



Report of the centralized in-depth review of the second national communication of Ukraine

Note by the secretariat

The report of the centralized in-depth review of the second national communication of Ukraine was published on 23 September 2009. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decision 4/CMP.4), the report is considered received by the secretariat on the same date. This report, FCCC/IDR.2/UKR, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.



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**Report of the centralized in-depth review of
the second national communication of Ukraine**

According to decision 4/CP.8, Parties included in Annex I to the Convention are requested to submit to the secretariat, in accordance with Article 12, paragraphs 1 and 2, of the Convention, a fourth national communication by 1 January 2006, and those that have not submitted their first, second or third national communication are urged to do so as soon as possible. This report presents the results of the in-depth review of the second national communication of Ukraine conducted by an expert review team in accordance with relevant provisions of the Convention and Article 8 of the Kyoto Protocol.

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I. Introduction and summary

A. Introduction

1. Ukraine has been a Party to the Convention since 1997 and to its Kyoto Protocol since 2004. Under the Kyoto Protocol, Ukraine committed itself to keeping its greenhouse gas (GHG) emissions at the 1990 level during the first commitment period from 2008 to 2012.
2. This report covers the centralized in-depth review (IDR) of the second national communication (NC2) of Ukraine, coordinated by the UNFCCC secretariat, in accordance with decision 7/CP.11. The review took place from 11 to 16 May 2009 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: Ms. Amrita Narayan Achanta (India); Mr. Matjaz Cesen (Slovenia); Mr. Eric Debrabanter (Luxembourg); Ms. Svetlana Dolgikh (Kazakhstan); Mr. Gebru J. Endalew (Ethiopia); Ms. Diana Harutyunyan (Armenia); Ms. Agnieszka Janowska (European Community); Ms. Asta Mikalauskiene (Lithuania); Ms. Valia Peeva (Energy Charter); and Mr. Janis Rekis (Latvia). Ms. Achanta and Ms. Peeva 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 part of the NC2. The ERT also evaluated the information contained in Ukraine's report demonstrating progress (RDP) in achieving its commitments under the Kyoto Protocol, and the supplementary information provided by Ukraine under Article 7, paragraph 2, of the Kyoto Protocol.
4. In accordance with the guidelines for review under Article 8 of the Kyoto Protocol (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 NC2 complies broadly 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 decisions 22/CP.7 and 25/CP.8, the RDP provides information on the progress made by the Party in achieving its commitments under the Kyoto Protocol. Supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol¹ is provided in both the NC2 and the RDP.

1. Completeness

6. The ERT noted that the NC2 covers all sections required by the UNFCCC reporting guidelines. The ERT also noted that Ukraine's RDP contains most of the parts stipulated by decisions 22/CP.7 and 25/CP.8. Furthermore, Ukraine has provided the supplementary information required under Article 7, paragraph 2, except for the information required under Article 2 on international aviation and marine bunker fuels.

2. Timeliness

7. The NC2 was submitted on 27 June 2006 and the RDP on 3 November 2006. Decision 4/CP.8 requested Parties to submit their fourth national communication by 1 January 2006, and those that had not submitted their first, second or third national communication were urged to do so as soon as possible; decision 22/CP.7 set the same date for Parties to submit their RDP.

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

3. Transparency

8. The ERT acknowledged that Ukraine's NC2 is concise and well structured, following the outline contained in the annex to the UNFCCC reporting guidelines. However, the ERT noted that the NC2 does not provide clear information on all aspects of implementation of the Convention. In the course of the review, the ERT formulated a number of recommendations that could help the Party to further increase the transparency of its reporting, such as a recommendation to provide complete and transparent information on the mitigation effect of individual policies and measures (PaMs) being implemented or planned under different programmes. The ERT noted that the information contained in the NC2 is generally consistent with that contained in the RDP.

II. Technical assessment of the reviewed elements

A. National circumstances relevant to greenhouse gas emissions and removals

9. In its NC2, Ukraine has provided a description of its national circumstances, and of how these circumstances and changes in them affect GHG emissions and removals over time. The main drivers of emission trends in Ukraine are its transition from a central planned economy to a market economy, changes in the pattern of primary energy use and the structure of the manufacturing industry, and demographic changes. The ERT noted that more information on the changes in the pattern of primary energy use and in power generation over time would be useful to better understand the market and policy drivers behind the emission trends. Table 1 illustrates the national circumstances of the country by providing some indicators relevant to GHG emissions and removals for 1990–2006.

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

	1990	1995	2000	2006	Change 1990–2000 (%)	Change 2000–2006 (%)	Change 1990–2006 (%)
Population (million)	51.9	51.5	49.2	46.8	-5.2	-4.9	-9.8
GDP (2000 USD billion using PPP)	456.9	219.3	198.5	307.6	-56.6	55.0	-32.7
TPES (Mtoe)	253.8	164.0	134.1	137.4	-47.2	2.5	-45.9
GDP per capita (2000 USD thousand using PPP)	8.8	4.3	4.0	6.6	-54.2	62.9	-25.3
TPES per capita (toe)	4.9	3.2	2.7	2.9	-44.3	7.7	-40.0
GHG emissions without LULUCF (Tg CO ₂ eq)	926.0	522.0	389.7	436.8	-57.9	12.1	-52.8
GHG emissions with LULUCF (Tg CO ₂ eq)	852.9	467.1	338.1	401.5	-60.4	18.8	-52.9
CO ₂ emissions per capita (Mg)	13.8	7.6	5.9	7.2	-57.4	23.2	-47.5
CO ₂ emissions per GDP unit (kg per 2000 USD using PPP)	1.6	1.8	1.5	1.1	-7.0	-24.4	-29.7
GHG emissions per capita (Mg CO ₂ eq)	17.8	10.1	7.9	9.3	-55.6	17.8	-47.7
GHG emissions per GDP unit (kg CO ₂ eq per 2000 USD using PPP)	2.0	2.4	2.0	1.4	-3.1	-27.7	-29.9

Data sources: (1) GHG emissions data: Ukraine's 2009 greenhouse gas inventory submission; (2) Population, GDP and TPES data: International Energy Agency.

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.

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.

10. In general, economic development in Ukraine in the 1990s was characterized by the transition to a market economy. This led to a decline of more than 50 per cent in gross domestic product (GDP) between 1990 and 2000. However, from 2000 onwards, the economy began to recover and by 2006 GDP had reached 67 per cent of its 1990 level. The level of power consumption has been also growing and in 2004 it was 10 per cent higher than in 2000. The energy intensity of the economy has been steadily decreasing (in 2006 it constituted only 71 per cent of the level in 1990).

11. The fall in the energy and emission intensity of the economy stems from the shifts in the pattern of primary fuel use and changes in the structure of the manufacturing industry, which has seen a reduction in emissions from the more energy-intensive sectors (such as iron and steel) and an increase in emissions from the service and construction sectors. The share of nuclear energy in the energy generation mix doubled between 1990 and 2004, while the shares of natural gas and coal decreased. Of all power generated in Ukraine in 2004, nuclear power contributed 48.0 per cent, energy generated by thermal power plants 45.5 per cent, and energy generated by hydropower stations 6.5 per cent. There are no data provided in the NC2 on the use of other renewable energy sources (RES) or the ratio of exported power to imported power.

12. Ukraine has provided a summary of information on GHG emission trends for the period 1990–2004. This information is broadly consistent with the 2009 national GHG inventory submission. Summary tables, however, including trend tables for emissions in carbon dioxide equivalent (CO₂ eq) (given in the common reporting format), are not provided as an annex to the NC2, despite this being a requirement of the UNFCCC reporting guidelines.

13. Total GHG emissions excluding emissions and removals from land use, land-use change and forestry (LULUCF) decreased by 52.9 per cent between 1990 and 2007 (see table 2). A major part of this decrease was experienced between 1990 and 2000 (during this period, emissions of CO₂ fell by 59.6 per cent, methane (CH₄) by 48.9 per cent and nitrous oxide (N₂O) by 60.7 per cent). Net GHG emissions and removals from LULUCF decreased by 40.6 per cent between 1990 and 2007, while emissions from the waste sector increased by 12.5 per cent. Emissions of fluorinated gases accounted for 0.02 per cent of total GHG emissions in 1990 and 0.04 per cent in 2007. Table 2 provides an overview of GHG emissions by sector from the base year to 2007 (see also discussion of sectoral trends in chapter II B).

Table 2. Greenhouse gas emissions by sector in Ukraine, 1990–2007

	GHG emissions (Tg CO ₂ eq)						Change (%)		Shares ^a by sector (%)	
	1990	1995	2000	2005	2006	2007	1990–2007	2006–2007	1990	2007
1. Energy	685.5	387.8	271.7	294.4	306.2	299.7	-56.3	-2.1	74.0	68.7
A1. Energy industries	272.0	NA	98.1	102.2	111.5	111.6	-59.0	0.1	29.4	25.6
A2. Manufacturing industries and construction	143.9	NA	42.9	49.3	49.3	48.7	-66.1	-1.1	15.5	11.2
A3. Transport	87.7	NA	34.4	42.7	43.7	44.5	-49.3	1.7	9.5	10.2
A4.–A5. Other	95.1	334.0	43.0	47.7	48.8	43.5	-54.3	-10.8	10.3	10.0
B. Fugitive emissions	86.8	53.8	53.3	52.5	53.0	51.5	-40.7	-2.8	9.4	11.8
2. Industrial processes	128.0	59.9	75.0	83.7	90.6	97.7	-23.7	7.8	13.8	22.4
3. Solvent and other product use	0.4	0.4	0.4	0.3	0.3	0.3	-10.7	-0.6	0.0	0.1
4. Agriculture	103.8	65.4	34.0	29.9	30.2	28.8	-72.3	-4.7	11.2	6.6
5. LULUCF	-73.1	-54.9	-51.6	-34.9	-35.2	-43.5	-40.6	23.3	-7.9	-10.0
6. Waste	8.4	8.5	8.7	9.3	9.4	9.5	12.5	0.9	0.9	2.2
7. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GHG total with LULUCF	852.9	467.1	338.1	382.7	401.5	392.5	-54.0	-2.2	92.1	90.0
GHG total without LULUCF	926.0	522.0	389.7	417.5	436.8	436.0	-52.9	-0.2	100.0	100.0

Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.

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.

^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.

14. The ERT encourages Ukraine to provide more information on national circumstances in its next national communication, including detailed information on structural changes in power generation (split by primary fuel use), on developments in the transportation sector, and on trends of heat energy consumption in residential and commercial buildings. During the review, Ukraine explained the reasons

for the reduction in GHG emissions from the agriculture sector. The ERT also encourages Ukraine to report on these drivers, and on the drivers for the increase in emissions from the waste sector, in its next national communication.

B. Policies and measures

15. As required by the UNFCCC reporting guidelines, Ukraine has provided in its NC2 generally well-organized information on its package of PaMs implemented, adopted and planned in order to fulfil its commitments under the Convention and the Kyoto Protocol. Each sector has its own textual description of the principal PaMs. However, the ERT noted that Ukraine did not provide the following reporting elements required by the UNFCCC reporting guidelines: information on PaMs adopted to implement commitments under Article 4, paragraph 2(a) and (b), of the Convention organized by sector, subdivided by gas; summary tables on PaMs by sector; and consistent presentation of each PaM, including information on each of the following subject headings: the GHG affected; type or types of policy or measure; status of implementation for some of the measures; and implementing entity or entities. During the review, in response to a request made by the ERT, Ukraine provided some additional information on updated PaMs.

16. Ukraine has provided information about the energy saving potential and emission reduction effects of energy efficiency and renewable energy measures in different sectors. Ukraine also elaborated on how those PaMs are modifying longer-term trends in GHG emissions. However, despite the information provided, it was not fully clear to the ERT how cross-cutting measures are linked to the specific PaMs presented in the relevant chapters of the NC2. The ERT was unable to review the mitigation impacts of individual PaMs currently being implemented or planned. The ERT encourages Ukraine to provide complete and clear information on the mitigation effects of individual PaMs in its next national communication. Table 3 provides a summary of the reported information on the PaMs of Ukraine.

1. Policy framework and cross-sectoral measures

17. The Ministry of Environmental Protection of Ukraine is the national coordinator for the fulfilment of Convention and Kyoto Protocol commitments, including preparation of national and subnational plans on climate change mitigation; preparation and submission of annual GHG inventories; operation of the national GHG registry; and implementation of joint implementation (JI) mechanisms. A special inter-agency commission composed of representatives of key ministries was set up in 1999 to coordinate activities of state bodies on strategic issues related to the implementation of the provisions of the Convention and the Kyoto Protocol. In 2006, the National Agency of Ecological Investment was established, with responsibilities for inventory planning, preparation and management, and for the functioning of the national GHG registry. The National Agency of Ukraine for Efficient Energy Use, established in 2005, is responsible for implementation of the state policy on energy efficiency.

18. The national plan for the implementation of the Kyoto Protocol was adopted in 2005. This included: establishing the regulatory, institutional and procedural basis for participation in Kyoto Protocol mechanisms, including creating a national inventory system, a national GHG registry and infrastructure for JI projects; preparation of national communications; development of a national GHG emissions trading system; development of national and subnational plans for climate change mitigation; and development of a database of environmentally sound technologies. Procedures for review, approval and implementation of JI projects and the rules for the national system for GHG inventory preparation were also adopted. During the review, Ukraine informed the ERT that the national plan for the implementation of the Kyoto Protocol has not been fully implemented owing to lack of sufficient financing. On 5 March 2009, the Cabinet of Ministers of Ukraine adopted the revised national plan for the implementation of the Kyoto Protocol, which includes a revised time frame.

Table 3. Summary of information on policies and measures

Major policies and measures	Examples/comments
Framework policies and cross-sectoral measures	
Integrated climate programme	National plan for the implementation of the Kyoto Protocol (2005)
Policies and measures by sector	
Energy	
Building regulations	State programme for the reform and development of the residential/communal sector for 2004–2010 (2004); law on heat supply (2005)
Renewable energy sources	Law on alternative energy sources (2003); state programme for the support of non-traditional and renewable energy sources and small hydro and thermal generation (1997); amendment of some laws aimed at stimulating the development of wind energy in Ukraine (2000); decree on the construction of wind power plants (1996); decree on the complex programme of construction of wind power plants (1997)
Energy efficiency improvements	Comprehensive state programme on energy conservation (1996); additional measures and adjusted performance indicators for the comprehensive state programme on energy conservation (2000); law on energy conservation (1994); law on combined heat and power generation (2004)
Other	The energy strategy of Ukraine for the period until 2030 (2006); programme for rehabilitation of thermal power plants (2002); national energy programme for the period until 2010 (1996); law on alternative types of liquid and gaseous fuels (2003); programme for the reduction of natural gas consumption (1997)
Transport	
	Various measures implemented through the Ministry of Transport; plan for implementation of the principal governmental environmental protection policy in the transport sector for 2005–2010 (2004)
Industrial processes	
	Concept document of the state industrial policy (2003); state programme for industrial development for 2003–2011 (2003); law on innovation (2002); law on priorities for innovations in Ukraine (2003); comprehensive national programme on energy conservation (1997)
Forestry	
	State programme for forests for 2002–2015 (2002)
Waste management	
	State programme for the management of municipal solid waste (2004)

19. The ERT noted that Ukraine puts emphasis on flexible mechanisms as a possible means to modernize its economy through increased investments and to raise the level of national production through more efficient use of energy resources. Additional information provided during the review indicated that many technical mitigation measures are currently planned in Ukraine under the framework of a green investment scheme and JI.

20. The energy strategy of Ukraine for the period until 2030 was used as a basis for reporting on the sectoral PaMs presented in the NC2. When fully implemented, this strategy was expected to result in an annual reduction in energy consumption and related emission reductions of 318 Mt CO₂ eq. However, according to additional information provided by the Party in response to a request made by the ERT during the review, the expected results have not yet been achieved, owing to insufficient financing. Consequently, it is foreseen that changes will be made to this strategic document.

21. The ERT noted that Ukraine's PaMs target sectors with the highest potential for GHG emission reductions, such as energy efficiency PaMs in energy industries and industrial processes.

2. Policies and measures in the energy sector

22. Between 1990 and 2007, GHG emissions from the energy sector decreased by 56.3 per cent, mainly driven by the economic recession in the 1990s and the accompanying decrease in primary energy consumption. The trend in GHG emissions from fuel combustion showed notable decreases in all sectors: 59.0 per cent in energy industries, 66.1 per cent in manufacturing industries and construction, and 49.3 per cent in transport. After 2000, when the economy began to recover, emissions stabilized and even rose, increasing by 12.1 per cent (without LULUCF) overall between 2000 and 2007. However, the

increase in primary energy consumption during the same period was only 2.5 per cent, and the ERT could not find any rational explanation for this difference in trends.

23. **Energy supply.** As one of the most energy-intensive economies in the world with a strong dependence on energy imports, Ukraine makes energy efficiency a priority in its energy and climate change policies. Following the law on energy conservation in 1994 and the comprehensive state programme on energy conservation (1996) and its amendment in 2000, energy efficiency policy is highlighted as a priority in the latest strategic document on energy – the energy strategy of Ukraine for the period until 2030. Funding for implementation of energy efficiency measures is provided by the state and local government budgets, by enterprise and through foreign investment.

24. In order to promote the use of new technologies and equipment and improve efficiency in energy production, Ukraine has adopted a number of specific regulations and programmes: the programme for the reduction of natural gas consumption (1997), the programme for rehabilitation of thermal power plants (2002) and the law on heat supply (2005). Ukraine's state programme for the support of non-traditional and renewable energy sources and small hydro and thermal generation (1997) aims to replace 8–10 per cent of electricity consumed in the country that is generated from fossil fuels with electricity generated from RES. The NC2 reports on efforts to promote and support wind energy.

25. Implementation of measures that reduce energy consumption and correspondingly lower GHG emissions in industry is based on laws and regulations such as: the concept document of the state industrial policy, the state programme for industry development for 2003–2011, the law on innovation and the law on priorities for innovations in Ukraine. Although some information about the expected effects of these PaMs is presented in the NC2, the ERT encourages Ukraine to report in more detail on their status of implementation and the GHG reductions achieved so far, in its next national communication.

26. **Energy demand.** Considerable potential for energy savings and emission reductions is identified in Ukraine's residential and commercial sector. The state programme for the reform and development of the residential/communal sector for 2004–2010 and the law on heat supply both involve a number of measures in heat supply and consumption systems and construction, and are expected to result in more efficient energy consumption.

27. **Transport.** Since 1990, the share of GHG emissions from transport in total GHG emissions has increased slightly (from 9.5 per cent to 10.2 per cent); however, in absolute figures, transport emissions have decreased substantially (by 43.2 Tg CO₂ eq). Ukraine has adopted a plan for implementation of the key elements of the national environmental protection policy in the transport sector for 2005–2010. This plan envisages an introduction of energy saving technologies and measures in road and railway transportation. The ERT encourages Ukraine to provide more information on the transport sector and on the status of implementation and emission reduction potential of the measures planned, in its next national communication.

28. The ERT noted the efforts of Ukraine to develop a number of PaMs targeted at energy efficiency and RES and encourages Ukraine to provide more comprehensive information about the GHG reductions achieved by individual PaMs, in its next national communication. Considering the priority given to the PaMs targeted at energy efficiency, Ukraine may wish to provide details of enhanced coordination between the institutions implementing PaMs targeting climate change and energy efficiency.

3. Policies and measures in other sectors

29. Between 1990 and 2007, GHG emissions from industrial processes (including solvent and other product use), agriculture and waste (excluding LULUCF) decreased by 43.4 per cent, mainly driven by a decrease in emissions from industrial processes and agriculture. The observed decrease in emissions in

these two sectors was partly offset by an increase in emissions from the waste sector. The ERT noted that the NC2 contains a description of PaMs in all non-energy sectors, except for those in the agriculture sector.

30. **Industrial processes.** In 1990–2007, GHG emissions from industrial processes decreased by 23.7 per cent. Improving the efficiency of fuel and energy use is a priority for the development of Ukrainian industry; the strategic documents that provide a basis for the improvements are mentioned in paragraph 25 above. No quantitative estimate of the impacts of individual PaMs in industrial processes was reported in the NC2.

31. **Agriculture.** GHG emissions from agriculture decreased by 72.3 per cent between 1990 and 2007. Very limited information is provided by Ukraine on the drivers for such a dramatic decrease. The ERT noted that the NC2 does not contain a detailed description of the PaMs in the agriculture sector, although some measures are described in the RDP. In response to a request made by the ERT during the review, Ukraine provided additional information, explaining that the decrease in emissions from the agricultural sector was caused only by a dramatic fall in production and that no specific mitigation PaMs were implemented in that time. The ERT recommends that Ukraine provide an explanation for the trend in GHG emissions from the agriculture sector in its next national communication.

32. **Forestry.** One of the key documents for the forestry sector is the state programme for forests for 2002–2015, adopted in 2002. The programme envisages an increase in forest area of 0.5 per cent (0.5 million ha) and an increase in total wood stock of 16.7 per cent between 2002 and 2015. The programme also includes a provision for the protection of biodiversity in forests.

33. **Waste.** CH₄ emissions from municipal solid waste (MSW) landfills dominate emissions in the waste sector. The amount of MSW disposed in landfill sites increased from 26 million m³ to 43 million m³ between 1990 and 2004, while Ukraine's population decreased from 50.1 million to 47.3 million people in the same period. A state programme for the management of MSW was launched in 2004 for the 2005–2011 period. The total financing of this programme amounts to USD 295,300, of which USD 265,100 will be allocated from the state budget and USD 30,200 will come from the National Fund for Environmental Protection.

C. Projections and the total effect of policies and measures

1. Projections

34. Ukraine's NC2 provides three 'with measures' scenarios of GHG emissions until 2030. The first 'baseline with measures' scenario is derived from Ukraine's 'baseline' scenario of economic development. The other two 'with measures' scenarios, labelled 'pessimistic' and 'optimistic', reflect different sets of assumptions concerning macroeconomic development and possible corresponding pathways of GHG emissions. In its NC2, Ukraine states that in 2010, under the 'baseline with measures' scenario, GHG emissions will reach 482.3 Tg CO₂ eq (47.6 per cent below the base year level). This scenario will be referred to again later in this document.

35. Ukraine's RDP provides two additional scenarios. The first, 'without measures' until 2020, is also derived from Ukraine's 'baseline' scenario of economic development. The RDP includes projections for energy, industrial processes, solvent and other product use, agriculture and waste, in an aggregated format for each sector for 2010, 2015, 2020, 2025 and 2030. The second scenario provided in the RDP is a 'with additional measures' scenario, which includes JI as the additional measures (the envisaged effect of the JI projects is an emission reduction of 36 Tg CO₂ eq in 2010).

36. The ERT noted that Ukraine did not provide the following reporting elements required by the UNFCCC reporting guidelines: projections for LULUCF; projections presented on a gas-by-gas basis for

all GHGs (CO₂, CH₄, N₂O, perfluorocarbons (PFCs), hydrofluorocarbons (HFCs) and sulphur hexafluoride (SF₆) (treating PFCs and HFCs collectively in each case)); and projections of emissions related to fuel sold to ships and aircraft engaged in international transport. Table 4 and the figure below provide a summary of GHG emission projections for Ukraine.

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 (%)
Inventory data 1990 ^a	926.0	0.6
Inventory data 2007 ^a	436.0	-52.9
Kyoto Protocol base year ^b	920.8	NA
Kyoto Protocol target ^b	920.8	0.0
'Without measures' projections for 2010 ^c	630.0	-31.6
'With measures' projections for 2010 ^d	482.3	-47.6

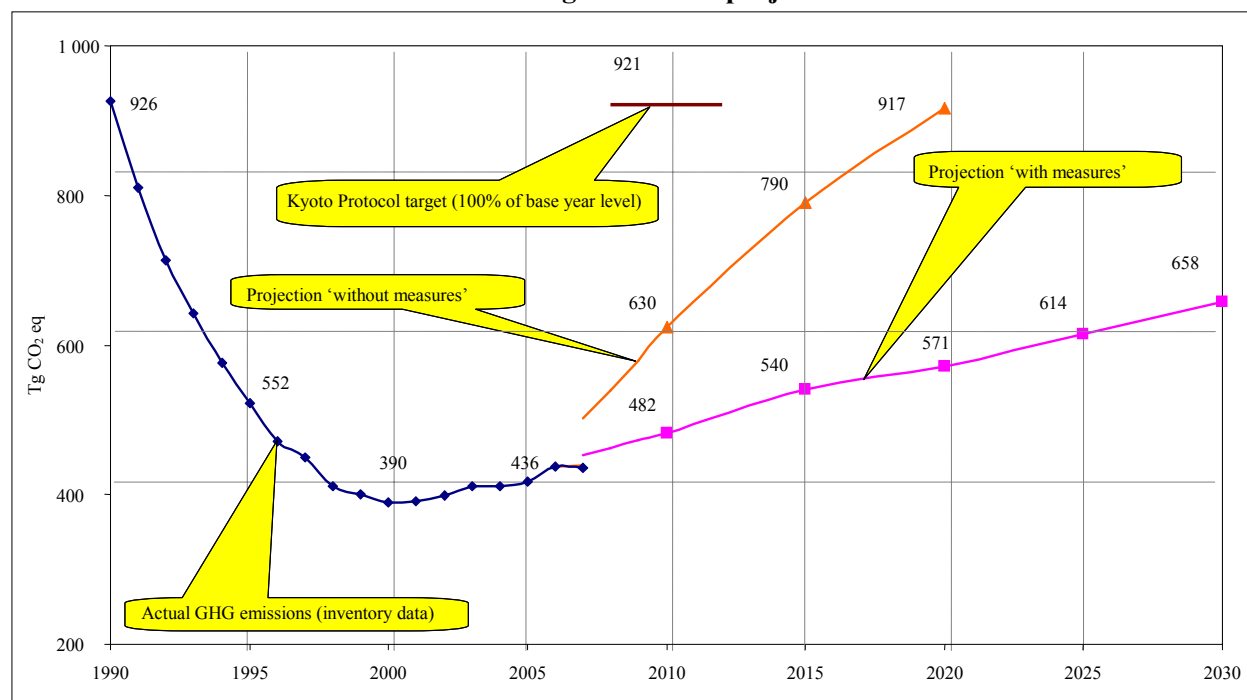
^a *Data source:* Ukraine's 2009 greenhouse gas inventory submission; the emissions are without land use, land-use change and forestry.

^b Based on the initial review report contained in document FCCC/IRR/2007/UKR.

^c *Data source:* Ukraine's report on demonstrable progress under the Kyoto Protocol.

^d *Data source:* Ukraine's second national communication.

Greenhouse gas emission projections



Data sources: (1) Data for the years 1990–2007: Ukraine's 2009 greenhouse gas inventory submission; the emissions are without land use, land-use change and forestry. (2) Data for the years 2008–2030: 'with measures' – Ukraine's second national communication; 'without measures' – Ukraine's report on demonstrable progress under the Kyoto Protocol; the emissions are without land use, land-use change and forestry.

37. In its RDP, Ukraine reported effects of the PaMs in tabular format and projections of GHG emissions in graphical format only, without indicating the exact figures behind the graph. Therefore, the ERT reconstructed the 'without measures' projection based on the estimated effects of PaMs and using the 'with measures' scenario indicated in the RDP. Based on the estimates of an emission reduction from energy efficiency improvements of 116.6 Tg CO₂ eq in 2010 and an emission reduction from the use of

alternative and renewable energy sources of 31.1 Tg CO₂ eq in 2010, the ERT estimated that emissions in 2010 according to ‘without measures scenario’ will be 630 Tg CO₂ eq which is well below the Kyoto Protocol target.

38. According to the RDP, GHG emissions under the ‘without measures’ scenario in 2010 would be 31.6 per cent lower than the base year level (which is also Ukraine’s Kyoto Protocol target). Under the ‘baseline with measures’ scenario presented in the NC2, GHG emissions would be 47.6 per cent lower than the base year level in 2010. Even according to the optimistic macroeconomic development ‘with measures’ scenario, which assumes relatively high economic growth, Ukraine will remain well below the GHG emission level of 1990 by 2030.

39. Projections of energy-related CO₂ emissions are based on the energy strategy of Ukraine for the period until 2030. The strategy includes a macroeconomic forecast and a corresponding forecast for primary energy consumption, which provide a base for preparing emission projections. The NC2 gives a good insight into the macroeconomic indicators used in the scenarios, summarizing them in several tables and listing primary energy consumption by fuel for all three ‘with measures’ scenarios. The ERT noted that limited detail on the methodology used was provided.

40. During the review, Ukraine explained that up-to-date official GHG emission projections are under preparation within the framework of the Ukraine Carbon Market Programme financed by the European Bank for Reconstruction and Development. The up-to-date GHG emission projections are expected to be included in the next national communication.

2. Total effect of policies and measures

41. In the RDP, Ukraine presents an estimate of the total effect of its PaMs in the energy sector, in accordance with the ‘with measures’ definition, compared with a situation without such PaMs. Reductions are presented in terms of GHG emissions avoided (on a CO₂ eq basis) in 2010, 2015 and 2020. However, Ukraine did not provide the estimated and expected total effect of implemented and adopted PaMs in non-energy sectors; nor did it provide an estimate of the total effect of its PaMs, in accordance with the ‘with measures’ definition, compared with a situation without such PaMs, presented in terms of GHG emissions avoided or sequestered, by gas (on a CO₂ eq basis), in 1995 and 2000. These are both reporting elements required by the UNFCCC reporting guidelines. Table 5 provides an overview of the total effect of PaMs as reported by Ukraine.

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

Sector	Effect of implemented and adopted measures (Tg CO₂ eq)	Relative value (% of base year emissions)	Effect of planned measures (Tg CO₂ eq)	Relative value (% of base year emissions)
Energy				
Energy efficiency improvements	116.6	12.7	NA	-
Alternative and renewable energy use	31.1	3.4	NA	-
Total	147.7	16.0	NA	-

Data source: Ukraine’s report on demonstrable progress under the Kyoto Protocol.

Note: The total effect of implemented and adopted policies and measures is defined as the difference between the ‘without measures’ and ‘with measures’ scenarios; the total effect of planned policies and measures is defined as the difference between the ‘with measures’ and ‘with additional measures’ scenarios.

42. As shown in table 5, the total effect of PaMs actually implemented in the energy sector is expected to be 147.7 Tg CO₂ eq in 2010. An additional effect of 36 Tg CO₂ eq is expected to be achieved through implementation of JI projects.

43. The ERT recommends that Ukraine provide the following elements in its next national communication: the total effect of PaMs under the ‘with measures’ scenario for all sectors, as well as their actual effect in the years 1995 and 2000 on a gas-by-gas basis; projections of net emissions and removals from the LULUCF sector; and projections for emissions from fuels sold to ships and aircraft engaged in international transport. In addition, the ERT encourages Ukraine to provide more detailed information on the methodologies and assumptions used for its projections of non-energy-related GHG emissions.

D. Vulnerability assessment, climate change impacts and adaptation measures

44. In its NC2, Ukraine has provided the required information on the expected impacts of climate change in the country and on adaptation options in two areas: the forestry sector and water resources. Table 6 summarizes the information on vulnerability and adaptation to climate change presented in the NC2.

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

Vulnerable area	Examples/comments/adaptation measures reported
Forestry	<p>Vulnerability: Changes are expected in the composition of forest species, their productivity and their resistance to pests and outbreaks; the boundaries between the areas of distribution of forest species would move northwards</p> <p>Adaptation: Improvements in forest management are being carried out, including improvements in disease prevention, fire protection, reforestation and afforestation</p>
Water resources	<p>Vulnerability: Changes in the stream flow of the Dnieper river depending on the climate change scenario, possibly leading to a decrease in drinking water quality</p> <p>Adaptation: Two sets of adaptation options are identified. The first set would apply if run-off from the Dnieper decreases, and would involve improvements to water regulations. The second set would apply if run-off from the Dnieper increases, and would include setting limits on water extraction and sustainable drawdown, increasing the efficiency and productivity of water use, upgrading irrigation infrastructure, and cultivating drought-resistant crops</p>

45. The NC2 reported that the average annual temperature in the country has increased by about 0.4 °C in 100 years. Annual precipitation is likely to increase in south-east Ukraine (a zone of low humidity) and decrease in the north-west (a zone of high humidity). Ukraine has also provided information on changes in the water resources of the main river basin (Dnieper). There is large uncertainty over the impact of climate change on the run-off of this river. For this reason, Ukraine presents two sets of adaptation options: one in case of decrease in run-off and the other in case of increase (see table 6).

46. The NC2 identifies four areas vulnerable to climate change: agriculture, the LULUCF sector, water resources and coastal zones. However, Ukraine has provided information on the expected impacts of climate change and adaptation options for only two of those areas: forestry and water resources. The ERT recommends that Ukraine assess all areas that are vulnerable to climate change in future and encourages the Party to consider using some of the dynamic models (global or regional) or statistical downscaling models when assessing the impact of climate change on the different sectors.

47. The ERT noted that, in its NC2, Ukraine did not provide information on action taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation. During the review, Ukraine informed the ERT that the revised national plan for the implementation of the Kyoto Protocol was adopted in March 2009, which envisages development of national and subnational adaptation plans in 2010. The ERT encourages Ukraine to provide this information and to elaborate on institutional arrangements for adaptation in its next national communication.

E. Research and systematic observation

48. Ukraine has provided information on its actions relating to research and systematic observation, and addressed both domestic and international activities. International activities included participation in the World Climate Programme and the Global Climate Observing System (GCOS), including the GCOS Surface Network, the GCOS Upper Air Network, and Global Atmosphere Watch. Furthermore, Ukraine has provided a summary of information on the national climate programme that was carried out in the period 1998–2002. However, the ERT noted that Ukraine did not provide information on capacity-building activities carried out in developing countries (to establish and maintain observing systems, and related data and monitoring systems) or on the effectiveness and sustainability of its capacity-building programmes, which are both reporting elements required by the UNFCCC reporting guidelines.

49. Ukraine reported that not all elements of the national climate programme were implemented owing to a lack of financial resources (only 16 per cent of the financial resources required were available), especially elements related to improving observing systems, data collection and archiving.

50. During the review, in response to a request made by the ERT, Ukraine provided detailed information on actions related to implemented, ongoing and planned research projects and programmes, including national and international components of them. The ERT encourages Ukraine to provide information in its next national communication on its support of developing countries to establish and maintain observing systems, and related data and monitoring systems.

F. Education, training and public awareness

51. In its NC2, Ukraine has provided information on its actions relating to education, training and public awareness. The Party reported that the concept document on environmental education was adopted by the Ministry of Education in 2001. However, no information was provided on any specific provisions for climate change and energy efficiency included in this document or on the progress of implementation of activities that the document identified.

52. Ukraine also provided details on the implementation of its Public Participation in Multilateral Conventions project (2003). Public discussions have been initiated on the preparation of the national GHG inventory, the national communication on climate change, and drafts of several laws (including draft laws on JI and the national plan for the implementation of the Kyoto Protocol). In 2001, the Public Council was set up under the auspices of the Ministry of Environmental Protection. This involves representatives of 18 non-governmental organizations, including the National Environmental Centre, which is active in climate change activities.

53. The ERT noted that Ukraine has not reported any significant progress made since its first national communication in implementation of Article 6 of the Convention. The NC2 does provide an assessment of the needs for implementation of Article 6 and related measures; however, it does not contain any practical steps for implementation of the suggested measures. The ERT suggests that Ukraine report in more detail on the activities related to the implementation of Article 6 of the Convention in its next national communication.

III. Evaluation of information contained in the report demonstrating progress and of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

A. Information contained in the report demonstrating progress

54. Ukraine's RDP includes four chapters, which contain most of the information required by decisions 22/CP.7 and 25/CP.8. The ERT found this information to be consistent, with some exceptions

(such as information on projections), to that provided in the NC2. The RDP states that, in accordance with the national plan for the implementation of the Kyoto Protocol, development of a national action plan and subnational plans for climate change mitigation and adaptation measures has begun.

55. As reported in the 2009 GHG inventory submission, GHG emissions decreased by 52.9 per cent between 1990 and 2007. The GHG emission projection scenario ‘with measures’ outlined in the RDP indicates that in 2010, emissions will be 47.6 per cent lower than in 1990. Consequently, Ukraine may not need to undertake any additional measures to fulfil its commitments under the Kyoto Protocol. The ERT noted, however, that although the LULUCF sector in Ukraine was a net removal of emissions in 1990–2007, the rate of removal has been decreasing and this sector removed 40.6 per cent more emissions in 1990 than in 2007. Trends in removals will thus effect trends in total GHG emissions in the future.

56. In its RDP, Ukraine has reported on its activities under the JI framework. Regulations mentioned in the RDP include the procedure for review, approval and implementation of JI projects. The RDP also contains information on intergovernmental memorandums of understanding for JI projects signed with Canada, Denmark, Netherlands and the World Bank, and indicates that Ukraine intends to sign further memorandums with Austria, France, Italy and Portugal.

B. Supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

57. Ukraine has provided most of the supplementary information under Article 7, paragraph 2, of the Kyoto Protocol in its NC2 and RDP. This information reflects the steps taken by Ukraine to implement the relevant provisions of the Kyoto Protocol. The supplementary information is placed in different sections of the NC2 and RDP. Table 7 provides references to the NC2 and RDP chapters in which supplementary information is provided.

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

Supplementary information	Reference
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	NC2, chapters 4.1 and 4.2, pp. 39–42 RDP, chapter 1, pp. 4–8
Policies and measures in accordance with Article 2	NC2, chapters 4.3–4.7, pp. 43–53
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	NC2, chapter 4.1, pp. 39–41 RDP, chapter 1, pp. 4–8
Information under Article 10	RDP, chapter 4, pp. 29–30
Financial resources ^a	–

^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 resources.

58. Ukraine has not provided information on what efforts it is making to implement PaMs in such a way as to minimize adverse effects, including the effects of climate change, effects on international trade, and social, environmental and economic impacts on other Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention. This is part of the supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol, and the ERT recommends that Ukraine include this reporting element in its next national communication.

59. The NC2 and the RDP provide short descriptions of Ukraine’s national inventory system, national registry system and national legislative arrangements and administrative procedures relating to the implementation of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. The ERT of the initial review under the Kyoto Protocol concluded² that the national system is in line with the

² FCCC/IRR/2007/UKR.

guidelines for national systems, although its operational functions need to be enhanced, and that the national registry is fully compliant with the registry requirements. The ERT took note of these conclusions.

IV. Conclusions

60. On the basis of the information provided in Ukraine's NC2 and RDP, the ERT developed an understanding of the status of implementation of the country's commitments under the Convention and the Kyoto Protocol. The ERT noted that, mainly because of the economic recession and transition to a market economy, Ukraine's GHG emissions declined by 59.6 per cent between 1990 and 2000. Since 2000, the level of GHG emissions has remained relatively stable despite the recovery of the economy: between 2000 and 2006, GDP increased by 55.0 per cent and GHG emissions increased by only 12.1 per cent, which is due to the structural changes in the economy and a shift in the energy supply mix towards less carbon-intensive fuels. In 2007, national GHG emissions (excluding LULUCF) were 52.9 per cent below the 1990 level.

61. In its NC2, Ukraine has provided well-organized information on its package of PaMs implemented and adopted in order to fulfil its commitments under the Convention and the Kyoto Protocol. During the review, Ukraine provided an update on its PaMs in response to a request made by the ERT. The ERT noted the efforts of Ukraine to develop a number of PaMs to promote energy efficiency and the use of RES.

62. In the NC2 and the RDP, Ukraine has presented GHG emission projections until 2030. Three main scenarios are included, derived from a 'baseline' scenario of economic development: (1) a baseline ('without measures') scenario up to 2020; (2) a 'with measures' scenario (including the effect of currently implemented and adopted PaMs) up to 2030; and (3) a 'with additional measures' scenario up to 2020 (which includes impacts of JI projects). Additionally, two further 'with measures' scenarios that use different assumptions for economic development (a 'pessimistic' scenario and an 'optimistic' scenario) are provided in the RDP.

63. Ukraine reports that in 2010, GHG emissions would be 31.6 per cent lower than the base year level under the 'without measures' scenario. Thus, the projections indicate that Ukraine can meet its Kyoto Protocol target even under a baseline scenario. Under the 'baseline with measures' scenario, emissions would be 47.6 per cent lower than the base year level. Even according to the 'optimistic' scenario, which assumes relatively high economic growth, Ukraine would remain well below the GHG emission level of 1990 – and its Kyoto target – by 2030.

64. In the course of the IDR, the ERT formulated a number of recommendations relating to the completeness and transparency of Ukraine's reporting under the Convention and the Kyoto Protocol. The key recommendations³ are that Ukraine:

- Provide a description of PaMs in all non-energy sectors, including those in the agriculture sector, and explain in detail how cross-cutting PaMs are linked to the specific PaMs presented in the relevant chapters of the NC2;
- Provide projections on a gas-by-gas basis for all GHGs (CO₂, CH₄, N₂O, PFCs, HFCs and SF₆ (treating PFCs and HFCs collectively in each case));
- Provide emission projections for the LULUCF sector and for fuels sold to ships and aircraft engaged in international transport;

³ The recommendations are given in full in the relevant sections of this report.

- Explain in more detail the methodologies and assumptions used for projections of non-energy emissions;
- Provide more detailed information on the range of research and systematic observation activities, especially with respect to institutional arrangements and national and international cooperation;
- Provide specific, comprehensive information on training, education and public awareness programmes and projects that are targeted at climate change and energy efficiency;
- Ensure timely submission of the next national communication, which, according to decision 10/CP.13, is due on 1 January 2010.

65. The ERT encourages Ukraine to provide information in its next national communication on the contribution of individual PaMs or groups of PaMs to reducing GHG emissions. It also encourages Ukraine to assess all economic sectors that may be vulnerable to climate change in future and provide more information on institutional arrangements for implementing adaptation activities in its next national communication.

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/IDR.1/UKR. Report on the in-depth review of the first national communication of Ukraine. Available at <<http://unfccc.int/resource/docs/idr/ukr01.pdf>>.

FCCC/SBI/2006/INF.2. Synthesis of reports demonstrating progress in accordance with Article 3, paragraph 2, of the Kyoto Protocol. Available at <<http://unfccc.int/resource/docs/2006/sbi/eng/inf02.pdf>>.

FCCC/SBI/2007/INF.6. Compilation and synthesis of second national communications. Available at <<http://unfccc.int/resource/docs/2007/sbi/eng/inf06.pdf>>.

FCCC/SBI/2007/INF.7. Compilation and synthesis of supplementary information incorporated in second national communications submitted in accordance with Article 7, paragraph 2, of the Kyoto Protocol. Available at <<http://unfccc.int/resource/docs/2007/sbi/eng/inf07.pdf>>.

FCCC/ARR/2008/UKR. Report of the individual review of the greenhouse gas inventories of Ukraine submitted in 2007 and 2008. Available at <<http://unfccc.int/resource/docs/2009/arr/ukr.pdf>>.

FCCC/IRR/2007/UKR. Report of the review of the initial report of Ukraine. Available at <<http://unfccc.int/resource/docs/2007/irr/ukr.pdf>>.

Second national communication of Ukraine. Available at <<http://unfccc.int/resource/docs/natc/ukrnc2r.pdf>>.

Report demonstrating progress of Ukraine. Available at <<http://unfccc.int/resource/docs/dpr/ukr1.pdf>>.

2009 greenhouse gas inventory submission of Ukraine. Available at <http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/4771.php>.

B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Nataliia Ivanenko (Department of National Inventory System, National Agency of Ecological Investments of Ukraine), including additional material on updated policies and measures, greenhouse gas projections, the national registry and recent climate policy developments in Ukraine.
