increase by 30 per cent and the use of renewables (without power generated by small hydropower and biofuel-fired plants) is expected to double by 2030 compared with in 2005.

56. ***Energy efficiency***. The NC5 attaches the highest priority to energy efficiency for GHG emission reduction in the energy sector. The energy strategy of Ukraine until 2030 (2006), the comprehensive State programme on energy conservation until 2010 and the recently adopted State programme on energy efficiency until 2015 set the foundation for improving energy efficiency.

57. In responding to the request of the ERT for information on the results of PaMs achieved in the oil and gas sector, Ukraine elaborated on implemented energy-efficiency measures and on the decrease in the specific energy intensity of gas transportation by 6 per cent in 2008 compared with the 2002 levels. The key planned technological measures (see para. 51 above) in relation to the gas sector aim at modernizing the gas transport system.

58. The NC5 presented a number of regional programmes on energy efficiency and provided some information on the expected effects of their implementation. For example, energy saving measures under the regional programme in the Odessa region are expected to reduce GHG emissions by 0.5 Mt CO_2 eq in 2010 compared with in 2007 (equivalent to 4 per cent).

59. ***Residential and commercial sectors***. The NC5 provides limited or no information on PaMs and other economic drivers affecting GHG emissions from the residential and commercial sectors. The ERT could not clearly identify the PaMs targeted at improving energy efficiency in buildings and the promotion of energy-efficient appliances in the residential and commercial sectors. The information on these sectors is limited to the description of power demand for water supply and sewage pump stations (average power demand is equal to 1.57 kW/m^3). Also, the NC5 reported that, despite an increase in the number of consumers of natural gas, the amount of natural gas consumed dropped by 4 billion m^3 during the period 1996–2007, owing to improvements in household gas metering and the reduction in gas leakage.

60. During the review, Ukraine provided additional information on development trends and recent PaMs adopted to address energy use in the residential and commercial sectors. According to the current regulations, all new buildings must comply with the building codes, which take into account newly adopted (2007–2010) energy-efficiency standards. For existing buildings, Ukraine, in the State economic programme on energy efficiency for 2010–2015 (2010), has identified targets and government financing for improved insulation of buildings constructed from the 1960s to the 1990s. The total energy savings in buildings as a result from such improvements is estimated to be 6.94 million tonnes oil equivalent by 2015. Moreover, in response to the request made by the ERT during the in-country review, Ukraine provided information on the State standards for energy-efficiency labelling of appliances. Taking into account the significant potential for improving energy efficiency in buildings, the ERT encourages Ukraine to highlight the drivers for the emission trends in

these sectors and to elaborate on the key PaMs in the area of energy efficiency in buildings and of appliances in its next national communication.

61. ***Transport sector***. Although overall GHG emissions from transport decreased by 49.4 per cent in the period 1990–2008, an increase in GHG emissions from this sector has been observed since 1997 and this increase is expected to become larger in the future in line with the growth in GDP. The growth in the number of road transport vehicles by nearly 29 per cent by 2015 compared with the 2007 level is considered as a key driver for the further increase in GHG emissions.

62. The NC5 emphasized the measures aimed at increasing energy efficiency and the use of renewables in the transport sector, which are implemented through the strategic plan and relevant programmes. The plan for the implementation of the principal governmental environmental protection policy in the transport sector for 2004–2010 (2004) and the sectoral programme for energy conservation and for the introduction of alternative fuels in transport for 2006–2010 provide guidance for the use of biofuels in vehicles and include planned technological measures (see para. 51 above) for energy savings.

63. During the in-country review, Ukraine provided the ERT with information on the instruments (green tariffs, and tax incentives for the use of bioethanol by vehicles) adopted in 2011 which could stimulate an increase in energy efficiency in the transport sector. Ukraine estimates the potential for an increase in the use of alternative fuels in transport of 23–25 per cent by 2020 (compared with the 2010 level).[9] This will include an increase in the use of liquefied natural gas and liquefied petroleum gas by 12–15 per cent and an increase in the use of biofuels by 10–12 per cent to blend with regular gasoline.

64. Although Ukraine has not reported in its NC5 information on its steps taken to promote decisions of ICAO and IMO in order to reduce or limit GHG emissions from fuel used in international transport, during the in-country review the ERT was informed about such steps. Ukraine explained that it cooperates through ICAO on the management of GHG emissions from fuel used in international aviation. On international maritime transport, owing to the very small Ukrainian maritime fleet, the steps taken to reduce emissions are limited to the indirect environmental protection activities of the operators of ships bearing the Ukrainian flag.

65. ***Industrial sector***. The NC5 provided information on new legislation, which includes provisions for efficient energy use in the industrial sector. In 2009, the Ministry of Industrial Policy approved the sectoral programme on energy efficiency until 2017, which focuses on improving energy efficiency in the energy-intensive industries, such as ferrous and non-ferrous metallurgy, machine manufacturing and the chemical industry. The programme estimates a potential reduction of energy use in those industries of almost 50 per cent (or emission reductions of 22.6 Mt CO_2 eq). It is estimated that the programme will result in the following energy savings: a decrease in energy intensity per output produced by 30 per cent in ferrous and non-ferrous metallurgy; and an increase in energy savings by 25–30 per cent in machine manufacturing. It is assumed that the majority of the measures set out in the programme will be implemented using the funds of the industries in question and that a number of the measures include a potential for JI projects.

66. During the in-country review, Ukraine informed the ERT that, in addition to the sectoral programme on energy efficiency until 2017, three other programmes include PaMs related to the industrial processes sector, namely: the State programme of industrial development for 2003–2011, the State programme for economical industrial development until 2017 and the State programme for development and reforms of mining and metallurgy

[9] State Road Transportation Research Institute. 2008. Alternative fuel in Ukraine. *Transporter UA*, No. 15. Available at <http://truck.net.ua/index.html?id=1055>.

complex until 2011. Also, the new concept of the State scientific–technical programme for reforming and development of the mining and metallurgy complex until 2020 has been prepared and is currently under consideration by the Cabinet of Ministers of Ukraine. These programmes set out the development plans for the industrial processes sector or individual industries and do not necessarily cover the PaMs targeted at the reduction of GHG emissions from the industrial processes sector. However, these programmes aim at reducing the use of raw materials and indirectly will increase energy efficiency in the industry through the modernization of industrial processes and the introduction of innovative methods and modern technologies.

3. Policies and measures in other sectors

67. Between 1990 and 2008, GHG emissions from industrial processes (including solvent and other product use), agriculture and waste decreased by 44.2 per cent (107.1 Tg CO_2 eq), driven mainly by the reduction in industrial and agricultural production in the 1990s. GHG emissions decreased significantly in agriculture (by 66.9 per cent or 70.1 Tg CO_2 eq) and in industrial processes (by 29.6 per cent or 38.1 Tg CO_2 eq). This decrease was partly compensated for by the increase in emissions from waste (by 14.1 per cent or 1.2 Tg CO_2 eq).

68. ***Industrial processes***. Between 1990 and 2008, GHG emissions from the industrial processes sector decreased by 29.6 per cent, driven mainly by the decline in industrial production and the high rates of inflation due to the economic recession in the early 1990s.

69. The NC5 presented estimates of the potential for the reduction of CO_2 emissions when producing cement, ammonia and cast iron. The key measures noted by Ukraine for reducing CO_2 emissions from processes are the replacement of wet process kilns with dry process kilns for cement production, the technological modernization of ammonia production and the decrease in coke consumption for cast iron production. In the NC5, it is estimated that the reduction of coke consumption has the biggest CO_2 emission reduction potential.

70. Ukraine presented the barriers that could hamper the implementation of the PaMs in the industrial processes sector: over-optimistic planning, insufficient government financing, lack of incentives for private investments and the global financial crisis. Examples of success stories that could potentially be replicated in the country include two GHG emission reduction projects, namely the replacement of the wet process kilns with dry process kilns and the utilization of surplus coke oven gas for electricity generation in coke production. Based on this experience, Ukraine intends to introduce dry process kilns in 14 cement production plants and to utilize surplus coke oven gas for electricity generation in 13 coke production plants.

71. The ERT noted that PaMs for the reduction of F-gases are not reported in the NC5. During the review, Ukraine explained that there is no production of F-gases in Ukraine and that currently there are no reliable data on the consumption of F-gases in the country; thus no PaMs targeted at reducing F-gases have been identified. Also, during the review Ukraine presented recent research done on HFC emissions from mobile air conditioning. The ERT welcomes Ukraine's efforts to estimate HFC emission from mobile air conditioning and recommends that Ukraine elaborate on the sources and amounts of F-gases and possible measures to reduce their consumption in its next national communication.

72. ***Agriculture***. Between 1990 and 2008, GHG emissions from the agriculture sector decreased by 66.9 per cent, driven mainly by the decrease in the agricultural areas under cultivation, the decrease of the use of mineral and organic fertilizers and the drop in the livestock population due to the overall economic recession in the country. Moreover, an increase in the share of small private holdings and a decrease in the number of large

governmental farms resulted in a decrease in the total livestock population and a corresponding decrease in emissions from agriculture, while the productivity per head of livestock shows an increasing tendency.

73. The key policy targeted at reducing emissions from agriculture is the governmental programme on the development of Ukrainian villages until 2015 (2007). Currently under implementation, this programme covers measures in the areas of milk production, utilization of biogas from manure management and practices of soil cultivation. Specific measures include the enhancement of productivity in dairy production by changing the feeding ration from raw and green forage to concentrated forage and by the improvement of the genetic potential of dairy cows. Additional measures included in the programme relate to the increased utilization of biogas from manure management systems and enhanced soil cultivation through more effective application of mineral and organic fertilizers or through organic farming (which implies a decrease in N_2O emissions from soils owing to the absence of tillage and the more effective application of mineral fertilizers). The ERT noted that the agricultural land area managed by certified organic agricultural farms increased by 64.3 per cent from 2002 (164.5 kha) to 2009 (270.2 kha), which in 2009 made 0.8 per cent of all arable land area.[10] The ERT also noted the recent development of a number of sectoral subprogrammes, including the sectoral dairy husbandry development programme until 2015 and the sectoral soil fertility programme for 2008–2015.

74. The implementation of the above-mentioned programmes is coordinated by the Ministry of Agricultural Policy and Food. The programmes are backed up by a separate budget line, which ensures that a certain amount of funding for their implementation will be provided on an annual basis.

75. Similar to the trend in the PaMs in the energy sector, in the agriculture sector Ukraine has taken steps to introduce economic measures for the promotion of climate change mitigation related actions. In 2010, the government adopted a new subsidy scheme, which included 50 per cent financial compensation for the construction of new large farms with highly productive animals. Additionally, in 2011 the government adopted favourable loan conditions for purchasing modern agricultural machinery.

76. Although such financial incentives are not aimed primarily at climate change mitigation, their application indirectly decreases GHG emissions from the agriculture sector. The increase in the number of new large farms in the country will reduce GHG emissions from manure management because of the construction of modern manure management systems, which minimize water and ambient air pollution from manure storage. The increase of the productivity of livestock could compensate for the potential increase in the number of livestock. More effective application of fertilizers and tillage with modern agricultural machinery bought through the soft loan schemes will result in a decrease of GHG emissions from agricultural soils.

77. With regard to CH_4 emissions from manure management, eight projects for the construction of biogas utilities are currently under way. The potential exists for the construction of another 20 utilities, subject to the availability of financial resources. As the estimated need for these 20 utilities totals as much as EUR 60 million, the implementation of these projects seems to be feasible only with foreign investment.

78. ***LULUCF***. The LULUCF sector was a net sink of 16.585 Tg CO_2 eq in Ukraine in 2008, and net GHG removals have decreased by 75.8 per cent since 1990. The decreasing

[10] Federation of Organic Agriculture in Ukraine. Agricultural land area managed by certified organic agricultural farms. Available at <http://www.organic.com.ua/ru/homepage/2010-01-26-13-42-29>. According to the 2011 annual submission, arable land area (cropland remaining cropland) was equal to 34,734.5 kha in 2009.

trend in removals was driven mainly by the decreased application of mineral and organic fertilizers, due to the decline in agricultural production as a consequence of the decline in the economic output of the country. Removals by forest biomass are the largest sink for CO_2; these removals were relatively stable during the period 1990–2008, owing to implemented measures for sustainable forest management and regulated fellings.

79. The NC5 reports on activities undertaken in the forestry sector only and does not provide information on PaMs related to cropland, wetlands, grassland or other types of land use. During the in-country review, Ukraine clarified that governmental programmes targeted at the agriculture sector (see para. 73 above) may be considered as measures targeting cropland. With regard to wetlands, Ukraine is considering the implementation of the rewetting of drained peatlands in the future. The ERT recommends that Ukraine include all adopted and planned PaMs for the entire LULUCF sector in its next national communication.

80. The governmental programme on forests of Ukraine for 2010–2015 (2009) is the main PaM in the forestry sector. It calls for more effective forest management, including the continuous increase in the forest area, the protection of biodiversity, better protection of forests from disturbance and the coordination of the flow of finance to the forestry sector. The main results achieved in 2009 within the framework of the programme include the afforestation and reforestation of 79,600 ha, the thinning of 317,200 ha and measures against forest pests and diseases implemented on 301,600 ha.

81. The majority of the forest in Ukraine is State-owned and managed by different governmental institutions, such as ministries, agencies and regional administrations. The State Forest Resources Agency coordinates the forest management implemented by the forest owners and forest users. The programme referred to in paragraph 80 above is funded from the governmental budget, which is distributed between the governmental institutions responsible for the management of the major share of Ukrainian forest. The distribution has been planned already for the entire period of the programme until 2015.

82. The NC5 does not include information on GHG emission trends for LULUCF activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. However, in conjunction with its 2010 annual submission, Ukraine provided some estimates and, during the review, some additional information on recent developments in that area, namely the reporting of the carbon pools of litter and dead organic matter, which were not estimated previously, and the further development of an information database for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. The ERT appreciates the efforts made by Ukraine and recommends that Ukraine report in a transparent manner on trends in GHG emissions and removals stemming from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol and on specific PaMs related to those activities in its next national communication.

83. Further, the NC5 does not describe national legislative arrangements and administrative procedures that seek to ensure that the implementation of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol also contributes to the conservation of biodiversity and the sustainable use of natural resources. During the in-country review, in response to the request of the ERT, Ukraine explained that measures of the governmental programme on forests of Ukraine 2010–2015 (2009) are aimed at sustainable forest management and the protection of biodiversity in all national forests, including areas subject to activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol (see para. 80 above). The ERT recommends that Ukraine elaborate on this information in its next national communication.

84. ***Waste management***. Waste is the only sector from which GHG emissions increased between 1990 and 2008 (by 14.1 per cent), driven mainly by the increased volume of

domestic solid waste. The ERT noted that out of 4,000 landfill sites, 28 per cent do not meet the required environmental protection standards.

85. The main PaM for waste management is the governmental programme on municipal solid waste management 2004–2011 (2004). Despite this programme having a period of implementation from 2004 to 2011, in the NC5 it was noted that most of the activities have not been implemented, owing to a lack of financing. A new programme targeting solid waste management is under development within the framework of the concept of the State economy and scientific–technical programme for the management of municipal solid wastes for 2010–2019 (2010). If implemented, this programme will reduce the amount of solid waste disposed on land by 6 per cent (or by 8 per cent depending on the availability of additional funding). The PaMs included in the programme aim at the use of the most effective waste processing technologies and the introduction of municipal solid waste separation. The planned measures presented in the NC5 focus mainly on the reduction of organic substances in municipal solid waste and on utilizing CH_4 from landfills.

86. During the in-country review, the ERT noted that, recently, several legislative acts have been adopted that will facilitate the implementation of the programmes related to waste management. Among these acts are the law on mandatory collection and sorting of solid waste (2010) and the rules for solid waste management in landfills (2011).

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

87. In its NC5, Ukraine has not reported information on how it strives to implement PaMs under Article 2 of the Kyoto Protocol in such a way as to minimize adverse effects, including the adverse effects of climate change and social, environmental and economic impacts, on other Parties, especially developing country Parties, and on international trade. During the in-country review Ukraine provided some relevant information. The ERT recommends that Ukraine report this information in its next national communication. Further information on how Ukraine strives to implement its commitments under Article 3, paragraph 1, in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties is presented in chapter II.H of this report.

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

88. In its NC5, Ukraine has reported on three GHG emission scenarios (‘with measures’, ‘with additional measures’ and ‘without measures’ until 2020, presented relative to actual inventory data for 2005. Projections are presented on a sectoral basis, using the same sectoral categories used in the PaMs section of the NC5, and on a gas-by-gas basis for the following GHGs: CO_2, CH_4, N_2O, PFCs and HFCs (treating PFCs and HFCs collectively in each case). Projections are also provided in an aggregated format for each sector as well as for a national total, using global warming potential values.

89. The ERT noted that Ukraine did not provide the following reporting elements required by the UNFCCC reporting guidelines: the total effect of implemented and adopted PaMs and emission projections related to fuel sold to ships and aircraft engaged in international transport. During the review, Ukraine explained that, compared with the total emissions of Ukraine, emissions related to fuel sold to ships and aircraft engaged in international transport are insignificant, and that therefore corresponding projections were not provided. The ERT recommends that Ukraine report on these elements in its next national communication.

1. Projections overview, methodology and key assumptions

90. According to the Party's definition, the 'with measures' scenario encompasses an economically and, in some cases, technically feasible GHG emission reduction potential, and this potential is not necessarily utilized through PaMs, while the 'with additional measures' scenario encompasses a technical emission reduction potential which might be achieved with some additional support, but that support is not necessarily identified or planned. The ERT noted that the definitions of the three emission scenarios provided in the NC5 do not fully comply with the definitions set out in the UNFCCC reporting guidelines.[11] The different definitions of scenarios compared with those in the UNFCCC reporting guidelines and the effects of individual measures implemented make it difficult to evaluate and monitor the effects of individual PaMs and to revise the PaMs accordingly. The ERT recommends that Ukraine adhere to the scenario definitions set out in the UNFCCC reporting guidelines and provide explicit definitions of the scenarios used in its next national communication.

91. With regard to projections for F-gases, during the in-country review Ukraine explained that PFC emissions in Ukraine originate from aluminium production, and therefore PFC emission projections are obtained following the forecast for aluminium production. HFC emissions in Ukraine in 2009 were estimated on the basis of the production and maintenance of refrigerators produced in Ukraine and HFC emission projections were based on expert judgement. Also, Ukraine explained that, at the time of preparation of the NC5 (late 2009), SF_6 emissions in Ukraine were not estimated. Therefore, projections of SF_6 emissions were not provided in the NC5. However, after the submission of the NC5, for its 2010 annual submission, Ukraine estimated SF_6 emissions to be insignificant (accounting for 0.025 per cent of the total emissions from industrial processes in 2008). Therefore, the absence of SF_6 emission projections does not influence the projections of total national GHG emissions.

92. Further, during the review Ukraine explained that projections of emissions from solvents were prepared on the basis of the planned development of the relevant industry and were added on to the projected emissions from industrial processes.

93. The methodology used by the Party for the preparation of the emission projections in the NC5 differs from that used for the preparation of the projections in its previous national communication (NC2), which does not allow for comparison of the results. Three scenarios were provided in the NC2, namely pessimistic, basic and optimistic, but the effect of the implementation of individual or groups of PaMs was not specified. During the review, Ukraine explained the key differences in the assumptions and methodologies used in the NC2 and the NC5 and noted that the rationale for the methodological changes was to better adhere to the UNFCCC reporting guidelines. The ERT encourages Ukraine to periodically update the projections and to elaborate the description of the methodology used to prepare its emission projections in its next national communication.

94. To project future GHG emissions from the energy, industrial processes, solvent and other product use, agriculture and waste sectors, Ukraine used a model based on the Microsoft Excel application and to project future emissions and removals from the LULUCF sector it used the EFISCEN model. The ERT noted that, owing to complexity and the large number of assumptions and variables used, the updating of the Excel application based model (especially for the energy sector) may be complicated, and it encourages Ukraine to develop a sustainable projection model that enables an update of the projections in a systematic way.

[11] According to the UNFCCC reporting guidelines, a 'with measures' scenario encompasses currently implemented and adopted PaMs and a 'with additional measures' scenario encompasses planned measures.

95. Assumptions provided in the NC5 for GDP, demographic trends, electricity consumption, energy-efficiency improvements, consumption of coal and a CO_2 certificate price appeared broadly plausible. For example, it is assumed that GDP will grow by 38 per cent by 2015 compared with 2007 and that energy consumption per GDP will decrease by 25.6 per cent by 2020 compared with 2007. Data came from the official governmental forecasts only for a few of these assumptions, namely for demographic trends and electricity consumption. The same assumptions for the key variables, such as GDP growth, were applied throughout all the sectoral projections. The remaining assumptions were based on expert judgement, and these differ across the sectors, owing to a lack of official projections and significant changes in the economy. Moreover, the methodology used for the preparation of the sectoral projections was not described transparently in the NC5. The ERT encourages Ukraine to increase cross-sectoral consistency of projections by using the same sources of information for key macroeconomic indicators and to increase transparency in presenting the methodology for sectoral projections by indicating the sources for assumptions used for each sector.

96. The ERT identified some areas for the improvement of transparency: for example, the provision of information on the growth rates of industry and the growth rate of public transportation, and the prognosis of fuel consumption by fuel type for the transport sector. During the in-country review, Ukraine provided some additional information, including the forecast for the number of motor vehicles in the country (a planned increase by 70 per cent from 2007 to 2020). The ERT noted that Ukraine did not provide a sensitivity analysis of the projections and encourages the Party to analyse the sensitivity of the projections to the main variables, such as GDP, and a share of coal in total primary energy supply.

2. Results of projections

97. Even according to the 'without measures' scenario, which incorporates significant growth in the use of coal, Ukraine expects to meet its Kyoto Protocol target (stabilization of emissions during 2008–2012 at the base year level). The projected emissions according to the 'without measures' scenario for the 2010 are 55.6 per cent, or about 512.3 Tg CO_2 eq below the base year level (see table 4 bellow).

98. In the Copenhagen Accord, Ukraine announced its intention to decrease its GHG emissions by 20 per cent (equivalent to emission levels of 736.7 Tg CO_2 eq) by 2020 compared with the base year level. Ukraine's emissions in 2020 under the 'with measures' scenario are approximately 30.7 per cent (282.7 Tg CO_2 eq) below its base year level, and the projected emission under the 'without measures' scenario are 2.5 per cent (18.5 Tg CO_2 eq) higher than the target set for 2020. The available projections suggest that Ukraine will meet its 2020 target of a 20 per cent reduction by 2020 with domestic measures only. Table 4 and the figure present the results of the Party's GHG emission projections under the 'without measures', 'with measures' and 'with additional measures' scenarios.

3. Total effect of policies and measures

99. In the NC5, Ukraine presented the estimated and expected effect of implemented and adopted PaMs by sector, in terms of GHG emissions avoided or sequestered, by gas (on a CO_2 eq basis), for 2010, 2015 and 2020, and showed the economically feasible emission reduction potential of PaMs; however, an estimate of the total effect of its PaMs was not presented. Relevant information on factors and activities influencing emission trends for each sector for the years 1990–2020 was not transparently presented in the NC5, but Ukraine provided a lot of relevant information during the in-country review.

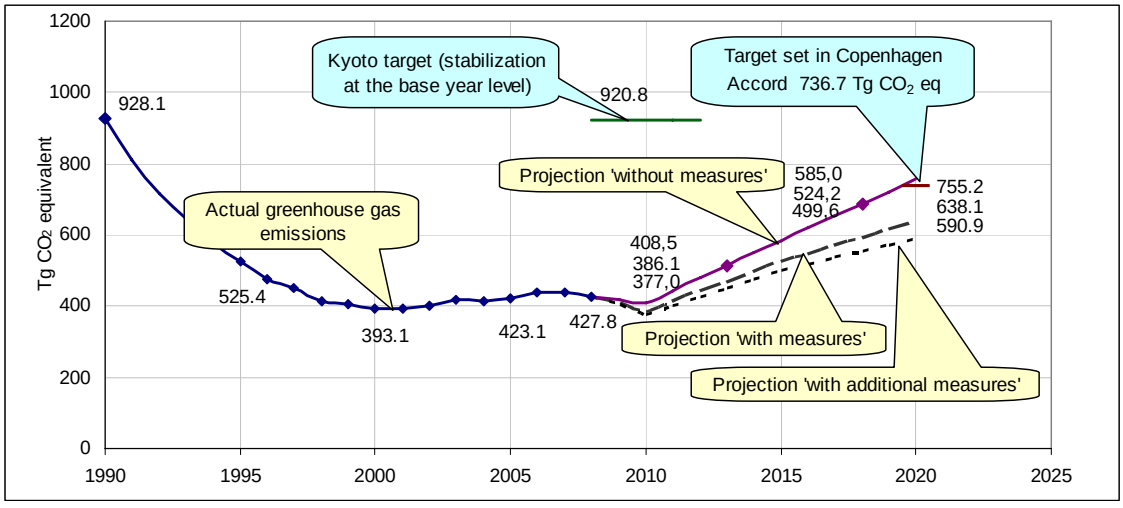
Table 4
Summary of greenhouse gas emission projections for Ukraine

	Greenhouse gas emissions (Tg CO_2 eq per year)	*Changes in relation to base year level (%)*	*Changes in relation to 1990 level (%)*
Inventory data 1990[a]	928.1	0.8	–
Inventory data 2008[a]	427.8	–53.5	–53.9
Kyoto Protocol base year[b]	920.8	–	–0.8
Kyoto Protocol target[b]	920.8	0.0	–0.8
'Without measures' projections for 2010[c]	408.5	–55.6	–56.0
'With measures' projections for 2010[c]	386.1	–58.1	–58.4
'With additional measures' projections for 2010[c]	377.0	–59.1	–59.4
'Without measures' projections for 2020[c]	755.2	–18.0	–18.6
'With measures' projections for 2020[c]	638.1	–30.7	–31.2
'With additional measures' projections for 2020	590.9	–35.8	–36.3

[a] *Data source*: Ukraine's 2010 greenhouse gas inventory submission (common reporting format version 3.1, submitted on 17 October 2010); the emissions are without land use, land-use change and forestry.
[b] *Data source*: Based on the initial review report contained in document FCCC/IRR/2007/UKR.
[c] *Data source*: Ukraine's fifth national communication.

Note: The inventory data for 1990 and the Kyoto Protocol base year differ due to the recalculations of greenhouse gas emissions in 1990.

Greenhouse gas emission projections



Sources: (1) Data for the years 1990–2008: Ukraine's 2010 greenhouse gas inventory submission (common reporting format version 3.1, submitted on 17 October 2010); the emissions are without land use, land-use change and forestry; (2) Data for the years 2009–2020: Ukraine's fifth national communication; the emissions are without land use, land-use change and forestry.

100. The total economically feasible emission reduction potential of Ukraine's PaMs is estimated at 23.1 Tg CO_2 eq in 2010 (calculated as the sum of the economically feasible GHG emission reduction potential of implemented and adopted measures by sector) and 119.1 Tg CO_2 eq in 2020. PaMs implemented in the energy sector have the largest emission

reduction potential (9.9 Tg CO_2 eq in 2010 and 86.1 Tg CO_2 eq in 2020), followed by PaMs in the industrial processes sector (11.6 Tg CO_2 eq in 2010 and 20.3 Tg CO_2 eq in 2020) and PaMs in the transport sector (0.7 Tg CO_2 eq in 2010 and 8.9 Tg CO_2 eq in 2020).

101. Table 5 provides an overview of the total effect of PaMs in 2010 and 2020 as reported by Ukraine. The effect of measures in the LULUCF sector was not evaluated. The largest effect in the industrial processes sector is expected to result from the decreased use of coke in iron production. For the waste sector, only measures for reducing GHG emissions from municipal solid waste were considered; the effect of measures for the minimization of emissions from wastewater, or similar, was not included in the projections.

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

102. Ukraine's GHG emissions are projected to be below its target under the Kyoto Protocol in 2008–2012; therefore, in its NC5 Ukraine implicitly stated that it will not use Kyoto Protocol mechanisms to comply with the target and did not elaborate on supplementarity as such.

103. Ukraine participates in two Kyoto Protocol mechanisms: JI and international emissions trading. The ERT noted that, since the submission of the NC2, Ukraine has made significant progress in the setting of a legal and institutional framework for the implementation of these mechanisms.

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_2 eq)*	*Relative value (% of 1990 emissions)*	*Effect of planned measures (Tg CO_2 eq)*	*Relative value (% of 1990 emissions)*	*Effect of implemented and adopted measures (Tg CO_2 eq)*	*Relative value (% of 1990 emissions)*	*Effect of planned measures (Tg CO_2 eq)*	*Relative value (% of 1990 emissions)*
	2010				*2020*			
Energy (without CO_2 from transport)	9.9	1.7	4.0	0.7	86.1	14.4	28.4	4.7
Transport – CO_2	0.7	0.8	0.4	0.5	8.9	10.2	4.8	5.5
Industrial processes	11.6	9.0	3.1	2.4	20.3	15.8	6.3	4.9
Agriculture	0.6	0.6	1.2	1.1	2.7	2.6	6.2	5.9
Waste management	0.3	3.6	0.2	2.4	1.1	13.1	0.7	8.3
Total	**23.1**	**2.5**	**8.9**	**1.0**	**119.1**	**12.8**	**46.4**	**5.0**

Source: Ukraine's fifth national communication.
Note: The total effect of implemented and adopted policies and measures is defined as the sum of the effect of implemented and adopted measures in different sectors.

104. JI is coordinated by NEIA and is regulated by a number of legal acts adopted during the period 2006–2010 which established a legal basis for the implementation of JI. Ukraine has in place a number of JI projects, which are at different stages of preparation and implementation. As at 1 March 2011, letters of endorsement had been issued to 207 JI

projects, letters of approval had been issued to 65 JI projects and 48 projects had been registered with the UNFCCC secretariat. These projects are relatively large-scale projects, with emission reductions ranging from 0.2 to 8.5 million t CO_2 eq for the period 2008–2012. Most of the JI projects target energy-efficiency improvement in industrial facilities, for example projects in cement production (46 projects, with expected emission reductions of 68.2 million t CO_2 eq for the period 2008–2012) and projects in fuel combustion facilities (77 projects, with expected emission reductions of 33.4 million t CO_2 eq for the period 2008–2012).

105. Examples of JI projects include the following: the installation of a new waste heat recovery system at the Alchevsk Coke Plant (with an estimated emission reduction of 11.0 million t CO_2 eq for the period 2008–2012) and the "Reduction of natural gas emissions at OJSC 'Odesagas' gate stations and gas distribution networks" project (with an estimated emission reduction of 1.9 million t CO_2 eq for the period 2008–2012). The majority of JI projects are supported by European Union countries (including Denmark, Germany, Ireland, Netherlands and United Kingdom of Great Britain and Northern Ireland) and the remaining projects are supported by Japan and Switzerland. The ERT noted that JI projects may be an important mechanism to attract foreign investment for the implementation of GHG emission reduction measures in industry.

106. With regard to participation in the international emission trading scheme, Ukraine has set up a Green Investment Scheme (GIS) that is funded from the revenue from the international emission trading of assigned amount units and aims at funding projects related to GHG emission reduction. GIS is coordinated by NEIA. It has become operational and is regulated by a number of legal acts adopted in 2008–2010. GIS covers a number of small-scale projects aimed mostly at achieving energy efficiency and energy savings in public buildings (schools, kindergartens, hospitals). As at 1 March 2011, 830 projects, with an expected annual emission reduction of 0.1 million t CO_2 eq, were under consideration by NEIA, of which about 25 per cent had already started the bidding process and implementation. So far,[12] 47 million assigned amount units have been sold to the key partners of GIS – Japan and Spain.

D. Vulnerability assessment, climate change impacts and adaptation measures

107. Ukraine, in its NC5, has provided the required information on the expected impacts of climate change on various sectors, including agriculture and food security, biodiversity and natural ecosystems, forestry, human health and water resources. This is a significant improvement compared with the NC2, in which only information on the vulnerability of and adaptation in the water and forestry sectors was reported. However, the ERT noted that Ukraine did not outline its climate change adaptation strategies to minimize the impacts of climate change or its actions taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation for several sectors, including fisheries and costal zones.

108. In the NC5, the conclusions and results of the vulnerability assessments are based on Intergovernmental Panel on Climate Change (IPCC) scenarios and also on some national scientific studies undertaken by Ukraine after the publication of the NC2. Since the NC2, the scope of studies on vulnerability has been broadened from two sectors (forestry and water) to include agriculture, human health and biodiversity, which have been assessed to

[12] Transactions under GIS were made in 2009 and 2010. More detail information is available at: <http://www.carbonunitsregistry.gov.ua/en/publication/content/679.htm>.

be the most vulnerable sectors. 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

Vulnerable area	*Examples/comments/adaptation measures reported*
Agriculture and food security	*Vulnerability*: Shortened growing season is likely to have a negative impact on Ukraine's ability to achieve food security. Number of pests and cases of diseases are expected to increase *Adaptation*: New crop strains are likely to be introduced. More studies will be carried out to determine specific adaptation measures
Biodiversity and natural ecosystems	*Vulnerability*: Expected losses of biodiversity; changes in rainfall amount and intensity and shifts in temperatures ranges are likely to have a negative impact on natural ecosystems *Adaptation*: Development of policies and strategies for biodiversity conservation, including, for example, by adhering to European Union standards on biodiversity protection and by increasing funding for preserving biodiversity
Forestry	*Vulnerability*: Changes are expected in the composition of forest species and in their productivity and resistance to pest outbreaks; the areas of forest species would move northwards. Potential increase in risk of forest fire, with a number of forest fires resulting from the arid conditions *Adaptation*: Enhancement of forest management, including disease prevention, fire protection, reforestation and afforestation
Human health	*Vulnerability*: An increase in mutations of bacteria and viruses, and an increase in cases of heart and respiratory illnesses and infections are expected *Adaptation*: Preventative measures across the public health system. A health care prevention programme has been running since 2002
Water resources	Changes are expected in the amount of water in the Dnieper River depending on the climate change scenario, possibly leading to worsen water quality, including a decrease in the quality of drinking water. Reduced snow cover *Adaptation*: Two sets of adaptation options identified: (1) if run-off from the Dnieper River decreases or (2) if it increases. The first set of measures includes the development of more stringent water regulations, sustainable drawdown, increasing the efficiency and productivity of water use and upgrading of irrigation infrastructure. The second set includes setting limits on water extraction and cultivating drought-resistant crops

109. For its NC5, Ukraine applied three IPCC scenarios to generate projections of future temperature and precipitation changes up to 2100. Temperature is expected to increase by 0.5 °C by 2020 and by 2.0–4.5 °C by the end of the century. Precipitation decreased by about 10 per cent in south-western Ukraine, while it increased by about the same amount in northern Ukraine. Ukraine has recorded a threefold increase in the number of extreme weather events, from about 50 events annually in the 1980s to about 150 events annually in the 2000s, and expects more extreme climate events that would impact on the costal zones of the Azov Sea and the Black Sea.

110. Ukraine has reported on its research programmes on climate change, including on its downscaling to regional climate modelling. Ukraine has undertaken a risk assessment based on economic and socio-economic risks and risks to the natural environment. The risk assessment was carried out and based on a survey on perceptions of climate change in 2009. The assessment identified climate change risks as a key reason for extreme weather events, the spread of pests and diseases, and negative climate change impacts on tourism, recreation, agriculture and settlements.

111. The ERT noted that work is ongoing on the National Adaptation Action Plan for Ukraine, which aims to evaluate relevant national regulatory frameworks, to consider socio-economic aspects of climate change adaptation and to elaborate on sectoral measures. The plan has been prepared by the Cabinet of Ministers of Ukraine and the implementing agencies include relevant ministries and other central executive bodies and the National Academy of Sciences. The plan is still to be approved; thus the scope of the plan and the time frame and the level of its implementation remain uncertain. The ERT encourages Ukraine to finalize the National Adaptation Action Plan and to report on the relevant progress made in its next national communication.

112. Some regions of the country are progressing more in their adaptation to climate change. For example, in the Donetsk region, the development of proposals for a regional plan for climate change mitigation and adaptation measures within the framework of the development of a regional anthropogenic emission assessment and GHG absorption programme is at its final stage. During the in-country review, Ukraine indicated the following key elements of the regional plan: the identification of new crop strains to ensure food security, and more studies to refine other potential adaptation measures; the conservation of biological diversity; the development of strategies for improving forest management; and the establishment of flood management and disaster response as well as water regulatory policies for adaptation to climate change in the water sector.

E. Research and systematic observation

113. Ukraine has provided information on its actions relating to research and systematic observation and has addressed both domestic and international activities. Ukraine has maintained the 30 stations contributing to the Global Surface Network since the NC2. International activities include, for example, participation in the World Climate Programme and the Global Climate Observing System (GCOS), including the GCOS Surface Network, the GCOS Upper Air Network, Global Atmosphere Watch and the IPCC.

114. Ukraine has a robust network of hydrometeorological stations, comprising more than 125 meteorological stations, of which eight are upper-air monitoring stations. There are more than 470 hydrology stations, including two specialized water balance stations. Data and observations from these stations are used as input to the research and modelling of future climate change.

115. Several institutions and members of the National Academy of Sciences take part in climate change research and several experts from Ukraine have contributed to the work of the IPCC, including contributions to the IPCC Fifth Assessment Report. During the in-depth review, in response to the request of the ERT, Ukraine specified implemented, ongoing and planned national and international research projects and programmes. The ERT learned that Ukraine is spending about 2 per cent of its GDP on financing scientific research and technical assistance projects, some of which are related to climate change.

116. The ERT encourages Ukraine to provide information in its next national communication on its provision of support to developing countries to establish and maintain observing systems, research and related data and monitoring systems.

F. Education, training and public awareness

117. In its NC5, Ukraine has provided information on its actions relating to education, training and public awareness. There are a number of ongoing education and public-awareness activities, including web portals and the publication of articles in newspapers. Training on topics related to climate change is provided at various levels of education (primary, secondary and higher education). The climate change related training programmes are developed by individual training institutions and overseen by NEIA.

118. During the review, Ukraine provided further details on the public consultative procedures and on the involvement of the public and non-governmental organizations (NGOs) in framing climate change policy. The NGOs are organized under the umbrella Env-NGO and Business NGO Liaison or the Public Council. During the in-country review, the ERT learned that draft documents are usually made publicly available for comment on the official governmental website, and that NGOs had a chance to participate in the preparation of the energy strategy of Ukraine until 2030.

119. The ERT noted that Ukraine continues to cooperate with Parties not included in Annex I to the Convention (non-Annex I Parties) on education and training related to climate change. Students from such Parties have an opportunity to study climate change related subjects at Ukrainian universities: for example, between 2008 and 2010, 1,250 students from 44 non-Annex I Parties undertook training in environmental studies at various academic institutions in Ukraine. The ERT encourages Ukraine to elaborate on the relevant training and capacity-building activities undertaken in support of developing country Parties in its next national communication.

G. Evaluation of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

120. Ukraine has provided most 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 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.

121. Ukraine has not reported the following elements of the supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol: a description of how it strives to minimize adverse effects under Article 2, paragraph 3, of the Kyoto Protocol; information on steps it has taken to promote and/or implement any decisions of ICAO and IMO in order to limit or reduce emissions of GHGs from international aviation and marine bunker fuels; and a description of national legislative arrangements and administrative procedures that seek to ensure that the implementation of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol (afforestation, reforestation and deforestation) contributes to the conservation of biodiversity and the sustainable use of natural resources. The ERT recommends that Ukraine include these reporting elements in its next national communication. The technical assessment of the information reported under Article 7, paragraph 2, is contained in the relevant sections of this report.

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

122. Ukraine has not reported the information requested in section H, “Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the annex to decision

15/CMP.1", as a part of its 2010 annual submission provided on 22 May 2010, but it has included some relevant information in the resubmission of the national inventory report of its 2010 annual submission, submitted on 16 August 2010. Ukraine reported that it does not take part in any of the activities identified in paragraph 24 of the annex to decision 15/CMP.1. The ERT noted that Ukraine has not reported on how it gives priority to the actions taken in implementing its commitments under Article 3, paragraph 14.

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

Supplementary information	*Reference*
National registry	NC5 chapter 3, pp. 126–137
National system	NC5 chapter 3, pp. 118–126
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	NC5 chapter 5.3, pp. 195–199
Policies and measures in accordance with Article 2	NC5 chapter 4, pp. 139–175
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	NC5 chapter 4.2, pp. 141–175
Information under Article 10	NC5 chapter 7, pp. 267–269
Financial resources[a]	Not reported

Abbreviation: NC5 = Ukraine's fifth national communication.
[a] As a country with an economy in transition, Ukraine does not have to report on the implementation of Article 11 of the Kyoto Protocol, including on the provision of new and additional financial resources.

123. During the in-country review, Ukraine provided the ERT with additional information on how it strives to implement its commitments under Article 3, paragraph 1, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention. These are the actions targeted at preventing human-induced climate change. Examples include the improvement of overall economic efficiency and the reduction of the carbon intensity per unit of GDP through economic instruments such as the regulation of the price of natural gas and electricity.

124. Ukraine also informed the ERT about its efforts to strengthen capacity in relation to climate change in developing country Parties and in the Commonwealth of Independent States through the training of their experts in the field of ecology, climatology, meteorology and energy efficiency. The training was carried out at more than 10 universities either within the framework of the university curriculum or as dedicated post-graduate courses.

125. The ERT commends Ukraine for the additional information provided during the in-country review and recommends that Ukraine improve the completeness and transparency of the reporting in its next national communication by including more information on the minimization of adverse impacts and by identifying how it prioritizes the actions taken to minimize adverse effects. The ERT encourages Ukraine to continue exploring the adverse impacts and effects of its PaMs targeted at climate change.

III. Conclusions and recommendations

126. The ERT concludes that the NC5 provides a general overview of the national climate policy of Ukraine on the date of its preparation. Information on recent developments in the national climate policy was provided during the in-country review. The information provided in the NC5 includes most of the mandatory information required by the UNFCCC reporting guidelines and most elements of the supplementary information under Article 7 of the Kyoto Protocol. During the in-country review, Ukraine provided requested additional information, including information on recent developments in relation to a database for the assessment of afforestation, deforestation and reforestation, developments in assessing HFCs from mobile air conditioning and improvements in archiving.

127. Total GHG emissions excluding LULUCF decreased by 53.9 per cent between 1990 and 2008, while total GHG emissions including LULUCF decreased by 52.2 per cent in the same period. The reduction in emissions was driven by changes that stem from the transition from a centrally planned to a market-driven economy, structural changes in the economy, with an increase in the share of services and an associated decrease in energy consumption, as well as by changes in the structure of primary energy use (reduced use of coal and increased use of natural gas). The effects of these drivers were supported by improvements in energy efficiency and related programmes.

128. Ukraine's emissions are far below its target under the Kyoto Protocol. Therefore, Ukraine does not urgently need an overarching national GHG emission reduction strategy and climate change related PaMs are mostly driven by the goals for economic efficiency and development and security of energy supply. Despite the priority given in the energy context to energy efficiency and renewable energy, there is a little evidence from monitoring and evaluation that PaMs promoting energy efficiency have resulted in sizeable energy and GHG emission savings. The vast potential for energy-efficiency improvements and enhancement of renewable energy outside large-scale hydropower is yet to be utilized.

129. Regulatory instruments (laws, regulations and standards) play a key role in Ukraine's climate change related policy. Nevertheless, there have been some initial steps taken towards consideration of economic instruments in Ukraine's climate change related policy portfolio in addition to the regulatory instruments, including recent initiatives to develop feed-in tariffs for electricity produced from renewables, tax incentives and the national ETS.

130. In the NC5, Ukraine presented GHG projections for the period 2010–2020, including three scenarios: baseline 'without measures', 'with measures' and 'with additional measures'. The projected GHG emission reductions in 2010 in relation to the base year levels under the 'without measures', 'with measures' and 'with additional measures' scenarios are lower by 55.6, 58.1, 59.1 per cent, respectively, and the projected GHG emissions reductions in 2020 are lower by 18,0, 30.7, 35.8 per cent, respectively. Thus, the projections indicate that Ukraine expects to meet its Kyoto Protocol target (which is GHG emissions stabilization at the base year levels) even under the 'without measures' scenario, and GHG emissions are not expected to exceed the country's base year level even by 2020.

131. Moreover, according to the projections, Ukraine can meet its target under the Copenhagen Accord – emission reduction by 20.0 per cent by 2020 compared with the base year level – with domestic measures only. This is with the backdrop of an expected increase by 2020 in the share of coal instead of natural gas in the structure of the primary energy supply.

132. The NC5 stated that Ukraine does not intend to make use of the Kyoto Protocol mechanisms to meet its target for the first commitment period of the Kyoto Protocol and did not elaborate on supplementarity as such. Ukraine hosts JI projects which mainly focus on energy-efficiency improvements in industry. Ukraine participates in international emission trading through GIS, which aims at using the revenue from emissions trading for funding mostly small-scale energy-efficiency projects in public buildings and landfill gas recovery for energy use.

133. The NC5 discusses the vulnerability assessment of agriculture, biodiversity, forestry, human health and water resources and climate change risk assessment; however, it does not elaborate on the corresponding adaptation actions. During the in-country review, Ukraine elaborated on potential adaptation actions and noted that the National Adaptation Action Plan, which is under preparation, will set the basis for the adaptation actions for various sectors. As the National Adaptation Action Plan has not yet been approved, the scope, time frame and level of its implementation remain uncertain.

134. The NC5 provided information on Ukraine's actions related to education, training and public awareness. The ERT commends Ukraine's continuous efforts to cooperate with developing country Parties on training on climate change. With regard to research and systematic observation, Ukraine maintains a network of hydrometeorological stations and contributes to the work of the IPCC on climate change.

135. The ERT notes the conclusion of the ARR 2010, that Ukraine's national system is not performing its required functions as set out in decision 19/CMP.1 and that at the time of the preparation and publication of this report the question of the implementation of the national system of Ukraine identified in the ARR 2010 remained unresolved.

136. The ERT concluded that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol. The ERT noted that updates of databases and applications, implemented security measures and changes to the national registry software are documented on a regular basis by nominated responsible persons.

137. Supplementary information under Article 7, paragraph 1, of the Kyoto Protocol on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol was provided by Ukraine in its 2010 annual submission (resubmission of 16 August 2010) under Article 7, paragraph 1, of the Kyoto Protocol. During the in-country review, Ukraine provided further relevant information.

138. In the course of the IDR, the ERT formulated several recommendations relating to the completeness and transparency of Ukraine's reporting under the Convention and its Kyoto Protocol. The key recommendations[13] are that Ukraine:

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

(i) Information on PaMs, such as objective, type of policy or measure, status of implementation and implementing entity;

(ii) Information on PaMs targeted at the reduction of F-gases;

(iii) Information on how its PaMs are modifying longer-term trends in GHG emissions and removals;

(iv) The total effect of its PaMs;

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

(v) Emission projections related to fuel sold to ships and aircraft engaged in international transport;

(vi) Description of the steps that it has taken to promote and/or implement any decisions of ICAO and IMO in order to limit or reduce emissions of GHGs from international aviation and marine bunker fuels;

(vii) Information on national legislative arrangements and administrative procedures that seek to ensure that the implementation of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol contributes to the conservation of biodiversity and the sustainable use of natural resources;

(viii) Reporting on information under Article 2, paragraph 3, of the Kyoto Protocol and on how it strives to implement PaMs in such a way as to minimize adverse effects, including the adverse effects of climate change and social, environmental and economic impacts, on other Parties, especially developing country Parties, and effects on international trade.

(b) Improve the transparency of its reporting by:

(i) Providing a clear description of the national system;

(ii) Providing more detailed information on the status of the implementation of PaMs and their effect actually achieved, on the monitoring and evaluation of the implementation of its PaMs and the entities responsible for monitoring and on the approach taken to distinguish between adopted and implemented measures and additional measures;

(iii) Providing more detailed and clear information on the assumptions and methodologies used to develop projections for all sectors;

(c) Improve the transparency and completeness of reporting by including in its next annual submission information on the actions taken to implement its commitments under Article 3, paragraph 14, of the Kyoto Protocol regarding the minimization of the adverse impacts of response measures to climate change.

139. The ERT encourages Ukraine to undertake a number of improvements regarding the transparency and completeness of its reporting. The most important of these are that the Party:

(a) Provide information on the effects of individual PaMs and their costs;

(b) Provide more detailed information on its PaMs in the building sector, its PaMs aimed at reducing F-gases and its PaMs that increase GHG emissions;

(c) Elaborate on the scenario definitions for GHG projections.

IV. Questions of implementation

140. During the review, the ERT assessed the NC5, including supplementary information provided under Article 7, paragraph 2, of the Kyoto Protocol, and reviewed information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol with regard to timeliness, completeness and transparency. No question of implementation was raised by the ERT during the review.

141. At the time of the preparation and publication of this report the question of implementation on the national system identified in the ARR 2010 remained unresolved.

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 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. Available at < http://unfccc.int/resource/docs/2011/sbi/eng/inf01.pdf>.

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2010 greenhouse gas inventory submission of Ukraine. Available at <http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php>.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Oleksii Khabatiuk (National Environmental Investment Agency of Ukraine), Tetyana Gerasymenko and Nadiya Ovchynnikova (Ministry of Ecology and Natural Resources of Ukraine), Bogdan Assaul, Mykhailo Chyzhenko, Bogdan Glazkov, Oleksandr Kolisnyk and Anatoliy Shmurak (National Environmental Investment Agency), Vyacheslav Didkivskiy (Ministry of Infrastructure of Ukraine), Olena Minitska (State Agency of Ukraine for Management of State Corporate Rights and Property), Tetyana Rakhimova (Ministry of Health of Ukraine), Tetyana Chornous (Ministry for Regional Development, Building and Housing of Ukraine), Glib Strygunenko, Pavlo Kuzhel (Ministry of Energy and Coal Industry of Ukraine), Viktor Tymoshchuk (Ministry of Agricultural Policy and Food of Ukraine), Viktor Korniyenko and Lyubov Polyakova (State Forest Resources Agency of Ukraine), Sergii Vasyliev (State Agency of Water Resources of Ukraine), Andrii Volkov (Ministry of Economic Development and Trade of Ukraine), Nataliya Guseva (State Statistics Service of Ukraine), Maryna Bereznytska, Oksana Butrym, Olga Khabatyuk, Georgii Panchenko, Yurii Pyrozhenko and Sergiy Skybyk (Environmental (Green) Investments Fund), Igor Buksha and Volodymyr Pasternak (Ukrainian Research Institute of Forestry and Forest Melioration named after G.N. Vysotsky), Igor Burakovsky and Vitalii Kravchuk (Institute for Economic Research and Policy Consulting), Andriy Konechenkov (Ukrainian Wind Energy Association), Oleksii Dybkov (Ecosoft XXI), Volodymyr Rakhno (State Enterprise Center for Alternative Fuels), Valentyna Babichenko, Vira Balabukh, Igor Budak, Galyna Diukel, Vitalii Dmytrenko, Natalia Gnatiuk, Svitlana Krakovska, Oleksii Kryvobok, Alla Krukivska, Gennadiy Laptev, Iurii Nabyvanets, Natalia Nikolayeva, Volodymyr Osadchiy, Liudmyla Palamarchuk, Iryna Shedemenko, Vitalii Shpyg, Mykhailo Susidko and Vladyslav Tymofeyev (Ukrainian Hydrometeorological Institute), including additional material on updated policies and measures, assumptions used for greenhouse gas projections, the national registry and recent climate policy developments in Ukraine.