COMPLIANCE COMMITTEE

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Report of the centralized in-depth review of the fourth national communication of Sweden

Note by the secretariat

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

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I. Introduction and summary

A. Introduction

1. Sweden ratified the UNFCCC in June 1993 and its Kyoto Protocol in May 2002. Its quantified emission limitation and reduction commitment under the Kyoto Protocol and the European Union (EU) burden-sharing agreement[1] (its Kyoto Protocol target) is to keep its total greenhouse gas (GHG) emissions below 104 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 Sweden, 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 Sweden's report demonstrating progress (RDP) in achieving its commitments under the Kyoto Protocol, and the supplementary information provided by Sweden 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 Sweden, 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 Sweden's NC4 complies with the UNFCCC reporting guidelines.[2] In accordance with decision 22/CP.8, the RDP provides information on the progress made in achieving the commitments of Sweden under the Kyoto Protocol. Supplementary information under Article 7, paragraph 2, of the Kyoto Protocol[3] is provided in both the NC4 and the RDP. The ERT commends Sweden for its coherent and consistent reporting.

1. Completeness

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

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[1] "European Council decision 2002/358/CE of 25 April 2002 concerning the approval, on behalf of the European Community, of the Kyoto Protocol to the UNFCCC and the joint fulfilment of commitments thereunder."

[2] "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.

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

2. Timeliness

7. The NC4 and the 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 Sweden'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 reporting guidelines. Still, the ERT noted that the transparency of the reporting could be enhanced, for example, by providing a "with additional measures" scenario in the section on GHG emission projections (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, Sweden has provided a comprehensive description of its national circumstances. However, the ERT noted that Sweden has provided only limited information on how national circumstances and changes in national circumstances affect GHG emissions and removals over time. It also noted that the key drivers of emission trends in Sweden include the structure of primary energy supply, electricity trade in the Baltic and Nordic regions, annual precipitation (availability of hydropower) and winter temperatures (number of heating days). The ERT noted that during the period 1990–2003 annual variations in these factors resulted in fluctuations in the trend of GHG emissions from energy, which overlapped with the underlying trends driven by economic activity and climate policy. In spite of these difficulties in analysing the domestic emission trend, the ERT concluded that policies and measures taken in Sweden to reduce GHG emissions from the production and use of electricity were likely also to reduce emissions in neighbouring countries because of the intense electricity trade in the Baltic and Nordic regions. Table 1 provides an overview of values of some relevant indicators (and changes in these values over time) for Sweden.

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

	1990	1995	2000	2003	Change 1990–2000 (%)	Change 2000–2003 (%)	Change 1990–2003 (%)
Population (millions)	8.56	8.83	8.87	8.96	3.7	1.0	4.7
GDP (billion USD 2000 PPP)	196	204	239	250	21.8	4.6	27.4
TPES (Mtoe)	47.6	51.0	48.5	51.5	1.9	6.4	8.3
GDP per capita (thousand USD 2000 PPP)	22.9	23.1	26.9	27.9	17.5	3.5	21.7
TPES per capita (toe)	5.6	5.8	5.5	5.8	–1.7	5.3	3.5
GHG emissions without LULUCF (Tg CO_2 eq)	72.2	73.4	67.3	70.6	–6.8	4.9	–2.3
GHG emissions with LULUCF (Tg CO_2 eq)	51.9	52.1	40.0	49.1	–23.0	22.7	–5.5
CO_2 emissions per capita (Mg)	6.6	6.5	5.9	6.3	–10.1	5.8	–4.9
CO_2 emissions per GDP unit (kg per USD 2000 PPP)	0.29	0.28	0.22	0.22	–23.5	2.2	–21.9
GHG emissions per capita (Mg CO_2 eq)	8.4	8.3	7.6	7.9	–10.1	3.8	–6.7
GHG emissions per GDP unit (kg CO_2 eq per USD 2000 PPP)	0.37	0.36	0.28	0.28	–23.5	0.3	–23.3

Sources: GHG emissions data are from the 2005 inventory submission of Sweden; 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, Sweden has provided a summary of information on GHG emission trends for the period 1990–2003. The summary tables, including CO_2 equivalent emission 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 2.3 per cent between 1990 and 2003, while total GHG emissions including net removals from LULUCF decreased by 5.5 per cent. This decrease was mainly attributed to reductions in CH_4 emissions, which decreased by 15.3 per cent (–997.2 Gg CO_2 equivalent) over this period, and the main contribution to this decrease in CH_4 emissions came from the waste sector. Emissions of N_2O decreased by 7.5 per cent (–661.0 Gg CO_2 equivalent), mainly due to a decrease in emissions from agricultural soil. Emissions of CO_2 remained almost stable (–0.5 per cent, or –282.5 Gg CO_2 equivalent), with a considerable decrease in the residential and services sector, contrasting with increases in the energy industries sector and, to a lesser extent, in the transport sector. Emissions of fluorinated gases accounted for about 0.8 per cent of total GHG emissions in 1990 and 1.2 per cent in 2003. Table 2 provides an overview of GHG emissions by sector in 1990–2003 (see also the discussion of sector trends in section II.B).

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

	GHG emissions (Tg CO_2 equivalent)					Change (%)		Shares[a] (%)	
	1990	1995	2000	2002	2003	1990–2003	2002–2003	1990	2003
1. Energy	53.7	55.1	50.3	52.7	53.6	–0.2	1.8	74.4	76.0
A1. Energy industries	10.5	11.7	9.9	12.6	13.3	25.9	5.7	14.6	18.8
A2. Manufacturing industries and construction	11.3	12.2	10.7	11.0	11.7	3.5	5.7	15.6	16.5
A3. Transport	18.9	19.5	20.1	20.6	20.9	10.4	1.3	26.2	29.6
A4–5. Other	11.9	10.5	8.5	7.3	7.0	–41.3	–4.2	16.5	9.9
B. Fugitive emissions	1.1	1.2	1.1	1.1	0.8	–25.5	–30.6	1.5	1.1
2. Industrial processes	5.7	5.8	5.6	5.7	5.9	3.6	4.0	7.9	8.3
3. Solvent and other product use	0.4	0.4	0.3	0.3	0.3	–25.6	0.8	0.6	0.4
4. Agriculture	9.6	9.5	8.9	8.8	8.7	–8.9	–0.7	13.3	12.4
5. LULUCF	–20.3	–21.3	–27.3	–26.5	–21.5	5.9	–19.0	–28.1	–30.5
6. Waste	2.8	2.6	2.2	2.0	2.0	–28.4	–2.2	3.9	2.8
GHG total with LULUCF	**51.9**	**52.1**	**40.0**	**42.9**	**49.1**	**–5.5**	**14.2**	–	–
GHG total without LULUCF	**72.2**	**73.4**	**67.3**	**69.5**	**70.6**	**–2.3**	**1.5**	–	–

[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.

12. The ERT encourages Sweden to provide more detailed data on its national circumstances in its next national communication, in order to facilitate the interpretation of emission trends at the sub-sector level (for example, regarding the structure and the development of the vehicle fleet).

B. Policies and measures

13. Sweden has provided in its NC4 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 sector. Each sector has its own description of the principal policies and measures. The policies and measures chapter is supplemented by a summary table on policies and measures by sector. Sweden 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 (Article 2).

14. Despite substantial growth in Sweden's economy since 1990 (growth in GDP during 1990–2003: +27.4 per cent), the country managed to stabilize its CO_2 emissions between 1990 and 2003 and to reduce its overall GHG emissions by 2.3 per cent over the same period. Since it submitted its NC3 in 2001, Sweden has further developed its portfolio of policies and measures to reduce GHG emissions, in which it has incorporated elements of the European Climate Change Programme. On the basis of the results of its active climate policy, Sweden can expect an overall emissions trend by 2010 that is fully in line with its national mitigation target and international commitments (see also section III of this report). In addition, Sweden has gained experience with the implementation of project-based mechanisms of the Kyoto

Protocol. The ERT noted that the use of these mechanisms might add some flexibility in the pursuit of Sweden's climate policy goals. Table 3 highlights important domestic policies and measures which Sweden has implemented in recent years.

Table 3. Summary information on policies and measures

Major policies and measures	Examples / comments / estimated effects
Framework policies and cross-sectoral measures	
Environmental Code	Aims to promote sustainable development, including meeting environmental quality objectives. Includes rules requiring use of best-practice technologies and reduced use of raw materials and energy, and encourages recycling
Sweden's Climate Strategy (government bill 2001/02:55)	Integrated framework for Swedish climate policy, including climate objectives; to be reviewed and updated at regular intervals
Klimp (successor to the LIP programme)	Primarily aimed at municipalities and companies; provides grants for GHG-reducing measures *(combined estimated effect of the Klimp and LIP programmes: up to 2 Tg CO_2/year in 2010)*
"Green tax shift" (ecological tax reform)	Increase of CO_2 taxes in parallel with a reduction of taxes on labour (building upon CO_2 taxation scheme introduced in the early 1990s)
Participation in the project-based flexible mechanisms of the Kyoto Protocol	Funds for international climate policy measures through the Baltic Sea Region Testing Ground Facility, the Prototype Carbon Fund, and SICLIP, a national programme for the acquisition of CERs and ERUs from CDM and JI projects
Emissions trading	Participation in the EU ETS in the context of the European Climate Change Programme
Energy	*Combined estimated effect: 10 Tg CO_2 equivalent/year in 2010*
Electricity certificate system	Main instrument to promote electricity production from RES by obligating end-users to purchase a certain percentage of electricity generated from RES; replaces investment grants for electricity from RES
Five-year support programme on energy efficiency improvements	Labelling, testing and certification of products and systems; tax discounts and investment support for measures and products; information and training programmes
PFE programme for energy efficiency in industry	Programme focusing on the increase of efficiency in electricity utilization in energy-intensive industrial sectors, e.g. by means of energy management systems
Transport	*Combined estimated effect: 3.3 Tg CO_2 equivalent/year in 2010*
Energy and CO_2 tax on transport fuels	Introduced in the 1950s and in 1991, respectively
Tax relief for biofuels	Since 2004, CO_2-neutral transport fuels have been exempt from taxation
Promotion of "green cars"	Tax benefits, grants and other benefits for cars that run on ethanol, natural gas/biogas or electricity, and hybrid electric cars; procurement regulations for state authorities
CO_2-related vehicle tax	As from 2006, new cars or cars fulfilling the 2005 EU exhaust emission requirements are taxed in relation to their CO_2 (and particulate matter) emissions
Industry	*Combined estimated effect: 0.2 Tg CO_2 equivalent/year by 2010*
Application of the Environmental Code	Aims to promote sustainable development, including meeting environmental quality objectives, through rules requiring use of best-practice technologies, reduced use of raw materials and energy, and recycling. Includes provisions to reduce emissions of PFCs in the aluminium industry, supported by an EU regulation to control use of HFCs in mobile air conditioners, and to control certain fluorinated gases. The Code excludes installations covered by the EU ETS
Agriculture	
Swedish environment and rural development programme	Targeted programme of subsidies, grants, environmental charges and information to reduce CH_4 and N_2O emissions
Waste management	*Combined estimated effect: 1.4 Tg CO_2 equivalent/year in 2010*
Rules on municipal waste planning and producer responsibility, tax on waste to landfills, and prohibitions on acceptance of organic waste and unsorted combustible waste at landfills	Combined effect reduces CH_4 production from landfills
Forestry	
Forestry Act	Increased carbon uptake through improved forest stewardship
Environmental Code	Increased carbon uptake and reduced CH_4 emissions through provisions on nature reserves, habitat protection and drainage
Voluntary measures	Increased carbon uptake through voluntary set-asides

Note: For the abbreviations used, see annex II.

1. Policy framework and cross-sectoral measures

15. Sweden has adopted a strategic approach to climate change which is oriented around its international commitments under the UNFCCC and the Kyoto Protocol and its requirements as a member State of the EU. Sweden uses a mix of policy instruments in accordance with two overarching principles:

to integrate environmental considerations into policies for all sectors; and to differentiate between central government agencies and local authorities in terms of responsibilities for achieving environmental objectives. The government bill entitled Sweden's Climate Strategy, adopted in 2002, defines short- and long-term objectives and integrates pre-existing elements with new instruments. It defines the framework for Swedish climate policy that currently applies and is evaluated at regular intervals. The EU obliges its member States to meet the requirements of the EU Emissions Trading Scheme (EU ETS) and other directives relating to climate change. Sweden has adapted its domestic policies accordingly.

16. Sweden has consolidated different areas of environmental legislation in the Environmental Code. The Code aims to promote sustainable development and gives effect to objectives relating to energy, waste and some GHG emissions through rules requiring, inter alia, the use of best-practice technologies in relation to materials use, energy reuse, recycling and renewable energy. Permits are required for environmentally hazardous activities, including those generating GHG emissions (in particular the fluorinated gases), although those emissions that are covered by the EU ETS are exempt from this requirement.

17. In addition to these regulatory measures, Sweden established the Climate Local Investment Programme (Klimp) in 2003. In 2005, it was extended and funding was increased, from SEK 1,040 million for the period 2003–2005, to SEK 1,880 million for the period 2006–2008.[4] Just over half of this grant funding (56 per cent) has gone to energy projects and 10 per cent to local initiatives to reduce GHG emissions from waste management.

18. The ERT commends Sweden for taking into account the conclusions and recommendations of the IDR of the NC3 in preparing its NC4. In particular, it acknowledges the additional insights provided in the assessment of the cost-effectiveness of measures, and the information on evaluation of climate policy instruments in general. It encourages Sweden to continue sharing with other Parties its extensive experience in policy evaluation and information on the political and economic implications of its emissions reduction strategy, for example, by making evaluation reports available in English.

2. Policies and measures in the energy sector

19. Between 1990 and 2003, GHG emissions from energy industries increased by 25.9 per cent (+2.7 Tg CO_2 equivalent). This was mainly due to the substitution of fossil fuel-based heating systems in the residential and services sector by public heat production (district heating, including enhanced use of combined heat and power (CHP) plants and biomass). Consequently, emissions from the residential and services sector decreased by 4.9 Tg, due to the reduced use of heating oil. The increasingly important role of biomass as a substitute for fossil fuel in Sweden between 1990 and 2003 is reflected in the fact that energy supply from combustion of biomass increased by 32.3 per cent (from 230.5 to 305.1 PJ) during the period 1990–2003. According to additional information provided by Sweden, logging residues, by-products from the pulp and lumber industries, wood waste and wood cut specifically for fuel are the main biomass fuels used for energy production.

20. By means of a comprehensive taxation system and additional measures to support the use of renewable energy (principally biomass but also ambient heat), such as electricity certificates, and the promotion of efficient means of energy production, such as CHP, Sweden has achieved a substantial shift towards a less emission-intensive energy supply.

21. In contrast to emissions from stationary sources, GHG emissions from transport increased notably (by +10.4 per cent or 2.0 Tg CO_2 equivalent) between 1990 and 2003. Sweden reports in its NC4 that volumes of domestic passenger transport increased by 12 per cent and freight transport by just over 14 per cent between 1990 and 2002. Use of diesel fuel increased by 50 per cent between 1990 and 2003, which

[4] 1 SEK = 0.1368 USD.

reflects both the strong growth in road freight transport by 25 per cent and the increase in the share of diesel-fuelled passenger cars in the Swedish car fleet.

22. Even though emissions from transport are being addressed by measures to promote the enhanced use of low-emission cars and to reduce the GHG emissions of motor fuels, they have continued to rise. On the basis of additional information provided by Sweden during the review, the ERT noted that Sweden is well aware of the existing potential for reductions in this sector and steps are being taken to address this potential in the near future.

3. Policies and measures in other sectors

23. The share of non-energy sectors in total GHG emissions (excluding LULUCF) remained relatively steady, at 24–25 per cent, during 1990–2003. In this period, decreases in emissions from agriculture and waste (by 8.9 and 28.4 per cent, respectively) were partly offset by increases in emissions from industrial processes (including solvent and other product use) (by 1.6 per cent).

24. ***Industrial processes.*** Emissions from industrial processes are dominated by CO_2 and the fluorinated gases. CO_2 emissions increased steadily over the period 1990–2003, by almost 6 per cent – from 4,252 to 4,505 Gg – mostly in the metals industry. Emissions of CO_2 from solvent use declined steadily over the period, from 320 to 169 Gg. The EU ETS covers CO_2 emissions from industrial processes, including those from metal, glass, cement and ceramic production.

25. HFC emissions rose strongly, from 3.85 Gg in 1990 to 470.9 Gg in 2003, and were only partially offset by reductions in emissions of PFCs and SF_6. In its NC4, Sweden reports that the principal instrument to control PFCs is the Environmental Code and EC regulation on the use of HFCs (Regulation (EC) No 842/2006, Directive 2006/40/EC), with an estimated mitigation effect of approximately 0.15 Tg CO_2 equivalent per year up to 2010.

26. Emissions from the ***agriculture*** sector decreased by 9 per cent between 1990 and 2003 through reductions in emissions of N_2O from soils and manure and of CH_4 from enteric fermentation. The reductions are a result of decreases in livestock numbers and subsequent reductions in the production of manure and use of fertilizer. The decline in these emissions is expected to continue, primarily as a consequence of reform of the EU Common Agricultural Policy to decouple subsidies from production. However, the NC4 notes that the Swedish government subsidizes forage crops and pasture land and that this may to some extent counteract the decrease in livestock numbers and thereby limit the potential future decrease in emissions.

27. In the ***land-use change and forestry*** sector, removals increased by 6 per cent between 1990 and 2003 (from 20,292 to 21,499 Gg). Although annual removals have fluctuated between approximately 20,000 and 29,000 Gg, total annual increments exceed annual harvest and natural wastage. Because the carbon stock in forests is still increasing, there are currently no special rules aimed at promoting increased carbon sequestration in forests.

28. On the basis of additional information provided by Sweden, the ERT noted that increased biomass production to substitute for fossil fuels has come into focus in recent years in Sweden. To meet a projected increase in demand for bioenergy, work is under way to investigate options to convert agricultural land to forest land (afforestation). Any measures to promote this could contribute to meeting climate change goals through increased biomass and the associated carbon uptake, and increased soil carbon.

29. ***Waste*** sector emissions declined by 28 per cent, from 2,793 to 2,001 Gg CO_2 equivalent, between 1990 and 2003, due largely to the success of methane capture and combustion in landfills and substantial reductions in the volume of organic material sent to landfills. While CO_2 emissions more than doubled between 1990 and 2003, from 43.85 Gg to 120.94 Gg, as incineration was increasingly used as a method

of waste management, emissions of CH_4 from solid waste disposal decreased by about one-third, from 2,553.6 to 1,738.8 Gg CO_2 equivalent.

30. Regulatory instruments have been the prime drivers of these changes. The Environmental Code includes provisions to require permits for activities that have adverse impacts on the environment, and provisions to prohibit certain activities. Under the Code, producer responsibility provisions (covering packaging, paper and tyres), municipal waste planning, and a ban on sorted combustible and organic waste being accepted at landfills, in conjunction with incineration, biodigestion and composting, have been progressively implemented and have contributed to the steady decline in waste emissions. A tax on waste sent to landfills has been established by law.

C. Projections and the total effect of policies and measures

1. Projections

31. The projections provided by Sweden in its NC4 include a "with measures" scenario until 2020 and are presented relative to actual inventory data for the preceding years, 1990–2003. Projections are presented by sector, using the same sectoral categories as the policies and measures section of the NC4, and on a gas-by-gas basis for the three main GHGs (CO_2, CH_4, N_2O) and the fluorinated gases combined. In addition, projections are provided in an aggregated format for each sector as well as for a national total, using global warming potential values. Table 4 provides a summary of GHG emission projections for Sweden.

Table 4. Summary of greenhouse gas emission projections for Sweden

	GHG emissions (Tg CO_2 equivalent per year)	Changes compared to base year level (%)
Inventory data 1990[a]	72.2	–
Inventory data 2003[a]	70.6	–2.3
Kyoto Protocol base year[b]	72.2	–
Kyoto Protocol target for 2008–12[c]	75.1	+4.0
"With measures" projections for 2010[b]	71.5	–1.0

[a] *Source*: Sweden's 2005 GHG inventory submission; the emissions are without LULUCF.
[b] *Source*: Sweden's NC4, section on GHG emission projections; the projections are for GHG emissions without LULUCF.
[c] See paragraph 1.
Note 1: Sweden's national target for 2008–2012 is 69.3 Tg CO_2 equivalent per year, corresponding to a reduction of 4 per cent compared to the 1990 level.
Note 2: For the abbreviations used, see annex II.

32. Different methods have been used to develop projections for different sectors. Projections on economic development were produced using the EMEC general equilibrium model run by the National Institute of Economic Research. The MARKAL-Nordic Model was used to provide activity and emission projections for energy use (excluding transport). Passenger and freight transport activities were projected by the SAMPERS and SAMGODS models, respectively. A spreadsheet model trend analysis was used to develop scenarios for emissions from industrial processes. Landfill emissions were projected using a modified model developed by the Intergovernmental Panel on Climate Change (IPCC). Agriculture sector emission projections were based on a detailed assessment of the future development of the sector. Projections for net removals in the LULUCF sector were based on the Hugin calculation system.[5] The methodological approach is clearly described and general as well as specific assumptions upon which the projections are based are presented.

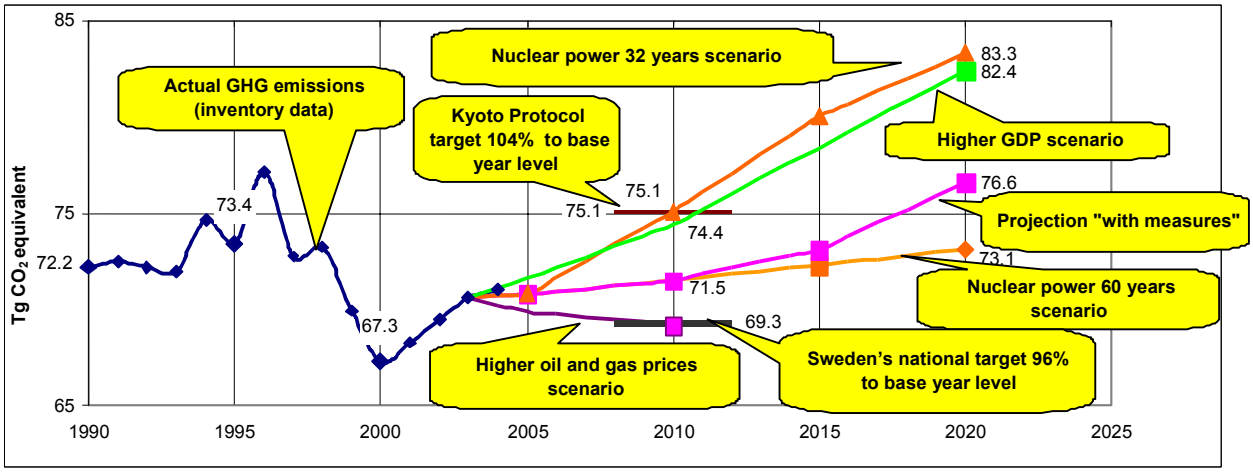
33. Four sensitivity analyses have been drawn up to complement the projections using the following alternatives to the assumptions used in the "with measures" scenario: (a) shortening the lifetime of nuclear power plants from 40 to 32 years; (b) extending the lifetime of nuclear power plants to 60 years;

[5] Lundström A. & Söderberg U. (1996). See annex I for complete reference.

(c) an increase in gross domestic product (GDP) growth – by 0.6 per cent over the whole period 2000–2020; and (d) higher oil and natural gas prices (approximately 2.5 times higher).

34. The results of these analyses suggest that higher oil and natural gas prices would have a major effect on GHG emission reductions (–3.2 per cent in 2010), mainly as a result of fuel shifts from natural gas to biomass. Extension of the lifetime of nuclear power plants has the second-largest impact on GHG emission reductions (0 per cent in 2010 and 4.6 per cent in 2020), whereas the other two alternatives (shortening of the lifetime of nuclear power plants and faster GDP growth) clearly show an increase in GHG emissions (by 5.0 and 4.0 per cent, respectively, in 2010 and by 8.7 and 7.4 per cent, respectively, in 2020). Figure 1 provides a summary of the GHG emission projections for Sweden.

Figure 1. Greenhouse gas emission projections



Source: Sweden's NC4; the projections are for GHG emissions without LULUCF.

2. Total effect of policies and measures

35. In its NC4, Sweden presents the estimated and expected total effect of individual implemented and adopted policies and measures. It also provides 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, for the years 2005, 2010, 2015 and 2020, as well as relevant information on factors and activities for each sector for the period 1990–2020. The ERT noted that, as Sweden has quantified the effects of only some implemented policies and measures, the total effect of all its implemented policies and measures is likely to be higher than the reported estimate of 11.9–13.6 Tg CO_2 equivalent.

36. The ERT noted that Sweden has not provided a "with additional measures" scenario, as it expects that its Kyoto Protocol target will already be met under a "with measures" scenario. However, the ERT noted that additional policies and measures are likely to be needed to meet Sweden's national target.[6] Table 5 provides an overview of the total effect of policies and measures as reported by Sweden.

[6] The ERT was informed by the Party that the implementation of additional measures was not considered necessary by Sweden, since the "with measures" scenario indicated that the quantified emission limitation and reduction commitment under the Kyoto Protocol and the EU burden sharing agreement would probably be fulfilled. However, with a view to meeting the national target, some additional policies and measures were adopted by the Swedish parliament after submission of the NC4 (e.g. the bill "National climate policy in global cooperation" 2005/06:172).

Table 5. Total effect of policies and measures, estimated for 2005 and projected for 2010 and 2020

	Absolute value ($Tg CO_2$ equivalent)	Relative value (% of base year emissions)
Total effect of implemented policies and measures in 2005 [a]	11.9–13.6	16.5–18.8
Total effect of implemented policies and measures in 2010 [a, b]	16.0–17.8	22.4–24.9
Total effect of planned policies and measures in 2010 [a]	0.35	0.6
Total effect of implemented and planned policies and measures in 2010 [a]	16.35–18.15	22.6–25.1
Total effect of implemented and planned policies and measures in 2020 [c]	47	65.1

[a] *Source*: Sweden's NC4, table 4-7, calculated by the ERT; the emissions are without LULUCF.
[b] Sweden reports in its NC4 (table 5-20) a value of 17 Mt, which corresponds to the results of the ERT's calculations.
[c] *Source*: Sweden's NC4, table 5-20.
Note: The total effect of policies and measures is defined in the NC4 as the estimated effects of selected measures that had been implemented or adopted by 2003 (implemented policies and measures) plus the estimated effects of some planned measures not included in the "with measures" projections (planned policies and measures).

37. The ERT commends Sweden for presenting a comparison between the projection results of the NC3 and the NC4. The major change in the assumptions underlying the two projections is faster economic growth, by about 0.7 percentage points until 2020, in the NC4. Both GHG emission projections show approximately the same trend between 1990 and 2010 for the energy sector excluding transport. The difference between the projections occurs in the trend between 2010 and 2020, when the NC4 projections show an increase in GHG emissions by 4 per cent, which is only one-third of the increase shown in the NC3. The ERT noted that the NC4 projections show a total use of natural gas in the energy sector in 2020 which is twice as high as in the NC3 projections, mainly due to much higher gas use in electricity production, resulting in a substantial increase in GHG emissions. Also, the NC4 reports a higher increase in GHG emissions in the transport sector, mainly due to increased use of diesel, compared with the NC3. At the same time, carbon removals are assumed to be lower due to higher felling in forestry. On the other hand, reductions in GHG emissions from energy use in households and from agriculture and waste management partly offset the growth in GHG emissions from the energy and transport sectors.

38. During the review process, the ERT received additional information from Sweden on quantified effects of new policies and measures proposed in recent government bills, which are expected to reduce GHG emissions by another 1–1.25 Tg CO_2 equivalent in 2010 (as compared to the figures presented in the NC4), and contribute to lowering emissions to 2.5–3 per cent below the 1990 level. Taking into account this additional information, the ERT concluded that additional policies and measures would contribute to Sweden meeting both its Kyoto Protocol target and its national GHG targets. The ERT encourages Sweden to include a "with additional measures" scenario in its next national communication.

D. Vulnerability assessment, climate change impacts and adaptation measures

39. In its NC4, Sweden has provided comprehensive information on the expected impacts of climate change in Sweden and an outline of the action taken to implement Article 4, paragraph 1 (b) and (e), of the Convention with regard to adaptation. Table 6 summarizes the information on vulnerability and adaptation to climate change.

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

Vulnerability area	Examples / comments / adaptation measures reported
Agriculture and food security	***Vulnerability***: benefits from a warmer climate and increased CO_2, but some problems could arise with pest and plant diseases
Biodiversity and natural ecosystems	***Vulnerability***: habitats and species are expected to move northwards and to higher altitudes; some risks may result from fire, insect attack and windfall. A rise in temperature will also have some impact on lake ecosystems
Coastal zones	***Vulnerability***: in addition to a rise in sea levels, an alteration in salt content and the concentration of pollutants may occur ***Adaptation***: flood defence measures
Fisheries	***Vulnerability***: potential changes in the composition of fish species and their distribution
Forests	***Vulnerability***: some benefit from increased CO_2 concentration and longer growing season, but negative effects from wind, fire, pests and diseases are likely ***Adaptation***: new strategy for the breeding of pine, spruce, birch and Pinus contorta in the early 1990s, which is still applied
Human health	***Vulnerability***: increased spread of heat-related diseases and allergy symptoms
Infrastructure and physical planning	***Vulnerability***: besides some positive effects, such as reduced need for snow clearing, gritting and salting of road surfaces and increased production of hydropower, negative economic impacts may include disruption to communications and electricity distribution, and costs relating to physical damage to infrastructure ***Adaptation***: amending regulations for physical planning and hydropower system; protection against natural disasters
Water resources	***Vulnerability***: changes in the seasonal distribution of run-off; negative consequences for both the supply and the quality of drinking water
Tourism	***Vulnerability***: winter tourism may be affected by reduced amounts of snow ***Adaptation***: production of artificial snow

40. Both positive and negative impacts are expected from the projected warmer and wetter climate. Increased run-off in Sweden as a whole could increase hydropower productivity but may also cause a risk of flooding. Even though agriculture in Sweden is highly sensitive to climate, it is likely to benefit more than the agriculture of most other countries from the expected climate change. Forestry may also see a positive impact in terms of production. However, there may be a reduction in wood quality. Lake and mountain ecosystems are considered to be vulnerable. Winter tourism in Sweden is identified as less vulnerable to climate change than its counterparts in the rest of Europe, which could result in benefits for Swedish ski resorts. Sweden has not yet developed a national strategy for adaptation to climate change, but a government inquiry was appointed in the summer of 2005. Furthermore, a start has been made at the municipal level by adopting some preventive measures, such as amending the regulations for physical planning, for example, on reassessing high flow rates or water levels. Limits have been set for the location of buildings, and heights have been established for minimum floor level and levels for the capacity of sewer systems. The ERT found that measures such as those identified in infrastructure and physical planning could also be extended to water resources and coastal zones.

41. The ERT encourages the Party to formulate more specific adaptation strategies in areas where such strategies have not been identified in the NC4, for example, agriculture and food security, biodiversity and natural ecosystems, and human health.

E. Financial resources and transfer of technologies

1. Financial resources

42. In its NC4, Sweden describes measures taken to give effect to its commitments under Article 4, paragraphs 3, 4, and 5, of the Convention. It indicates what "new and additional" financial resources it has provided pursuant to Article 4, paragraph 3, and clarifies that these additional resources are intended to support work under the Convention and its Kyoto Protocol.

43. Swedish official development assistance (ODA) in the area of climate change is intended to contribute to measures that prevent or minimize GHG emissions, reduce the vulnerability of least developed countries to the effects of climate change, and enhance their capacity to cope with and adapt to

a changed climate. Sweden is one of the few countries to meet the United Nations ODA target of 0.79 per cent of gross national income (GNI) per year (see table 7). The country's ODA budget for 2006 amounts to SEK 28,090 million, or 1 per cent of the calculated GNI for 2006. The greater part of Sweden's ODA consists of financial assistance for developing countries and countries with economics in transition, and is managed by the Swedish International Development Cooperation Agency (Sida). Approximately one third of Swedish ODA is channelled via multilateral organizations, coordinated by the Ministry of Foreign Affairs.

44. Furthermore, Sweden provides information on payments to multilateral organizations, which are reported in table 7-3 of the NC4 for the years 2000–2003. Annex 3 to the NC4 shows bilateral and regional financial support to recipient countries relating to climate change for the years 2000–2003 and may include activities which cannot be regarded as relating directly to the Convention.

Table 7. Summary information on financial resources

Official development assistance (ODA)	SEK 19,388 million (0.79 per cent of GNI) in 2003
Climate-related aid in bilateral ODA	SEK 1,646 million in 2003
Climate-related support programmes	Sweden supports the participation of developing countries in the UNFCCC by making extra contributions to the Trust Fund for Participation in the UNFCCC Process and the Trust Fund for Supplementary Activities
Contributions to GEF	SEK 241.7 million for the period 2000–2003
Pledge for 3rd GEF replenishment	SEK 665 million (+SEK 100 million extra grant) up to 2012
JI and CDM under the Kyoto Protocol	Sweden contributes to the work under the CDM Executive Board
Other (bilateral/multilateral)	Sweden contributed SEK 3 million to the Least Developed Countries Fund in 2002 Sweden paid SEK 5,357 million to multilateral institutions and programmes in 2003

Note: For the abbreviations used, see annex II.

45. While the bilateral and regional assistance and sector support provided by Sweden are increasing, the proportion of support that is given to specific projects or programmes is decreasing. As the Party explained, development cooperation between Sweden and recipient countries demands active participation in the whole process, from idea to implementation, but also requires that the donor promote governance of specific projects in the partner country.

46. The ERT noted that most of the financial support provided via bilateral cooperation in 2000–2003 was directed to energy-related projects (SEK 1,573.16 million), followed by agriculture (SEK 464.14 million), forestry (SEK 308.86 million), waste (SEK 307.12 million), coastal zones (SEK 285.5 million), transport (270.45 million) and industry (SEK 94.80 million). Substantial support was also provided for capacity-building and research, which amounted to more than SEK 1,700 million in 2000–2003.

47. The ERT encourages Sweden to provide information on its financial contributions by filling in the relevant tables in US dollars. This would help the ERT to make inter-country comparisons.

2. Transfer of technology

48. In its NC4, Sweden describes projects in the field of technology transfer in certain areas of activity, such as energy and industry. It distinguishes clearly between activities undertaken by the public sector through the Swedish Trade Council and the Swedish Export Credits Guarantee Board and those undertaken by the private sector, such as the Church of Sweden and the Swedish Society for Nature Conservation.

49. Furthermore, Sweden reports on several projects that are being implemented in China, India, Indonesia, Mongolia, the Philippines, Thailand and Viet Nam with the aim of improving capacity for environmental inspection and administration, reducing GHG emissions in the iron and steel, cement and

lime, pulp and paper, and chemical industries. The activities involve the training of operators and civil servants, supervision and the development of inspection guidelines.

50. The ERT noted that in recent years Sweden has significantly increased its support to developing countries, with the aims of mitigating GHG emissions, reducing the vulnerability of poor countries and strengthening their ability to adapt to a changed climate. However, Sweden does not report any success stories or lessons learned. The ERT encourages the Party to use table 6 of the reporting guidelines and to address such activities in more detail in its next national communication.

F. Research and systematic observation

51. Sweden has provided comprehensive information on its domestic and international actions relating to research and systematic observation, including its participation in the International Geosphere–Biosphere Programme and the EU framework programmes. The NC4 also reflects action taken by Sweden to support related capacity-building in developing countries. Furthermore, Sweden has provided summary information on its activities relating to the Global Climate Observing System (GCOS).

52. A number of new research programmes on modelling and projections, including global climate models, socio-economic analysis and the development of mitigation and adaptation measures, have been initiated since the publication of the NC3. A new Internet-based service intended for clients who need climate scenario maps and numerical data is being set up at the Rossby Centre of the Swedish Meteorological and Hydrological Institute (SMHI). A research programme, comprising two major research projects, was initiated in 2004 with the aim of providing support to decision makers in international climate negotiations and developing emissions trading as a tool of climate policy. A major initiative on pilot plants for the production of climate-neutral biofuels has also been launched. The Party provides support for research in developing countries through Sida.

53. Climate observation comprises the systematic collection of data on meteorology, hydrology and oceanography, together with monitoring of sources and sinks of GHGs and assessment of climate-related impacts on ecosystems. Through the SMHI and various collaborating agencies, Sweden provides the GCOS with long-term observations and measurements of temperature, precipitation, wave height, icing and variations in glaciers. The Party plays an active part in the Global Operational Oceanographic System and the Global Terrestrial Observing System. Sweden contributes to the establishment of monitoring systems in certain developing countries through the SMHI.

G. Education, training and public awareness

54. The ERT noted that Sweden has followed the UNFCCC reporting guidelines in describing its activities in public awareness and policies towards improved education, training and public awareness in the field of climate change.

55. The Swedish government established the Green School Award in 1999 to encourage teaching on ecological sustainability. That award was replaced by the School for Sustainable Development award in 2005. Basic school education covers issues relating to climate change and sustainable development, but the ERT noted that there are no requirements for general environmental knowledge for students at colleges of higher education and universities equivalent to those in the curricula of primary and lower secondary schools. The provision and dissemination of information forms part of the Swedish climate strategy, and several public information campaigns have been conducted in recent years, including a very broadly-based mass communication campaign on the theme of "Something odd is happening to the weather" (December 2002–April 2003), with information made available also in the five main immigrant languages, an eco-driving campaign (summer 2003), and the "In Town, Without My Car!" campaign (during World Environment Day 2003).

56. The ERT noted Sweden's active consumer policy developed in 2003–2004 to reduce household emissions through energy saving and energy labelling. Sweden places considerable emphasis on increasing public awareness through the provision of better information about the environmental impacts of products and by supporting efforts to change consumer behaviour. A number of public and non-governmental organizations are involved in public awareness-raising.

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

57. Sweden's RDP includes five 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.

58. Sweden's Kyoto target under the EU burden-sharing agreement is to keep total GHG emissions during the first commitment period (2008–2012) below 104 per cent of the 1990 level. On the basis of the information contained in its RDP, Sweden will meet this target by means of policies and measures already adopted or implemented. According to the NC4 projections, total GHG emissions (excluding LULUCF) are expected to be 1 per cent lower in 2010 than in 1990.

59. Emissions and removals due to activities under Article 3, paragraph 3, of the Kyoto Protocol are expected to result in net emissions. When added to the non-LULUCF sectors, this would lead to a level of emissions that is close to the target within the EU burden-sharing agreement. No figure is given on the expected contribution of emissions from the LULUCF sector to total GHG emissions. The ERT noted that, because the Swedish forests represent a substantial sink, emissions would be well below the 1990 level should Sweden choose to elect activities under Article 3, paragraph 4, of the Kyoto Protocol.

60. Sweden is developing the option of using the Kyoto Protocol mechanisms through its active participation in the pilot phase of the activities implemented jointly, as well as through investments in multilateral joint implementation (JI) and clean development mechanism (CDM) funds. It has allocated SEK 174 million for the acquisition of emission reduction units from JI and CDM projects. However, the RDP does not contain any information on Sweden's intentions to make use of this option in the context of its commitments during the first commitment period.

61. A description of Sweden's legislative arrangements and enforcement and administrative procedures is provided in chapters 2 and 4 of its NC4. On the foundation of a long-standing climate policy tradition, Sweden has in place a comprehensive system of measures directed at controlling GHG emission trends. By combining responsibility for climate and energy issues in a Ministry of Sustainable Development, formed in 2005, Sweden has added an additional element of coherence to its administrative set-up in the climate sector.

62. The ERT noted that, against the background of the achievements of Swedish climate policy to date, it may thus be assumed that government structures are adequate for Sweden to perform its tasks and honour its commitments at the international level. In addition, as an EU member State, Sweden participates in the EU common and coordinated climate policies and measures.

63. Besides the policies and programmes contributing to the mitigation of climate change, work on a national strategy addressing adaptation measures was initiated in 2005. At the international level, Sweden has made extensive efforts in the areas of financial assistance, technology transfer and capacity-building directed to developing countries.

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

64. Sweden 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 Sweden to implement the relevant provisions of the Kyoto Protocol. The supplementary information is placed in different sections of the NC4 and RDP. Table 8 provides references to the RDP and NC4 sections in which supplementary information is provided.

Table 8. Overview on 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	NC4, p. 77 RDP, pp. 4, 16ff
Policies and measures in accordance with Article 2	NC4, chapter 4 RDP, chapters 2, 4, 5
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	NC4, chapters 2, 4
Information under Article 10	NC4, chapters 3.3, 4, 6.3, 6.4, 7, 8, 9.8 RDP, chapters 2, 4, 5
Financial resources	NC4, chapter 7 RDP, chapters 5.6, 5.7

65. The ERT commends Sweden for the presentation of its account of work undertaken within the International Civil Aviation Organization and the International Maritime Organization relating to emissions from fuel used in international transport, in response to its commitments under Article 2, paragraph 2, of the Kyoto Protocol. It noted with appreciation the transparent documentation on related activities in a separate section of Sweden's NC4.

66. The ERT noted that Sweden has not reported the following elements of the supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol: (a) information on what efforts Sweden 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 (b) 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 Sweden provide additional information on these reporting elements in its next national communication.

IV. Conclusions and recommendations

67. On the basis of the information provided in Sweden's NC4 and RDP, as well as additional information provided by Sweden in response to questions raised by the ERT during the review, the ERT developed an understanding of the Swedish approach to climate policy and the state of its implementation of its commitments under the Convention and the Kyoto Protocol. The ERT noted that, in spite of considerable economic growth since the mid-1990s, Sweden is likely to reach its emission reduction commitment under the Kyoto Protocol by means of domestic measures alone.

68. Sweden managed to stabilize its CO_2 emissions between 1990 and 2003 and to reduce its overall GHG emissions by 2.3 per cent over the same period. Emission reductions in the residential/commercial sector (–41.3 per cent) and in the waste sector (–28.4 per cent) were partly offset by increases in emissions from energy industries (+25.9 per cent) and from transport (+10.4 per cent).

69. Since the early 1990s, Sweden has developed and implemented a wide range of policies and measures aimed at mitigating GHG emissions. The ERT found that the work of strengthening and refining these policies and measures has continued and is coherent with active participation of a broad

range of stakeholders and institutions at all administrative levels. Therefore, the ERT concluded that Sweden is likely to reach its emission reduction commitment under the Kyoto Protocol by means of domestic measures alone. Furthermore, the ERT noted with interest that Sweden is considering adopting a medium-term objective to reduce its total GHG emissions by 25 per cent by 2020, subject to the commitments of other EU member States, and that a government commission was established in 2005 to advise the government on reducing Sweden's dependence on oil and other fossil raw materials.

70. The ERT commends Sweden for its comprehensive efforts to reduce GHG emissions and for its contributions to combating climate change at the international level. Policies and measures adopted by the Party were found to be well targeted towards the sources of emissions, effective in achieving reductions in many sectors, and appropriate to the national circumstances in these sectors.

71. The ERT was assisted in its task by the thorough, concise and transparent manner in which Sweden presented information. It commends Sweden on this effort. Nevertheless, as a leading country in the field of climate policy and for the benefit of other Parties, Sweden is invited to further improve its ways of documenting action taken in response to its commitments. Possible areas for improvement include:

(a) More detailed presentation of the practical steps that will lead to Sweden's achieving its projected emission reductions, for example, in its strategy to substitute fossil fuels with biomass and other renewable energy sources;[7]

(b) More detailed description of the process of harmonizing its national climate policies with the common and coordinated EU-wide climate policies and of the impact of this process on national policy development and the definition of national objectives;

(c) Provision of a "with additional measures" scenario in the section on GHG emission projections, in order to clarify the role of additional policies and measures in meeting the national emission reduction target;

(d) More detailed documentation of success stories or lessons learned in the area of cooperation with developing country Parties or Parties with economies in transition.

[7] The ERT was informed by the Party that the Commission on Oil Independence was appointed in late 2005 to advise the Government on this matter. A report was presented in July 2006 and is available from the commission's website at: <http://www.sweden.gov.se/sb/d/2058/a/57732>.

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>.

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UNFCCC (2002). Report on the in-depth review of the third national communication of Sweden. FCCC/IDR.3/SWE. Available at <http://unfccc.int/resource/docs/idr/swe03.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 (2005). Report of the individual review of the greenhouse gas inventory of Sweden submitted in 2005. FCCC/ARR/2005/SWE. Available at <http://unfccc.int/resource/docs/2006/arr/swe.pdf>.

Swedish Ministry of Sustainable Development (2005). Sweden's fourth national communication on climate change under the United Nations Framework Convention on Climate Change. Available at <http://unfccc.int/resource/docs/natc/swenc4.pdf>.

Swedish Ministry of Sustainable Development (2005). The Swedish Report on Demonstrable Progress under the Kyoto Protocol. Available at <http://unfccc.int/resource/docs/dpr/swe1.pdf>.

Lundström A. & Söderberg U. (1996). Outline of the Hugin system for long-term forecast timber of timber yields and possible cuts. In: Large-Scale Forestry Scenario Models: experiences and requirements. EFI Proceedings No. 5, pp 63–77.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Reino Abrahamsson (Swedish Environmental Protection Agency) including additional material on the Swedish electricity certificate system, renewable energy and green certificates, and data on the use of biomass for energy purposes in Sweden.

Annex II

Acronyms and abbreviations

CDM	clean development mechanism
CER	certified emission reductions
CH_4	methane
CHP	combined heat and power
CO_2 eq	carbon dioxide equivalent
CO_2	carbon dioxide
CRF	common reporting format
ERT	expert review team
ERU	emission reduction unit
ETS	emissions trading scheme
EU	European Union
GCOS	Global Climate Observing System
GDP	gross domestic product
GEF	Global Environment Facility
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the weighted sum of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 without GHG emissions and removals from LULUCF
GNI	gross national product
HFCs	hydrofluorocarbons
IDR	in-depth review
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
IPPC	integrated pollution prevention and control
JI	joint implementation
kg	kilogram (1 kg = 1 thousand grams)
Klimp	Climate Local Investment Programme
LIP	Local Investment Programme
LULUCF	land use, land-use change and forestry
Mg	megagram (1 Mg = 1 tonne)
Mtoe	millions of tonnes of oil equivalent
N_2O	nitrous oxide
NC3	third national communication
NC4	fourth national communication
ODA	official development assistance
PFCs	perfluorocarbons
PFE	Programme for Energy Efficiency
PJ	petajoule (1 PJ = 10^{15} joule)
PPP	purchasing power parities
RDP	Report demonstrating progress under the Kyoto Protocol
RES	renewable energy sources
SEK	Swedish Kronor (1SEK = 0.1368 USD)
SICLIP	Swedish International Climate Investment Programme
Sida	Swedish International Development Cooperation Agency
SF_6	sulphur hexafluoride
SMHI	Swedish Meteorological and Hydrological Institute
Tg	teragram (1 Tg = 1 million tonnes)
toe	tonnes of oil equivalent
TPES	total primary energy supply
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States dollars

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