



COMPLIANCE COMMITTEE

**CC/ERT/2006/7
5 October 2006**

**Report of the centralized in-depth review of the fourth national
communication of Estonia**

Note by the secretariat

The report of the centralized in-depth review of the fourth national communication of Estonia 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 fourth national communication of Estonia**

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I. Introduction and summary

A. Introduction

1. Estonia ratified the UNFCCC in July 1994 and the Kyoto Protocol in October 2002. Its quantified emission limitation and reduction commitment under the Kyoto Protocol (Kyoto Protocol target) is to keep its total greenhouse gas (GHG) emissions below 92 per cent of the base year (1990) level during the first commitment period (2008–2012).
2. This report covers the centralized in-depth review (IDR) of the fourth national communication (NC4) of Estonia, coordinated by the UNFCCC secretariat, in accordance with decision 7/CP.11. The review took place from 5 to 10 June 2006 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: Mr. Amit Garg (India), Mr. Brett Longley (New Zealand), Mr. Miroslav Maly (Czech Republic), Mr. Markus Nauser (Switzerland), Ms. Batimaa Punsalmaa (Mongolia) and Ms. Tatiana Tugui (Republic of Moldova). Mr. Garg and Mr. Nauser were the lead reviewers. The review was coordinated by Mr. Harald Diaz-Bone (UNFCCC secretariat).
3. During the IDR, the review team examined each part of the NC4. It also evaluated the information contained in Estonia's report demonstrating progress (RDP) in achieving its commitments under the Kyoto Protocol, and the supplementary information provided by Estonia 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 Estonia, which provided comments that were considered and incorporated, as appropriate, in this final version of the report.

B. Summary

5. The expert review team (ERT) noted that, in general, Estonia's NC4 complies with the UNFCCC reporting guidelines.¹ In accordance with decision 22/CP.8, the RDP provides detailed information on the progress made towards achieving the commitments of Estonia under the Kyoto Protocol. Supplementary information under Article 7, paragraph 2, of the Kyoto Protocol² is provided in both the NC4 and the RDP.

1. Completeness

6. The ERT noted that Estonia's NC4 contains all the sections of a national communication stipulated by the reporting guidelines.³ It also noted that Estonia's RDP contains all parts stipulated by decisions 22/CP.7 and 25/CP.8. Furthermore, the ERT noted that the supplementary information provided by Estonia under Article 7, paragraph 2, of the Kyoto Protocol is complete, except for four reporting elements (see section III.B).

¹ "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications." Document FCCC/CP/1999/7, pages 80–100.

² See document FCCC/KP/CMP/2005/8/Add.2, decision 15/CMP.1, annex, chapter II.

³ The section on research and systematic observation was included under the section on education, training and public awareness (see the NC4, section 7.5).

2. Timeliness

7. The NC4 and RDP were both submitted on 30 December 2005. Decision 4/CP.8 requested the submission of the NC4 by 1 January 2006. Decision 22/CP.7 set the same date for Parties to submit their RDPs.

3. Transparency

8. The ERT acknowledged that Estonia's NC4 provides a comprehensive and consistent overview of the national climate policy. It is structured following the outline contained in the annex to the UNFCCC reporting guidelines. However, the ERT noted that transparency in reporting on policies and measures, and on projections and the total effect of policies and measures, could be enhanced, for example, by consistent reporting of the estimated effects of the policies and measures in mitigating GHG emissions in chapters 4 and 5 of the NC4, by providing projections by sector, and by providing gas-by-gas projections as stipulated in the UNFCCC guidelines. Also, when reporting additional or new policies and measures which are not included in the "with measures" scenario, the use of a "with additional measures" scenario would increase the transparency of reporting on future emission trends (see also section IV).

II. Technical assessment of the reviewed elements

A. National circumstances relevant to greenhouse gas emissions and removals

9. In its NC4, Estonia has provided a comprehensive description of its national circumstances, how these national circumstances affect GHG emissions and removals in Estonia, and how national circumstances and changes in national circumstances affect GHG emissions and removals over time. The ERT noted that the list of key drivers on emission trends in Estonia included the transition from a planned to a market economy, which started in the early 1990s, massive restructuring of its economy, energy efficiency enhancement in the power generation and transport sectors, and the enhancement of forest cover. Table 1 provides an overview of values of indicators (and changes in these values over time) which partly reflect these national circumstances.

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

	1992	1995	2000	2003	Change 1992–2000 (%)	Change 2000–2003 (%)	Change 1992–2003 (%)
Population (millions)	1.53	1.44	1.37	1.35	-10.6	-1.2	-11.7
GDP (billion USD 2000 PPP)	10.8	10.3	14.0	17.3	30.1	23.2	60.3
TPES (Mtoe)	6.3	4.8	4.5	4.9	-27.9	8.7	-21.6
GDP per capita (thousand USD 2000 PPP)	7.0	7.2	10.2	12.8	45.5	24.8	81.6
TPES per capita (toe)	4.1	3.3	3.3	3.6	-19.3	10.1	-11.2
GHG emissions without LULUCF (Tg CO ₂ eq)	43.5	22.3	19.7	21.4	-54.8	8.8	-50.8
GHG emissions with LULUCF (Tg CO ₂ eq)	37.2	14.5	11.3	12.7	-69.6	12.1	-65.9
CO ₂ emissions per capita (Mg)	24.9	13.4	12.3	14.1	-50.5	14.8	-43.2
CO ₂ emissions per GDP unit (kg per USD 2000 PPP)	3.53	1.87	1.20	1.10	-66.0	-8.0	-68.7
GHG emissions per capita (Mg CO ₂ eq)	28.4	15.5	14.4	15.8	-49.4	10.1	-44.3
GHG emissions per GDP unit (kg CO ₂ eq per USD 2000 PPP)	4.03	2.16	1.40	1.24	-65.2	-11.8	-69.3

Sources: GHG emissions data are from of Estonia's 2005 inventory submission; population, GDP and TPES data are from the IEA.

Note 1: 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.

Note 2: For the abbreviations used, see annex II.

10. In its NC4, Estonia has provided a summary of information on GHG emission trends for the period 1990–2003. The summary tables, including CO₂ equivalent emissions trend tables (given in the common reporting format (CRF)), are also provided in an annex to the NC4.

11. Total GHG emissions excluding emissions and removals of GHG from land use, land-use change and forestry (LULUCF) decreased by 50.8 per cent between 1990 and 2003, while total GHG emissions including net removals from LULUCF decreased by 65.9 per cent. This was mainly attributed to a fall in CO₂ emissions, which decreased by 49.9 per cent over this period. Emissions of CH₄ also decreased by 54.9 per cent, while emissions of N₂O decreased by 69.4 per cent. A major part of these decreases was due to Estonia's transition from a planned to a market economy, which started in the early 1990s, and ongoing implementation of necessary reforms. Emissions of fluorinated gases have not been estimated. Estonia has indicated that it does not currently have a data collection system for calculating emissions of fluorinated gases. Table 2 provides an overview of GHG emissions by sector during the period 1990–2003 (see also the discussion of sector trends in section II.B).

Table 2. Greenhouse gas emissions by sector for Estonia, 1990–2003

	GHG emissions (Tg CO ₂ equivalent)					Change (%)		Shares ^a (%)	
	1990	1995	2000	2002	2003	1990–2003	2002–2003	1990	2003
1. Energy	38.8	19.9	17.3	17.7	19.6	-49.4	10.8	89.3	91.9
A1. Energy industries	29.8	16.4	14.0	13.9	15.9	-46.7	13.9	68.5	74.2
A2. Manufacturing industries and construction	2.7	0.6	0.5	0.4	0.4	-84.0	0.3	6.1	2.0
A3. Transport	2.7	1.1	1.0	2.2	2.2	-20.2	-1.3	6.2	10.1
A4–5. Other	2.5	1.1	1.2	0.6	0.5	-78.7	-8.6	5.7	2.5
B. Fugitive emissions	1.2	0.6	0.7	0.6	0.7	-45.5	7.5	2.8	3.1
2. Industrial processes	0.6	0.2	0.4	0.3	0.3	-55.0	-18.8	1.4	1.3
3. Solvent and other product use	0.0	0.0	0.0	0.0	0.0	–	–	0.0	0.0
4. Agriculture	2.4	1.1	0.8	0.7	0.7	-70.0	4.3	5.6	3.4
5. LULUCF	-6.3	-7.8	-8.4	-8.6	-8.7	38.0	1.8	-14.5	-40.8
6. Waste	1.6	1.1	1.2	0.7	0.7	-54.4	-2.0	3.7	3.4
GHG total with LULUCF	37.2	14.5	11.3	11.0	12.7	-65.9	15.6	–	–
GHG total without LULUCF	43.5	22.3	19.7	19.5	21.4	-50.8	9.5	–	–

^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 which was offset by GHG removals through LULUCF.

Note 1: 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.

Note 2: For the abbreviations used, see annex II.

B. Policies and measures

12. In its NC4, Estonia has provided comprehensive information on policies and measures adopted to implement its commitments under Article 4, paragraph 2(a) and (b), of the Convention and organized the reporting of policies and measures by sectors, subdivided by GHG. Each sector has its own textual description of the principal policies and measures, supplemented by summary tables on policies and measures by sector, following the structure shown in the UNFCCC reporting guidelines. Estonia has also provided information on how it believes its policies and measures are modifying longer-term trends in anthropogenic GHG emissions and removals, consistent with the objective of the Convention.

13. Table 3 provides a summary of the reported information on Estonia's domestic policies and measures.

Table 3. Summary information on policies and measures

Major policies and measures	Examples / comments / estimated effects
Framework policies and cross-sectoral measures	
Sustainable Development Act (1995)	Serves as the basis for all environment-related legislation and relevant national programmes
Pollution Charges Act (1999)	Includes payment of pollution charges for CO ₂ emissions by all enterprises with installed combustion equipment of capacity higher than 50 MW. The Act was repealed and replaced (since 1 January 2006) by the Environment Charges Act
Ambient Air Protection Act (2004)	Provides the basis for air emission standards, harmonizes with relevant EU directives and also stipulates need for GHG emissions mitigation. Provides the mandate for Ministry of the Environment actions to meet requirements under the UNFCCC and the Kyoto Protocol
National Environmental Strategy	Establishes the most important environmental goals to be achieved by 2010
National Development Plan for Implementation of EU Structural Funds	Provides objectives and measures for climate change, including waste reduction, investment in best available technology for oil-shale combustion, promotion of renewable energy sources (RES), integrated land improvement, agriculture, and forestry
National Programme of Greenhouse Gas Emissions Reduction for 2003–2012	Sets goal to ensure targets under the UNFCCC and the Kyoto Protocol are met. Sets a national target to reduce GHG emissions by 21 per cent by 2010 (compared with 1999 level)
Integrated Pollution Prevention and Control Act 2004	Determines environmentally hazardous activities and provides the basis for integrated prevention and control of pollution from such activities
Energy sector	
Energy Act (1998–2003)	Regulated the whole energy sector till 2003. It was repealed and replaced with 4 subsector-specific acts in 2003
Electricity Market Act (2003)	Regulates all aspects of the power sector. Government has to review and revise the electricity development plan every 3 years. RES support scheme introduced
District Heating Act (2003)	Zoning of district heating, energy efficiency commitment, energy conservation programmes
Energy Efficiency of Equipment Act (2003)	Energy efficiency and labelling for appliances, to ensure full compliance with EU requirements
Energy Conservation Programme (2000)	Quantitative objective to keep the growth rate of energy consumption at the level of 50 per cent of the economic (GDP) growth rate
Fuel and Energy Taxation	Under EU Directive 2003/96/EC, Estonia has been granted some transitional periods by the EU for introduction of energy taxation, e.g., oil shales are exempt from taxation until 1 January 2009
Value Added Tax Act (2001)	All fuels and energy types are subject to VAT, with a few specific provisions of tax rebates till 1 July 2007
Transport	
Liquid Fuel Act (2003)	Prescribes liquid fuel quality requirements, which become gradually more stringent, and mechanisms for controlling fuel enterprises
Promotion of public transport	Subsidies for public transport; increase of 12 per cent in passenger numbers between 2002 and 2010
Use of biofuels	Sets indicative targets for the share of biofuels in total primary energy supply: 2 per cent by 2005 (not met), 5.75 per cent by 2010
Industry	
Voluntary agreements in cement and lime production	7 enterprises have entered into voluntary agreements with the Ministry of the Environment to adopt guidelines to improve environmental performance, including CO ₂ reduction
Agriculture	
EU Common Agricultural Policy	Provides support payments to raise production efficiency through use of new technologies subject to meeting environmental (and other) requirements, including GHG emissions reduction
Waste management	
Waste Act 2004	Mandates preparation of a National Waste Management Plan, includes provision for local authorities to impose a waste tax, and provides a basis for regulation of landfills
National Waste Management Plan	A development plan for waste management including provisions for improved waste management and treatment by local authorities, businesses and the public, and through cooperation with other countries
Forestry	
Forest Act 1999	Detailed legal framework to regulate management of forests to meet environmental and economic objectives. Prescribes an obligation to prepare a forestry development plan at least every 10 years
Estonian Forest Policy	Implemented through the Forestry Development Plan to 2010, which provides principles and rules for protection and use of forests, sets priorities and activities, and funding for these. The Plan links forestry with wood processing activities and with environmental issues

1. Policy framework and cross-sectoral measures

14. Estonia has instituted many legal provisions and approved several sectoral strategy documents and action plans for environment-related policies and measures since its transition from a planned to a market economy which started in the early 1990s. It has also concluded 49 bilateral or trilateral international environmental agreements and has become a party to 24 environmental conventions and protocols. These actions are expected to have a profound positive impact on streamlining the energy sector, improving the energy efficiency of the economy, and mitigating GHG emissions in the short- and longer terms. The energy policies and measures are also well integrated across different sectors.

15. As a European Union (EU) member State, Estonia is bound by EU legislation, including regulations related to climate change. Its energy and climate policies are therefore developed in close interaction with the EU common and coordinated policies. In this context, preparatory work for participation in the EU Emissions Trading Scheme (ETS) plays a central role for Estonia. To meet EU requirements, Estonia has implemented EU directives relating to, inter alia, fuel and energy taxation, oil shale-based power generation, energy efficiency, pollution prevention and control, agriculture policy, waste management in landfills, and waste incineration. Great emphasis has been put on establishing the legal framework, making institutional arrangements and preparing national plans. The ERT noted that Estonia recognizes that much still remains to be done, including the monitoring and regular evaluation of policies and measures.

16. In 2004, Estonia adopted its National Programme of Greenhouse Gas Emissions Reduction for 2003–2012. It stipulates the national target to reduce GHG emissions by 21 per cent by 2010 (as compared with 1999 emissions levels). The plan includes a reduction in CO₂ emissions of 20 per cent, a reduction in CH₄ emissions of 28 per cent and an increase in N₂O emissions of 9 per cent.

17. Estonia has adopted policies and measures covering all the major sectors of its economy that have a bearing on GHG emissions (see table 3). It has also provided details on specific quantitative objectives and targets under a few policies. The share of the service sector, which is less energy intensive, has been growing continuously in Estonia; it therefore contributes to improving the energy efficiency of the economy.

2. Policies and measures in the energy sector

18. Between 1990 and 2003, GHG emissions from the energy sector decreased by 49.4 per cent (–19,183 Gg), driven mainly by a 46.7 per cent decrease in energy industries, and a 20.2 per cent reduction in GHG emissions, from the transport sector.

19. **Energy development plan.** Estonia approved its first long-term development plan for the energy sector in 1998. The plan for fuel and energy sector development till 2015 was approved in 2004, and this is supplemented by the electricity sector development plan. Together, these provide a road map for the Estonian energy sector with specific quantitative targets, such as 5.1 per cent of gross electricity consumption to be supplied from renewable sources by 2010, and maintaining the volume of primary energy consumption in 2010 at the 2003 level.

20. **Power production.** Nearly 90 per cent of Estonia's energy is produced through combustion of fossil fuels. Electricity and heat production, which accounted for 74.1 per cent of total national GHG emissions in 2003, is dominated by oil shale-based pulverized combustion technology. Oil shale is the abundant domestic energy resource, and the development of oil shale-based power production, using environmentally sound technologies, is a high priority in Estonia. To comply with EU Directive 2001/80/EC, the owner of the largest power plants (based on oil shale-based pulverized coal technology), Narva Elektriijaamad AS, is having to reconstruct several units in its power plants. In 2004, more efficient circulating fluidized-bed oil-shale combustion technology replaced two units of 215 MW each, thus eliminating 53.4 Gg CO₂ emissions annually. The ERT was informed that the results of the actual

operation of the new technology have so far been even slightly better than the design values. For example, comparison of the emissions from Block no. 8 (at the Eesti power plant) indicates that CO₂ emissions have been reduced to 0.9744 kg/kWh (compared to 1.2985 kg/kWh when using pulverized combustion) and boiler gross efficiency is now 93.3–94.9 per cent (as compared to approximately 82 per cent previously). The ERT noted that further renovations of large combustion plants (excluding the Narva power plant) are either planned or ongoing for the period 2003–2012. These are regulatory measures and are projected to mitigate 11.8 Gg CO₂ each year after completion. The ERT recommends that Estonia provide further details on the revisions to its emission projections that will result from these renovations in the light of the actual performance of the plants after the renovations are completed.

21. **Energy efficiency of buildings and district heating.** Estonia has indicated that currently preparations for implementing the EU Directive on the Energy Performance of Buildings (2002/91/EC) are in progress. The introduction of regular energy auditing of buildings with a floor area above 1000 m², the formulation of energy conservation plans and several other regulatory measures under the EU Directive would result in improved energy efficiency in building and mitigate GHG emissions. Estonia has estimated that improving the efficiency of district heating systems over the period 2003–2012 could save over 15 Gg CO₂ annually. Estonia has also estimated the potential for practical energy conservation in buildings at 15–20 per cent, resulting in reductions in emissions of 10.3 Gg CO₂ per year during the period 2003–2012.

22. **Renewable energy sources.** The promotion of biomass for decentralized energy production and the development of wind-based power generation are the main renewable energy policies. The ongoing installation of new wind generators during 2004–2012 is projected to avoid 53 Gg CO₂ emissions annually.

23. **Environmental investments in energy.** In Estonia, the income from environmental taxes (pollution charges) from the energy sector is directed back mainly to the energy sector, to support special-purpose environmental investments through a foundation (the Environmental Investment Centre) set up by the government in 2000.

24. **Transport.** Between 1990 and 2002, the numbers of registered passenger cars increased by 66 per cent, while the numbers of buses and motorcycles decreased by 33 and 93 per cent, respectively. New cars registered for the first time during 1995–2002 accounted for 20.2 per cent of total registered cars in 2002, and new buses registered over the same period accounted for 10.1 per cent of the bus fleet. Over the period 1990–2003, the consumption of motor fuels in the transport sector declined by 19 per cent. Estonia has explained this decline in fuel consumption at the same time as the number of registered vehicles was rising as being due to the increasing share of new and more energy-efficient vehicles. However, the ERT noted that the massive decline in bus and motorcycle fleets, and corresponding reductions in activity levels, also contributed greatly to this decline. The ERT was informed that in Estonia the analysis of specific consumption of motor fuels in transport for the period 1990–2003 is a very complicated task. There are several reasons for these difficulties: poor statistics on consumption of fuels (diesel oil in particular); the shadow market in motor fuels which to a certain extent still exists; and problems with vehicle stock statistics (e.g. a great number of vehicles registered have not been in use for many years). The ERT recommends that Estonia ensure more transparent and time-series consistent reporting of fuel consumption in the transport sector.

25. Estonia has set a policy target to stabilize the absolute amounts of GHG emissions from transport by 2005, followed by reduction in subsequent periods, as a general environment-related objective of the transport sector. The main elements of this target are indicated as increasing the share of public transport through subsidies; more energy-efficient vehicles; increased penetration of biofuels; better roads; and technical inspection of vehicles.

3. Policies and measures in other sectors

26. Emissions from the non-energy sectors constitute 8–9 per cent of total GHG emissions in Estonia. Between 1990 and 2003, GHG emissions from industrial processes (including solvent and other product use), agriculture and waste decreased by 59.7 per cent (from 3,811 to 1,536 Gg CO₂ equivalent). The largest contributor to the reduction was the agriculture sector, but reductions in industrial processes and waste management were also significant.

27. **Industrial processes.** Between 1990 and 2003, industrial process emissions from the cement and lime industries decreased by 54.9 per cent, from 614 to 276 Gg. After a very large drop in 1992–1993 following economic restructuring, these emissions have risen steadily since, although they are still well below the 1990 levels.

28. The NC4 reports that both cement and lime manufacture have reached capacity in terms of output and further growth is possible only through new investment. The ERT noted that this could provide an opportunity for further reductions, and encourages the Party to develop measures to achieve this. The NC4 refers to the use of environmental management systems based on international standards such as those of the International Organization for Standardization (ISO) and the Environmental Management and Audit Scheme (EMAS), and to voluntary agreements under which industries adopt guidelines to improve environmental performance. The ERT encourages Estonia to develop specific measures to help enterprises implement such policies and measures.

29. The Party assumes that the introduction of the EU ETS will create sufficient incentives for the relevant enterprises to seek efficient ways by which to reduce their emissions. Further information would be useful to support this assumption. The ERT recommends that Estonia consider the role in the national economy of enterprises that have (or will have) allowances under the EU ETS, consider the extent to which these enterprises are able to respond to incentives created by the EU ETS, and identify which measures (if any) might be appropriate to assist them in responding to such incentives.

30. **Agriculture.** Emissions from agriculture are dominated by CH₄ from dairy livestock. Emissions decreased steadily over the period 1990–2003 as livestock numbers declined, initially as collective farms were dismantled following independence from Russia in 1991, and subsequently as returns to farmers were insufficient to allow investment in improvements.

31. Further reductions may be limited by changes as a consequence of Estonia's accession to the EU. Investments that occurred under the Special Accession Programme for Agriculture and Rural Development programme during the accession negotiations, combined with support from programmes under the Common Agricultural Policy, are expected to reduce emissions per unit of output, but may not reduce total emissions. Despite this, emissions from the agriculture sector are not expected to rise to more than 45 per cent of the 1990 level by 2020.

32. **Land use, land-use change and forestry** contributed to a net increase in removals of 37.9 per cent, up from 6,317 Gg in 1990 to 8,717 Gg in 2003. Removals from forest land declined over this period but still accounted for 58.2 per cent of total removals in 2003. Net contributions from the conversion of forest land and soil cultivation have reversed since 1991, and forest soils are now a net sink. Abandoned agricultural land has also increased its sink capacity as cultivation has ceased.

33. Further changes in the forestry industry are occurring as ownership shifts from the state to the private sector. Harvesting rates have risen as a result, with a direct effect on removals of carbon (down 34.3 per cent since 1990, although the level has fluctuated from year to year).

34. A development plan to afforest 300,000 hectares of abandoned agricultural land may partially offset increased harvesting, although it was not clear to the ERT that the measures proposed would be sufficient to ensure that the increases in emissions from harvesting remain below additions to the total

sink capacity. The ERT encourages the Party to carry out, and subsequently report on, an assessment of the extent to which measures proposed in the development plan to afforest 300,000 hectares of abandoned agricultural land will offset increased harvesting.

35. The NC4 indicates that the Sustainable Development Act (1995) includes measures to control harvesting, encourage reforestation, increase total biomass, support research on soils and tree species, and generate improved statistics on forest changes. The ERT would welcome further information on how these will be implemented.

36. **Waste management.** Emissions from waste management declined over the period 1990–2003 by 30.2 per cent, from 757 to 528 Gg per year, due largely to reductions in CH₄ emissions from landfills and waste-water treatment. Significant reductions have been achieved since 1999 through measures to improve landfill gas capture and combustion, and to reduce the volumes of organic waste disposed to landfills. Further reductions are expected following the Waste Act (2004) and the National Waste Management Plan. These envisage eight or nine regional waste disposal sites for municipal waste, the closure of some large waste disposal sites, reductions in amounts of organic waste, increased recycling, the introduction of requirements to collect and combust CH₄ at landfills, and ensuring that by 2009 only landfills that meet the relevant requirements can accept waste.

C. Projections and the total effect of policies and measures

1. Projections

37. The projections provided by Estonia in its NC4 include “with measures”, “with additional measures” and “without measures” scenarios until 2030, and these are presented relative to actual inventory data for the preceding years (1990–2003). Projections are presented for CO₂ emissions from the energy sector (figure 5.3.1 of the NC4), CH₄ and N₂O emissions from agriculture, and CO₂ emissions from forestry. However, the ERT noted that Estonia has not provided the following reporting elements required by the UNFCCC reporting guidelines: projections presented on a sectoral basis, for industrial processes (including solvent use) and waste (para. 34 of the guidelines); projections presented on a gas-by-gas basis for CO₂ (all sectors other than energy and forestry), CH₄ (all sectors other than agriculture), N₂O (all sectors other than agriculture), PFCs, HFCs and SF₆ (see para. 35 of the reporting guidelines);⁴ and projections in an aggregated format for each sector as well as for a national total, using global warming potential (GWP) values (para. 35 of the reporting guidelines) in both tabular and graphic format. Table 4 provides a summary of CO₂ emission projections from the energy sector for Estonia based on the NC4. The ERT recommends that the Party follow the UNFCCC reporting guidelines and provide a complete set of projections, including all sectors and GHGs, in its next national communication.

Table 4. Summary of CO₂ emission projections from the energy sector for Estonia

	GHG emissions (Tg CO ₂ equivalent per year)	Changes compared to base year level (%)
Inventory data, 1990 ^a	37.5	0
Inventory data, 2003 ^a	18.8	-49.8
Projections for “with measures”, 2010	16.5	-57.5
Projections for “without measures”, 2010	17.2	-55.7
Projections for “with additional measures’ 1 and 2”, 2010	16.5	-57.5

^a Source: Estonia’s 2005 GHG inventory submission.

^b Source: Estonia’s NC4, section on GHG emission projections.

Note 1: CO₂ emissions from the energy sector accounted for 88.0 per cent of Estonia’s GHG emissions in 2003.

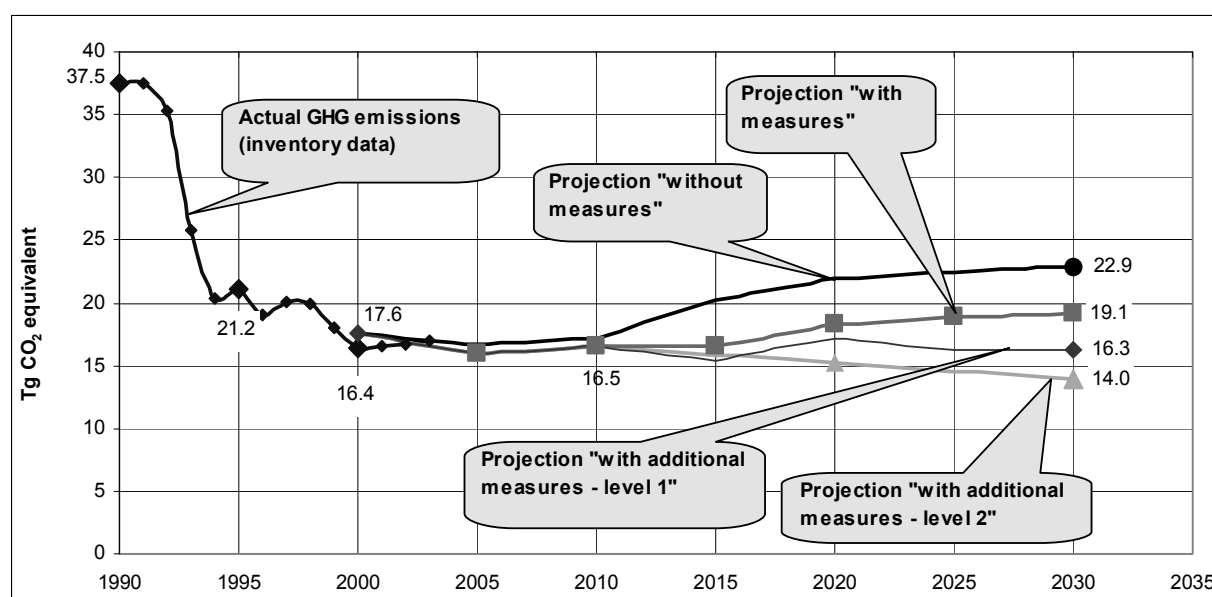
Note 2: For the abbreviations used, see annex II.

⁴ The ERT noted that in its NC3 Estonia provided projections on a sectoral basis as well as on a gas-by-gas basis.

38. The ERT noted that the description of the methodology used for the development of the NC4 projections is not transparent. A reference is given to the draft national long-term development plan for the fuel and energy sector until 2015, but it remained unclear to the ERT to what extent the plan was used and to what extent modelling, applying the MARKAL model, was carried out. It also remained unclear how a potential new pulp and paper factory was included in the GHG emission projections. The ERT noted that such a factory could have a considerable impact on future energy demand and related GHG emissions.

39. Estonia has not provided overall projections for GHG emissions in its NC4. Figure 1 provides a summary of only the CO₂ emissions from the energy sector for Estonia.

Figure 1. CO₂ emissions projections for the energy sector in Estonia



Source: Estonia's NC4, and comments received from the Party.

Note 1: CO₂ emissions from the energy sector accounted for 88.0 per cent of Estonia's GHG emissions in 2003.

40. The ERT recommends that Estonia provide more transparent information on the methodology for GHG emission projections in its next national communication, including a clearly structured summary of key variables and assumptions, using table 2 from the UNFCCC reporting guidelines. The ERT also recommended that Estonia provide an analysis of the sensitivity of the GHG emission projections to changes in the underlying assumptions, namely those concerning the rate of growth of gross domestic product (GDP), oil and gas price changes, and the construction of a new pulp and paper factory.

2. Total effect of policies and measures

41. The ERT noted that in the projections section of its NC4 Estonia presents neither the estimated and expected total effect of implemented and adopted policies and measures nor the expected effect of planned policies and measures. Instead, section 4.7 of the NC4 provides an estimate of the effects of individual planned policies and measures for the period 2002–2012. The NC4 does not present an estimate of the total effect of its policies and measures, in accordance with the "with measures" definition, compared to a situation without such policies and measures, in terms of GHG emissions avoided or sequestered, by gas (on a CO₂ equivalent basis), in 1995 and 2000, as required by the UNFCCC reporting guidelines (para. 40). The ERT recommends that the Party follow the provisions of the reporting guidelines on estimates of total effects of policies and measures, as stipulated by paragraphs 39–41 of the guidelines.

D. Vulnerability assessment, climate change impacts and adaptation measures

42. In its NC4, Estonia provides information on the expected impacts of climate change in Estonia. However, the ERT noted that Estonia has not provided information on the action taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation (para. 49 of the UNFCCC reporting guidelines). Table 5 summarizes the information on vulnerability and adaptation to climate change.

Table 5. Summary information on vulnerability and adaptation to climate change

Vulnerability area	Examples / comments / adaptation measures reported
Agriculture and food security	Vulnerability: decreased crop yield Adaptation: not reported
Coastal zones	Vulnerability: loss of settlements, recreational area and rare ecosystems, and erosion as a result of rising sea levels and wind storms Adaptation: not reported
Forests	Vulnerability: some benefit from increased CO ₂ concentration, but negative effects such as increased forest fire and migration of species are likely
Water resources	Vulnerability: significant changes in the seasonal distribution of run-off and lake ecology Adaptation: not reported

43. Estonia presented information on climate change scenarios and sensitivity analyses for agriculture, water resources and forestry. The ERT noted that most of the results presented in the NC4 come from studies conducted in 1995 under the US Country Study Programme. These results projected an increase in annual mean temperature by 1.3–2.6° C for the year 2050, with greater increases occurring in central and eastern Estonia. Precipitation was projected to increase in cold seasons and to decrease in summers. Increased temperature was expected to affect crop yields, particularly in areas with dry, sandy soils, while high precipitation in spring would result in decreased yields of potatoes. Climate change was also expected to impact on the annual distribution of river run-off and lake ecosystems. However, water supply would benefit from the projected rise in the groundwater table. The ERT noted that Estonia is also vulnerable to climate change because of its extensive coastal areas.

44. The previous IDR indicated that no specific adaptation measures were included in Estonia's NC3 and that some discussions related to adaptation were under way at the time of the IDR (November 2002). However, the ERT noted that the NC4 does not provide any information on ongoing adaptation assessment or identified adaptation options. The ERT therefore recommends that the Party conduct an adaptation assessment and report on the outline of the action taken to implement Article 4, paragraph 1(b) and (e), with regard to adaptation (para. 49 of the UNFCCC reporting guidelines). The ERT noted that most of the impact and vulnerability results presented in the NC4 are identical to those reported in the NC3.

E. Research and systematic observation

45. In its NC4, Estonia has not provided a separate section on its actions relating to research and systematic observation, or on domestic and international activities (for example, the World Climate Programme, the International Geosphere–Biosphere Programme, the Global Climate Observing System and the Intergovernmental Panel on Climate Change), as required by the UNFCCC reporting guidelines (paras. 57–64). However, the ERT noted that the section on education, training and public awareness in the NC4 provides some information on domestic research activities in Estonia.

46. According to the information provided in the NC4, the Estonian Science Foundation and the Ministry of Education and Research have financed more than 54 climate change-related research projects on atmospheric circulation processes, ionization, analyses of satellite images and climate modelling. The National Institute of Hydrology and Meteorology, the Tartu Observatory and the Institute of Geography of the University of Tartu, the Estonian Agricultural University, the Institute of Ecology at Tallinn University, the Marine Institute at the University of Tartu, the Marine Systems Laboratory of Tallinn and the University of Technology are responsible for conducting related studies on climate change.

47. The ERT recommends that Estonia provide more detailed information in a separate section on research and systematic observation, as required by the UNFCCC reporting guidelines (paras. 57–64).

F. Education, training and public awareness

48. The ERT noted that Estonia has followed the UNFCCC reporting guidelines in providing information on its actions relating to education, training and public awareness in the broader field of climate change. It noted that a number of efforts are being made in the development of curricula, in training for schoolteachers focusing on climate change, and in the integration of topics relating to climate change at all educational levels and across the disciplines.

49. The Ministry of the Environment and the Ministry of Education and Research aim to promote education supporting sustainable development, including on nature and the environment. The programme of environmental awareness is financed by the Environmental Investment Centre, which was established under the law that sets down how the revenues gained from environmental charges and taxes are to be used.

50. The NC4 reports on the main results of several regional and international projects related to raising public awareness and enhancing environmental education, implemented by different institutes and non-governmental organizations (NGOs) in cooperation with, inter alia, the United States government, the EU and the Dutch Foundation of Permanent Education.

51. Many NGOs are involved in environmental education and awareness raising, assisted by national and international donors, including REC Estonia, the Estonian Fund for Nature, and the Stockholm Environment Institute Tallinn Centre. Besides the projects mentioned, there is a network of various types of centre whose activities include environmental training.

52. The ERT noted that, in spite of the number of reported measures in the field of public awareness and education, many barriers to strengthening climate change education and outreach activities remain. These barriers include the shortage of funding and technical skills, limited governmental support, and the lack of identification of synergies with other environmental conventions.

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

53. Estonia's RDP includes four chapters which contain all the information required by decisions 22/CP.7 and 25/CP.8. The ERT found this information to be consistent with that provided in the NC4.

54. Under the Kyoto Protocol, Estonia has a quantified emission limitation and reduction commitment to keep its total GHG emissions below 92 per cent of the base year (1990) level during the commitment period (2008–2012). Its GHG emissions (excluding LULUCF) in 2003 were 50.8 per cent below the 1990 levels. Estonia expects to meet its Kyoto commitments by domestic actions alone.

55. Estonia has also signed memoranda of understanding on joint implementation (JI) with Finland, the Netherlands, Denmark, Sweden and Austria. Negotiations are under way with Portugal.

56. Estonia has put in place extensive legal provisions for several sectors that will have a bearing on GHG emissions. The Environmental Supervision Act stipulates institutional responsibilities for monitoring compliance.

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

57. Estonia has provided most of the supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol in its NC4 and RDP. This information reflects the steps taken by Estonia to implement the relevant provisions of the Kyoto Protocol. The supplementary information is placed in different sections of the NC4 and RDP. Table 6 provides references to the RDP and NC4 sections in which supplementary information is provided.

Table 6. Overview on supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

Supplementary information	Reference
Supplementary information relating to the mechanisms pursuant to Articles 6, 12 and 17	NC4 (page 88), RDP (pp 20–21)
Policies and measures in accordance with Article 2	NC4 (chapter 4), RDP (chapter 1)
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	RDP (pp 2–17)
Information under Article 10	RDP (pp 19–20)

58. Estonia has not reported the following elements of the supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol: (a) a description of the national inventory system; (b) a description of the national registry; (c) information on what efforts Estonia is making to implement policies and measures in such a way as to minimize adverse effects, including the effects of climate change, effects on international trade, and social, environmental and economic impacts on other Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention; and (d) a description of 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 recommends that Estonia include these reporting elements in its next national communication.

IV. Conclusions and recommendations

59. The ERT noted that, mainly as a result of the transition process from a planned to a market economy, GHG emissions (excluding LULUCF) in Estonia in 2003 were 50.8 per cent below the 1990 levels. Estonia expects to meet its Kyoto commitments by domestic actions alone. Nonetheless, as an EU member State, Estonia is bound by EU legislation, including regulations related to climate change. Its energy and climate policies are therefore developed in close interaction with the EU common and coordinated policies. Estonia recognizes that much still remains to be done, including the monitoring and regular evaluation of policies and measures.

60. The ERT acknowledged that Estonia has adopted policies and measures covering all the major sectors of its economy that have a bearing on GHG emissions. These policies and measures include plans for power generation, the energy conservation programme, the transport development plan, plans for pollution control, the strategy on sustainable development, the national waste management plan, and the national forest policy. Estonia has also provided details of specific quantitative objectives and targets under a few policies.

61. In 2004, Estonia adopted its National Programme of Greenhouse Gas Emissions Reduction for the period 2003–2012, which sets a national target to reduce GHG emissions by 21 per cent by 2010 (as compared with 1999 emissions levels). This would include a reduction in CO₂ emissions of 20 per cent, a reduction in CH₄ emissions of 28 per cent, and an increase in N₂O emissions of 9 per cent.

62. In the course of the IDR, the ERT formulated a number of recommendations relating to the completeness and transparency of Estonia's reporting under the Convention and the Kyoto Protocol. The ERT recommends that Estonia:⁵

- Provide further details on the revisions to its emission projections that will result from the renovations of large oil shale-based combustion plants for power generation. The ERT noted that renovations of these combustion plants (excluding the Narva power plant) are either planned or ongoing during the period 2003–2012 as regulatory measures.
- Ensure more transparent and time-series consistent reporting of fuel consumption in the transport sector.
- Carry out, and subsequently report on, an assessment of the extent to which measures proposed in the development plan to afforest 300,000 hectares of abandoned agricultural land will offset increased harvesting.
- Investigate measures to support new investment in cement and lime manufacture that could promote industry growth and deliver further reductions in emissions. The ERT also encourages Estonia to urge enterprises to implement environmental management systems based on international standards such as ISO and EMAS, and to adopt guidelines to improve environmental performance.
- Consider the role in the national economy of enterprises that have (or will have) allowances under the EU ETS, consider the extent to which these enterprises are able to respond to incentives created by the EU ETS, and identify which measures (if any) might be appropriate to assist them in responding to such incentives.
- Follow the UNFCCC reporting guidelines and provide a complete set of projections, including all sectors and GHGs, in its next national communication. The ERT further recommends that Estonia provide more transparent information on the methodology used for its GHG emission projections in its next national communication, including a clearly structured summary of key variables and assumptions, using table 2 from the UNFCCC reporting guidelines. The ERT also recommends that Estonia provide an analysis of the sensitivity of the GHG emission projections to changes in the underlying assumptions, namely those concerning GDP growth rate, oil and gas price changes, and the construction of a new pulp and paper factory.
- Provide more detailed information in a separate section on research and systematic observation as required by the UNFCCC reporting guidelines (paras. 57–64).
- Conduct an adaptation assessment and report the action taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation (para. 49 of the UNFCCC reporting guidelines). The ERT further recommends that Estonia include all elements of the supplementary information under Article 7, paragraph 2, of the Kyoto Protocol in its next national communication.

⁵ For a complete list of recommendations, the relevant sections of this report should be consulted.

Annex I**Documents and information used during the review****A. Reference documents**

- UNFCCC. 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>>.
- UNFCCC. Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol, decision 15/CMP.1. FCCC/KP/CMP/2005/8/Add.2. Available at <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>>.
- UNFCCC. Guidelines for review under Article 8 of the Kyoto Protocol, decision 22/CMP.1. FCCC/KP/CMP/2005/8/Add.3. Available at <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>>.
- UNFCCC. Report on the in-depth review of the third national communication of Estonia. FCCC/IDR.3/EST. Available at <<http://unfccc.int/resource/docs/idr/est03.pdf>>.
- UNFCCC. Synthesis of reports demonstrating progress in accordance with Article 3, paragraph 2, of the Kyoto Protocol. FCCC/SBI/2006/INF.2. Available at <<http://unfccc.int/resource/docs/2006/sbi/eng/inf02.pdf>>.
- UNFCCC. Report of the individual review of the greenhouse gas inventory of Estonia submitted in 2005. FCCC/ARR/2005/EST. Available at <<http://unfccc.int/resource/docs/2006/arr/est.pdf>>.
- Estonian Ministry of the Environment. 2005. Estonia's fourth national communication under the UN Framework Convention on Climate Change. Available at <<http://unfccc.int/resource/docs/natc/estnc4pI.pdf>> (part I) and <<http://unfccc.int/resource/docs/natc/estnc4pII.pdf>> (part II).
- Estonian Environment Information Centre. 2005. Report on the demonstration of progress achieved by 2005 by Estonia pursuant to article 5 (4) of the Decision 280/2004/EC. Available at <<http://unfccc.int/resource/docs/dpr/est1.pdf>>.

B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Eve Tamme (Climate and Ozone Bureau, Estonian Environment Information Centre) including additional material on most recent developments in the design of climate policy in Estonia.

Annex II**Acronyms and abbreviations**

CH ₄	methane	LULUCF	land use, land-use change and forestry
CO ₂ eq	carbon dioxide equivalent	Mg	megagram (1 Mg = 1 tonne)
CO ₂	carbon dioxide	mg	milligram (1000 mg = 1 gram)
CRF	common reporting format	Mtoe	millions of tonnes of oil equivalent
EC	European Community	N ₂ O	nitrous oxide
EMAS	Environmental Management and Audit Scheme	NC3	third national communication
ERT	expert review team	NC4	fourth national communication
ETS	emissions trading scheme	NGO	non-governmental organization
EU	European Union	Nm ³	standard cubic meter
GDP	gross domestic product	PFCs	perfluorocarbons
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the weighted sum of CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs and SF ₆ without GHG emissions and removals from LULUCF	PPP	purchasing power parities
GWP	global warming potential	RDP	Report demonstrating progress under the Kyoto Protocol
HFCs	hydrofluorocarbons	RES	renewable energy sources
IDR	in-depth review	SF ₆	sulphur hexafluoride
IEA	International Energy Agency	SO ₂	sulphur dioxide
ISO	International Organization for Standardization	Tg	teragram (1 Tg = 1 million tonnes)
kg	kilogram (1 kg = 1 thousand grams)	toe	tonnes of oil equivalent
kWh	kilowatt hour	TPES	total primary energy supply
JI	joint implementation	UNFCCC	United Nations Framework Convention on Climate Change
		USD	US dollar
		VAT	value-added tax
