COMPLIANCE COMMITTEE **CC/ERT/2014/8**
1 September 2014

Report of the technical review of the sixth national communication of Sweden

Note by the secretariat

The report of the technical review of the national communication of Sweden was published on 27 August 2014. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decisions 4/CMP.4 and 8/CMP.9), the report is considered received by the secretariat on the same date. This report, FCCC/IDR.6/SWE, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.

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Report of the technical review of the sixth national communication of Sweden

Parties included in Annex I to the Convention are requested, in accordance with decision 9/CP.16, to submit a sixth national communication to the secretariat by 1 January 2014. In accordance with decision 7/CMP.8, Parties included in Annex I to the Convention that are also Parties to the Kyoto Protocol shall include in their sixth national communication supplementary information under Article 7, paragraph 2, of the Kyoto Protocol. In accordance with decision 15/CMP.1, these Parties shall start reporting the information under Article 7, paragraph 1, of the Kyoto Protocol with the inventory submission due under the Convention for the first year of the commitment period. This includes supplementary information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol.

This report presents the results of the technical review of the sixth national communication and supplementary information under the Kyoto Protocol of Sweden conducted by an expert review team in accordance with the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention" and the "Guidelines for review under Article 8 of the Kyoto Protocol".

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I. Introduction and summary

A. Introduction

1. For Sweden the Convention entered into force on 23 June 1993 and the Kyoto Protocol on 16 February 2005. Under the Convention, Sweden will as part of the European Union (EU) take on a quantified economy-wide emission reduction target jointly with all EU member States to reduce its greenhouse gas (GHG) emissions by 2020. The EU and its member States have communicated an independent quantified economy-wide emission reduction target of a 20 per cent emission reduction by 2020 compared with 1990 levels.[1]

2. Within the burden-sharing agreement of the European Union for meeting commitments under the Kyoto Protocol, Sweden committed itself to limiting the growth in its GHG emissions to 4 per cent in relation to the base year[2] level during the first commitment period, from 2008 to 2012.

3. For the second commitment period of the Kyoto Protocol, from 2013 to 2020, as amended by decision 1/CMP.8, Sweden will as part of the EU take on a quantified economy-wide emission reduction target jointly with all EU member States to reduce its GHG emissions when the amendment enters into force. In accordance with decision 1/CMP.8, the EU and its member States will jointly reduce their GHG emissions by at least 20 per cent in relation to the base year level during the second commitment period.

4. Under the EU climate and energy package, this target will be met by the EU and its member States through a 21 per cent reduction, from 2005 levels, in GHG emissions from installations under the European Union Emissions Trading System (EU ETS) and a 10 per cent reduction, from 2005 levels, in GHG emissions in non-ETS[3] sectors (primarily transport, some industrial processes, agriculture and waste). According to the decision on EU effort sharing of the non-ETS target, Sweden is to reduce its GHG emissions outside the EU ETS by 17 per cent, from 2005 levels, by 2020.

5. Sweden has set an ambitious domestic target to reduce its emissions not covered by the EU ETS by 40 per cent, or around 20,000 kilotonnes of carbon dioxide equivalent (kt CO_2 eq), by 2020, compared with 1990 levels.

6. This report covers the in-country technical review of the sixth national communication (NC6) of Sweden, coordinated by the secretariat, in accordance with the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention" (decision 23/CP.19) and the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1).

7. The review took place from 7 to 12 April 2014 in Stockholm, Sweden, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: Ms. Tuğba İçmeli (Turkey), Mr. Mahendra Kumar (Fiji), Ms. Tahira Munir (Pakistan), and

[1] FCCC/SB/2011/INF.1/Rev.1 and FCCC/AWGLCA/2012/MISC.1.

[2] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for carbon dioxide, methane and nitrous oxide, and 1995 for perfluorocarbons, hydrofluorocarbons and sulphur hexafluoride. The base year emissions include emissions from sectors/source categories listed in Annex A to the Kyoto Protocol.

[3] ETS = emissions trading system.

Mr. Erik Rasmussen (Denmark). Mr. Kumar and Mr. Rasmussen were the lead reviewers. The review was coordinated by Mr. Bernd Hackmann (secretariat).

8. During the review, the expert review team (ERT) reviewed each section of the NC6. The ERT also reviewed the supplementary information provided by Sweden as a part of the NC6 in accordance with Article 7, paragraph 2, of the Kyoto Protocol. In addition, the ERT reviewed the information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, which was provided by Sweden in its 2013 annual submission and previous submissions.

9. In accordance with decisions 23/CP.19 and 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 into this final version of the report.

B. Summary

10. The ERT conducted a technical review of the information reported in the NC6 of Sweden in accordance with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications" (hereinafter referred to as the UNFCCC reporting guidelines on NCs). As required by decision 15/CMP.1, supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol[4] is provided in the NC6 (see, in particular, paras. 23–34, 78–81, 100, 123–129 and 146–147 below). The supplementary information on the minimization of adverse impacts referred to in paragraph 8 above is mostly complete and transparent. The ERT identified gaps and issues in reported information that are summarized in table 1 below.

11. Sweden considered all recommendations and part of the encouragements provided in the report of the in-depth review of the fifth national communication of Sweden.[5] The ERT commended Sweden for its improved reporting. During the review, Sweden provided further relevant information, including further information on national circumstances (see para. 16 below), the national system (see para. 24 below), provision of financial resources (see para. 111 below), technology transfer (see para. 125 below), and the minimization of adverse impacts on developing country Parties (see para. 148 below).

1. Completeness and transparency of reporting

12. Gaps and issues related to the reported information identified by the ERT are presented in table 1 below.

2. Timeliness

13. The NC6 was submitted on 20 December 2013, before the deadline of 1 January 2014 mandated by decision 9/CP.16. Sweden submitted a revised version of its NC6 on 28 April 2014. The ERT took note of the revised version of the NC6.

3. Adherence to the reporting guidelines

14. The information reported by Sweden in its NC6 is mostly in adherence to the UNFCCC reporting guidelines on NCs as per decision 4/CP.5 (see table 1).

[4] Decision 15/CMP.1, annex, chapter II.
[5] FCCC/IDR.5/SWE.

Table 1

Assessment of completeness and transparency issues of reported information in the sixth national communication of Sweden[a]

Sections of national communication	*Completeness*	*Transparency*	*Reference to paragraphs*	*Supplementary information under the Kyoto Protocol*	*Completeness*	*Transparency*	*Reference to paragraphs*
Executive summary	Complete	Transparent		National systems	Complete	Transparent	
National circumstances	Complete	Transparent		National registries	Complete	Transparent	
Greenhouse gas inventory	Complete	Transparent		Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Complete	Transparent	
Policies and measures (PaMs)	Complete	Mostly transparent	37	PaMs in accordance with Article 2	Complete	Transparent	
Projections and total effect of PaMs	Mostly complete	Mostly transparent	85, 103	Domestic and regional programmes and/or arrangements and procedures	Mostly complete	Transparent	29
Vulnerability assessment, climate change impacts and adaptation measures	Complete	Mostly transparent	133	Information under Article 10	Complete	Transparent	
Financial resources and transfer of technology	Complete	Mostly transparent	111, 126, 128	Financial resources	Complete	Transparent	
Research and systematic observation	Complete	Transparent		Minimization of adverse impacts in accordance with Article 3, paragraph 14	Mostly complete	Transparent	148
Education, training and public awareness	Complete	Transparent					

[a] A list of recommendations pertaining to the completeness and transparency issues identified in this table is included in the chapter on conclusions and recommendations.

II. Technical review of the reported information in the national communication and supplementary information under the Kyoto Protocol

A. Information on greenhouse gas emissions and national circumstances relevant to greenhouse gas emissions and removals, including other elements related to the Kyoto Protocol

1. Information on relevant national circumstances

15. In its NC6, Sweden has provided a concise description of the national circumstances and elaborated on the framework legislation and key policy documents on climate change. Further information on the review of the institutional and legislative arrangements for the coordination and implementation of policies and measures (PaMs) is provided in chapter II.B below. Table 2 illustrates the national circumstances of Sweden by providing some indicators relevant to GHG emissions and removals.

Table 2
Indicators relevant to greenhouse gas emissions and removals for Sweden

	1990	*2000*	*2005*	*2010*	*2011*	*Change 1990–2011 (%)*	*Change 2010–2011 (%)*
Population (million)	8.56	8.87	9.03	9.38	9.45	10.4	0.7
GDP (2005 USD billion using PPP)	210.27	258.58	295.29	320.03	331.89	57.8	3.7
TPES (Mtoe)	47.20	47.56	51.57	51.32	49.04	3.9	–4.4
GHG emissions without LULUCF (kt CO_2 eq)	72 750.39	68 901.73	67 268.27	6 5551.42	61 447.45	–15.5	–6.3
GHG emissions with LULUCF (kt CO_2 eq)	35 565.93	33 360.28	40 177.67	34 850.82	26 215.78	–26.3	–24.8
GDP per capita (2005 USD thousand using PPP)	24.56	29.15	32.70	34.12	35.12	43.0	2.9
TPES per capita (toe)	5.51	5.36	5.71	5.47	5.19	–5.8	–5.1
GHG emissions per capita (t CO_2 eq)	8.50	7.77	7.45	6.99	6.50	–23.5	–7.0
GHG emissions per GDP unit (kg CO_2 eq per 2005 USD using PPP)	0.35	0.27	0.23	0.20	0.19	–45.7	–5.0

Sources: (1) GHG emissions data: Sweden's 2013 GHG inventory submission; (2) Population, GDP and TPES data: International Energy Agency.

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

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

16. The NC6 includes all information required by the UNFCCC reporting guidelines on NCs on government structure, population profile, geographic profile, climate profile,

economic profile, energy, transportation, industry, waste, building stock and urban infrastructure, agriculture, and forestry. The ERT noted that the transparency of the report can further be improved by providing information on the coordination between the different levels of governance, in particular between the ministries and municipalities. During the review, Sweden provided additional information on the national circumstances, elaborating on procedural arrangements between the government and municipalities for coordination. The ERT, therefore, encourages Sweden to provide such information in its next national communication.

17. The ERT noted that while during the period 1990–2011 the population and gross domestic product (GDP) increased by 10.4 per cent and 57.8 per cent, respectively, GHG emissions per GDP and GHG emissions per capita decreased significantly – by 45.7 per cent and 23.5 per cent, respectively. The ERT noted a significant decoupling of total GHG emissions from economic growth.

2. Information on the greenhouse gas inventory, emissions and trends

18. Sweden has provided a summary of information on GHG emission trends for the period 1990–2011. The information provided in the NC6 GHG inventory section is mostly consistent with the 2013 national GHG inventory. There were a few inconsistencies in the national inventory report (NIR) and NC6 inventory data, mainly due to rounding off errors. The ERT encourages Sweden to improve the transparency of its reporting by ensuring consistency between common reporting format (CRF) tables, NIR and NC6 GHG inventory data. Summary tables, including trend tables for emissions in carbon dioxide equivalent (CO_2 eq) (given in the CRF tables), are provided in an annex to the NC6.

19. Total GHG emissions[6] excluding emissions and removals from land use, land-use change and forestry (LULUCF) decreased by 15.5 per cent between 1990 and 2011, whereas total GHG emissions including net emissions or removals from LULUCF decreased by 26.3 per cent over the same period. The decrease in total GHG emissions between 1990 and 2011 was mainly attributable to the decrease in CO_2 emissions by 14.5 per cent, the decrease in methane (CH_4) emissions by 28.2 per cent and the decrease in nitrous oxide (N_2O) emissions by 20.2 per cent. Most of this decrease was experienced after 2005 (trends for 2005–2011: CO_2 –13.9 per cent, CH_4 –15.3 per cent and N_2O –8.1 per cent). Emissions of fluorinated gases (F-gases) accounted for about 1.75 per cent of total GHG emissions in 2011.

20. In its NC6, Sweden reported that in 2011 the largest sources of emissions were domestic transport (32.5 per cent), energy industries (17.4 per cent) manufacturing industries (15.5 per cent), agriculture (12.6 per cent) and industrial processes (10.8 per cent). The relatively small share of emissions from the energy industry reflects the fact that electricity production in Sweden is almost carbon-free as it is based on nuclear power and hydropower (see para. 52 below).

21. The overall decreasing trend in total GHG emissions between 1990 and 2011 can be attributed to a reduction in emissions from the energy sector of 16.1 per cent, mainly driven by an 85 per cent emission decrease in the residential and services sector since 1990 due to a switch from oil to biomass in district heating (and in recent years to heat pumps and pellet-fired boilers), and a 9.5 per cent reduction since 1990 in emissions from fuel combustion in industry mainly due to a fuel switch from fossil fuels to biomass/biofuels. Also, emissions have been reduced for the same period in the agriculture sector by 13.6 per cent owing to a decrease in the number of dairy cows and the decreased use of mineral

[6] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding land use, land-use change and forestry, unless otherwise specified.

fertilizer and animal manure, as well as in the waste sector by 49.9 per cent owing to the municipal waste planning requirements introduced in 1991, a tax on waste sent to landfill introduced in 2000, and a ban on the landfilling of separated combustible and organic material introduced in 2002 and 2005, respectively. Emissions from transport account for 32.5 per cent of Sweden's total GHG emissions in 2011, and increased by 3.6 per cent from 1990 to 2011.

22. An analysis of the drivers of GHG emissions trends in each sector is provided in chapter II.B below. Table 3 provides an overview of GHG emissions by sector from the base year to 2011.

Table 3
Greenhouse gas emissions by sector in Sweden, 1990–2011

	GHG emissions (kt CO_2 eq)				*Change (%)*		*Share[a] by sector (%)*	
Sector	*1990*	*2000*	*2010*	*2011*	*1990–2011*	*2010–2011*	*1990*	*2011*
1. Energy	53 669.62	50 583.57	48 871.57	45 014.72	–16.1	–7.9	73.8	73.3
A1. Energy industries	10 144.84	8 974.94	13 090.42	10 662.06	5.1	–18.6	13.9	17.4
A2. Manufacturing industries and construction	12 059.32	12 621.35	10 154.83	9 514.50	–15.8	–6.3	16.6	15.5
A3. Transport	19 301.08	19 874.71	20 526.55	20 000.13	3.6	–2.6	26.5	32.5
A4.–A5. Other	11 778.89	8 663.86	4 098.34	3 840.66	–67.4	–6.3	16.2	6.3
B. Fugitive emissions	385.49	448.71	1 001.43	997.36	158.7	–0.4	0.5	1.6
2. Industrial processes	6 329.78	6 811.84	6 810.30	6 660.58	5.2	–2.2	8.7	10.8
3. Solvent and other product use	332.49	277.54	288.93	288.93	–13.1	0.0	0.5	0.5
4. Agriculture	8 997.22	8 313.10	7 782.46	7 770.64	–13.6	-0.2	12.4	12.6
5. LULUCF	–37 184.46	–35 541.44	–30 700.61	–35 231.66	–5.3	14.8	–51.1	–57.3
6. Waste	3 421.27	2 915.69	1 798.17	1 712.58	–49.9	–4.8	4.7	2.8
GHG total with LULUCF	**35 565.93**	**33 360.28**	**34 850.82**	**26 215.78**	**–26.3**	**–24.8**	**NA**	**NA**
GHG total without LULUCF	**72 750.39**	**68 901.73**	**65 551.42**	**61,447.45**	**–15.5**	**-6.3**	**100.0**	**100.0**

Note: The changes in emissions and the share by sector are calculated using the exact (not rounded) values and may therefore differ from values calculated with the rounded numbers provided in the table.

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

[a] The shares of sectors are calculated relative to GHG emissions without LULUCF; for the LULUCF sector, the negative values indicate the share of GHG emissions that was offset by GHG removals through LULUCF.

3. National system

23. Sweden provided in its NC6 a description of how its national system is performing the general and specific functions defined in the guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol (decision 19/CMP.1). The description includes all the elements mandated by decision 15/CMP.1. The NC6 also contains a reference to the description of a national system provided in the national inventory report of the 2013 annual submission. The ERT took note of the review of the changes to the national system as reflected in the report of the individual review of GHG inventory of Sweden submitted in 2013.

24. During the review, Sweden provided additional information on the national system, elaborating on the arrangement between the Ministry of the Environment of Sweden and the Swedish Environmental Protection Agency (SEPA) about the designation of the responsibility and on the procedure for recalculations. The Party also underlined that the national system will be changed during the coming years in accordance with the changes in the EU legislation and the envisaged changes in the UNFCCC reporting guidelines on NCs. The ERT noted Sweden's intention to include updated information on the national system in its next NC.

4. National registry

25. In its NC6, Sweden has provided information on the national registry in accordance with the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1. The ERT took note of the review of the changes to the national registry as reflected in the report of the individual review of the GHG inventory of Sweden submitted in 2013.

26. Sweden described the changes, specifically due to the centralization of the EU ETS operations into a single European Union registry operated by the European Commission (EC) called the Consolidated System of European Union registries (CSEUR). The CSEUR is a consolidated platform which implements the national registries in a consolidated manner and was developed together with the new EU registry.

5. Domestic and regional programmes and/or legislative arrangements and procedures related to the Kyoto Protocol

27. Sweden has reported in its NC6 information on the domestic and regional programmes, and legislative arrangements and procedures related to PaMs it implemented and elaborated nationally and in cooperation with other Parties to achieve its quantified economy-wide emission reduction target under Articles 3 and 4 of the Kyoto Protocol. Information on Sweden's participation in the mechanisms under Articles 6 and 12, of the Kyoto Protocol, is also provided in the NC6.

28. Although not clearly stated in its NC6, information on all national legislative arrangements, and enforcement and administrative procedures is publicly available in Sweden with relevant references to this information being provided in the NC6.

29. The NC6 does not include some information on domestic and regional programmes, legislative arrangements, and enforcement and administrative procedures required by the UNFCCC guidelines on the reporting of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol. The ERT recommends that Sweden include information on, or references to, relevant legislative arrangements and enforcement and administrative procedures for all PaMs reported; provisions to make information on these legislative arrangements, and enforcement and administrative procedures publicly accessible; and procedures for addressing cases of non-compliance under domestic law.

30. The overall responsibility for climate change policymaking lies within the Ministry of the Environment of Sweden, and a number of national institutions are involved in the implementation of this policy.

31. Sweden's environmental quality objective "Reduced Climate Impact" forms the basis for action on climate change. The implementation of the Kyoto Protocol is underpinned by the Swedish Government bills entitled "An Integrated Climate and Energy Policy" (Government bills 2008/09:162 and 163), adopted by the Swedish Parliament (Riksdagen) in 1999 and 2009, respectively, with the latter being an update of the former.

32. At the national level, the SEPA is responsible for the environmental quality objective "Reduced Climate Impact", and for Sweden's regular climate reporting to the

UNFCCC and the EU. The role of SEPA also includes ensuring that new statistics are produced annually on emission trends, and that projections and reports on policies and measures forming part of Sweden's climate strategy are prepared every two years. This work is done in close collaboration with other relevant authorities.

33. In its NC6, Sweden reports that no specific additional administrative procedures have been introduced to implement the Kyoto Protocol, since the existing structure of central government administration and government inquiries effectively addresses Sweden's commitments under the Kyoto Protocol.

34. Sweden provided a description of national legislative arrangements and administrative procedures that seek to ensure that the implementation of activities under Article 3, paragraph 3, and forest management elected under Article 3, paragraph 4, of the Kyoto Protocol also contribute to the conservation of biodiversity and the sustainable use of natural resources. Sweden's current forest policy, for example the Forestry Act puts great emphasis on using forests sustainably as a natural resource and on conserving biodiversity. Sweden has stated that there has not been a need for supplementary legislation to conserve biodiversity and ensure sustainable use of natural resources as a consequence of the implementation of Article 3, paragraphs 3 and 4, since the provisions of the Forestry Act and the environmental legislation on nature reserves and habitat protection areas are sufficient to address the concern.

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

35. Sweden has provided in its NC6 comprehensive and well-organized information on its package of PaMs implemented, adopted and planned in order to fulfil its commitments under the Convention and its Kyoto Protocol.

1. Policies and measures related to implementation of commitments under the Convention

36. In its NC6, Sweden reported on the PaMs it adopted, implemented and planned to achieve its commitments under the Convention. Sweden provided information on PaMs by sector and a description of the principal PaMs. For each sector the gases affected are described. Sweden has also provided information on how it believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals, in accordance with the objective of the Convention. The NC6 contains, with a few exceptions, a set of PaMs similar to those in the NC5.

37. The NC6 does not include the reporting of PaMs with a clear subdivision by gas for each sector as required by the UNFCCC reporting guidelines on NCs. The ERT recommends that Sweden improve the transparency of its reporting by providing, in its next national communication, a clear subdivision by gas for each sector.

38. For some of the PaMs implemented in the area of electricity and heat supply in Sweden between 1990 and 2010, information on estimated costs to society and annual emission reductions for specific measures has been reported. However, in general there are no clear linkages between the PaMs for which costs have been reported and the PaMs reported for the energy sector. The ERT encourages Sweden to improve the consistency between reporting of cost estimates and emission reduction estimates in its future national communications.

39. In its NC6, Sweden reported the following four measures that were discussed in its NC5 as not being in place any more: Delegation for Sustainable Cities, Support for Solar

Heating, Programme for Energy Efficiency in Energy-intensive Industries (PFE) Act, and Green Vehicle Rebate. However, explanations as to why these measures have been discontinued were not provided in the NC6. During the review, Sweden provided relevant information and explained that the Support for Solar Heating was replaced by a Property Renovation Deduction and that the energy-intensive industries are now regulated under the EU ETS.

40. The NC6 does not include information required by the UNFCCC reporting guidelines on NCs, for some of the PaMs reported, on quantitative estimates of impacts of individual PaMs or collections of PaMs or, in cases where estimates are given, a brief description of the estimation methodology used. The ERT encourages Sweden to report in more detail on the quantitative estimates of the impacts of individual PaMs or collections of PaMs, and to include a brief description of the methodology or methodologies used, in its future national communications.

41. Some of the encouragements made in the previous review report were taken into consideration in order to improve reporting in the NC6. This included further information on PaMs at the subnational level, more information on relevant legislation and references theretofore, information on the assessment of the abatement costs based on different scenarios for future biomass prices, and marginal electricity is to some extent included in NC6, where the marginal abatement cost (MAC) curve includes different types of biomass combined heat and power (CHP) measures. Although analyses on the sensitivity to economic growth and fossil fuel prices have been reported, sensitivities specifically to biomass prices have not. The ERT encourages Sweden to report in more detail on sensitivities specifically related to biomass prices in its future national communications.

2. Policy framework and cross-sectoral measures

42. In Sweden, environmental and climate change related policies have a long track record and have been developed progressively since the 1980s. It was among the first countries to introduce energy and carbon taxes in the early 1990s. Climate policies have shifted in recent years towards stronger EU integration and closer international cooperation.

43. The key framework climate and energy policy is the Government bill entitled 'An Integrated Climate and Energy Policy' approved in 2009 (hereinafter referred to as the 2009 climate and energy bill). It sets ambitious targets for Sweden's climate policy by 2020 (see para. 5 above), and includes a long-term vision of Sweden not releasing any net emissions of GHGs into the atmosphere by 2050. Commissioned by the Swedish Government, SEPA has undertaken a background analysis for a road map exploring how the vision for 2050 can be achieved.

44. In addition to its commitment under the EU effort-sharing decision, related to the implementation of the EU climate and energy package, to reduce its emissions that are not covered by the EU ETS by 17 per cent from 2005 levels by 2020, Sweden has an ambitious domestic target, set by its 2009 climate and energy bill, to reduce emissions not covered by the EU ETS by 40 per cent, or around 20,000 kt CO_2 eq, by 2020, compared with 1990 levels. This target is accompanied by targets to increase the renewable energy share of total energy use to at least 50.0 per cent by 2020, to reduce energy intensity by 2020 by 20 per cent compared with the 2008 level, and to have a vehicle fleet not dependent on fossil fuels by 2030.

45. The ERT noted that the success of Sweden's climate policy since 1990s has been largely based on fuel switching from fossil fuels to biomass-based energy for district heating. This was largely influenced by the energy and carbon taxes in the 1990s, the green electricity certificate system introduced in 2003 (see paras. 53 and 60 below) and the continued use of nuclear power. While most of the biofuels used for district heating can be

covered by domestic biomass, the biofuels used in the transport sector have to be largely and increasingly imported.

46. Sweden's key cross-cutting policies and policy instruments are in the core of its policy portfolio, driving successful emission reductions across all sectors, encompassing the EU ETS, energy and carbon taxes, and support provided for research and development. The ERT noted that the economic policy instruments complement one another and are supported by energy-related research aiming to strengthen those synergies.

47. In its NC6, Sweden has reported that the EU ETS covers around 33 per cent of Sweden's total GHG emissions, with around 80 per cent of these emissions coming from industrial installations. An energy tax is levied on fossil fuels. In 2013 the energy tax on natural gas, coal and fuel oil was equivalent to 0.82 Swedish kronor (SEK) per kilowatt-hour. The energy tax on petrol (environmental class 1) amounted to SEK 0.346/kWh and that on diesel (environmental class 1) to SEK 0.177/kWh (see paras. 59 and 60 below). The carbon dioxide tax, introduced in 1991, has been raised in stages, since its introduction, to SEK 1.08/kg CO_2 in 2012 (see para. 60 below). Public investments in climate-related research and development are aimed at a long-term energy transformation towards substantial emission reductions and are set at the level of some SEK 1.3 billion annually for the years 2013–2015 and around SEK 1.4 billion annually from 2016 onwards.

48. The NC6 provides estimates of the effects of some of the PaMs or collections of PaMs expected to contribute to GHG emission reductions in Sweden and help the country achieve its international and domestic targets. For energy-related emissions in particular, the impact assessment is based on the prevalent economic instruments – energy and carbon taxes. This impact is aggregated for the following sectors: heat (from district heating) and electricity production; transport; the residential and services sector; and energy combustion in the industrial sector. The assessment of the impact of PaMs in the waste sector is based on the reduction in CH_4 emissions due to the landfill ban. The ERT encourages Sweden to continue its assessments of PaMs and to expand its efforts by assessing and reporting the effects of existing PaMs, such as on legislation, as well as the effects of planned PaMs and of potential additional PaMs, in its next national communication.

49. Overall, in the context of PaMs, the ERT encourages Sweden to report more extensively on new PaMs and their potential impact based on ex ante assessments. The ERT also encourages Sweden to provide more information on how PaMs are being designed and implemented to meet the long-term policy objective of zero net emissions and a low carbon society by 2050.

50. Sweden provided comprehensive information on PaMs at the national level, and some information at the subnational level. The implementation of some of the PaMs involves the regional (county administrative boards) and local level (municipalities). Sweden provided some information on the activities and PaMs at local and regional levels. Table 4 above provides a summary of the reported information on the PaMs of Sweden.

Table 4
Summary of information on policies and measures reported by Sweden

Sectors affected	*List of key policies and measures*	*Estimate of mitigation impact (1000 kt CO_2 eq) for 2010/2015/2020/2030*
Policy framework and cross-sectoral measures	EU ETS[a]	NE
	Environmental Code	NE
	New Planning and Building Act	NE
	Research and development	NE

Sectors affected	*List of key policies and measures*	*Estimate of mitigation impact (1000 kt CO_2 eq) for 2010/2015/2020/2030*
Energy		
Production of electricity and district heating, including energy supply, renewable energy and energy efficiency	Economic measures, including energy tax, carbon dioxide tax, electricity certificates system and EU ETS[a]	14/16/16/15
	Special support for wind power	NE
	Central government support for installation of solar cells	NE
Residential and commercial /institutional sector	Energy tax, carbon dioxide tax, building regulations – energy efficiency standards, energy performance certificates, ecodesign directive and mandatory energy labelling	1.3/0.3/0.5/0.7
	Technology procurement	NE
	Support for solar heating	NE
Transport	Vehicle fuel taxes (energy and carbon dioxide taxes)	2/2/2/NE
	Targeted instruments to promote introduction of renewable transport fuels	1.8/ 2.6/3/NE
	CO_2-based annual vehicle tax	NE
	CO_2 standards for new vehicles[a]	NE
	Tax relief on transport biofuels/quota obligation	NE
	Incentives for green vehicles	NE
Industrial sectors (Industrial emissions from fuel combustion and processes (including emissions of fluorinated GHGs))	Economic measures, including energy tax, carbon dioxide tax, electricity certificates system and EU ETS[a]	–0.8/0/0.2/0.4
	Reduced carbon dioxide tax relief for industry outside the EU ETS, and energy tax on fossil fuels for heating in industry	NE/0.4/0.4/NE
	F-gas regulation and mobile air conditioning directive[a]	0.2/0.5/0.7/NE
	Programme for Energy Efficiency in Energy-Intensive Industry	NE
	Environmental Code	NE
Agriculture	Targeted agri-environment payments under the Rural Development Programme[a]	0.5/NE/NE/NE
	Energy and carbon dioxide taxes	NE
	Support for biogas	NE
Forestry/LULUCF	Provisions of Forestry Act on forest management, etc.	NE
	Provisions of the Environmental Code on land drainage	NE
	Provisions on nature reserves and habitat protection areas in the Environmental Code, and nature conservation agreements	NE
Waste management	Rules on municipal waste planning and on producer responsibility for certain products, landfill tax (2000), bans on landfill of separated combustible waste (2002) and of organic waste (2005)[a]	1.4/1.7/1.9/NE
	Methane recovery	NE
	Recycling	NE

Note: The greenhouse gas emission reduction estimates given are estimated reductions in emissions of CO_2 or CO_2 eq reported in Sweden's sixth national communication.

*Abbreviation*s: EU ETS = European Union Emissions Trading System, F-gas = fluorinated gas, GHGs = greenhouse gases, LULUCF = land use, land-use change and forestry, NE = not estimated.

[a] EU instrument.

3. Policies and measures in the energy sector

51. Between 1990 and 2011, GHG emissions from the energy sector decreased by 16.1 per cent (8,654.90 kt CO_2 eq), mainly owing to the increased use of biomass and biofuels in sectors other than industry. The trend in GHG emissions from fuel combustion showed an increase in transport (3.5 per cent or 699.05 kt CO_2 eq) and a decrease in energy use in other sectors, including the residential and services sector (66.5 per cent or 7,261.23 kt CO_2 eq). In the residential and services sector, emissions have decreased significantly by some 85 per cent since 1990 as a result of the switch from oil to biomass in district heating, and in recent years to heat pumps and pellet-fired boilers.

52. ***Energy supply***. Electricity production in 2011 in Sweden is dominated by hydropower (around 45 per cent) and nuclear (around 40 per cent). The increase in electricity production in recent years has principally come from wind power and biomass CHP plants.

53. Sweden has a quota system with green electricity certificates, which favours the use of biofuels and peat in CHP plants, and for electricity production wind power and hydropower, etc. The potential for wind energy is considerable, especially in the north of the country but also offshore. One of the main barriers to the deployment of wind energy in the north appears to be the cost of connecting the remote sites to the national electricity grid. The ERT notes that this might have a negative impact on the climate since peat is not considered a renewable energy at the international level.

54. Sweden has 10 nuclear power plants in operation at three sites. The future of nuclear energy in Sweden has remained a political issue since 1980, when a plan for the phase-out of nuclear energy by 2010 was introduced by referendum. In June 2010, the parliament opened up the possibility of constructing new nuclear power reactors to replace existing ones. The ERT noted that the future of nuclear power in Sweden could be of critical importance to any plans to achieve the national climate change targets.

55. Aggregate GHG emissions from electricity and district heating production taken together were around 8,300 kt CO_2 eq in 2011 – slightly above the 1990 level. This was above the trend because 2011 was a relatively cold year. District heating energy production taken separately has increased by over 30 per cent since 1990, while emissions have decreased. This can be explained by the successful policy that led to a fuel shift in district heating from fossil fuels to the use of biomass and waste from the late 1980s onwards.

56. ***Renewable energy sources***. Sweden's total primary energy supply amounts to approximately 600 TWh (614 TWh, 577 TWh and 598 TWh in 2010, 2011 and 2012, respectively). Hydropower contributes about 80 TWh to primary energy use, while biomass (including biofuel, peat and waste) contribute about 132 TWh (up from 78 TWh in 1990). Between 1990 and 2010, the share of renewable energy in the primary energy supply in Sweden rose by 15 percentage points to around 48 per cent. The renewable energy sources contributing to this trend were hydropower, wind power, by-products used in the paper and pulp industry, and biomass/biofuels for district heating production. Biofuels make up approximately 11.8 per cent of fuels for road transportation (2011) exceeding the EU target of a 10 per cent share of biofuels by 2020.

57. In 2003, Sweden introduced a green electricity certificate scheme. This is a market-based support system (quotas) for the expansion of electricity production from renewable energy sources and peat. Production of renewable electricity under the certificate scheme amounted to 21.5 TWh in 2012. On 1 January 2012, Sweden and Norway introduced a common electricity certificates market and announced a joint target to increase renewable electricity production by 26.4 TWh between 2012 and 2020. The ERT noted with appreciation these very ambitious targets for renewable energy production.

58. The ERT also noted that electricity production in Sweden qualifying for certificates grew by just over 13 TWh between 2002 and 2011. The increase came principally from the production of electricity from biomass and biofuels in existing CHP power plants, as well as from an expansion of capacity of biomass/biofuel plants. In recent years, the potential of wind power, significant in the north of the country, has also been tapped under the certificate system. However, the ERT noted that the use of peat for electricity production might increase emissions since peat is not considered a source of renewable energy at the international level (see para. 53 above). The ERT commended Sweden for the sizeable increase in its biomass use, in particular in district heating.

59. ***Energy efficiency***. Sweden's PFE programme addressed the issue of efficiency of electricity consumption in industry. The first stage of the programme ran from 2004 to 2009, and achieved electricity savings of 1.45 TWh per year. The programme offered companies in the manufacturing sector the opportunity to be granted tax exemption on their electricity consumption if they took action to improve their energy efficiency. Participation in the programme was voluntary and open to energy-intensive manufacturing companies, which implemented cost-effective measures to reduce their energy consumption. The PFE programme continues to apply to companies approved as participants before the end of 2012 (currently 94 companies, responsible for some 72 per cent of industrial energy use). Sweden is currently working on developing policy instruments that will continue to encourage energy-intensive industry to improve the efficiency of its use of electricity. Although this programme might lead to minor market distortions internationally, the ERT commends Sweden for this instrument, which supplements the energy efficiency improvements achieved through the energy and carbon tax.

60. ***Residential and commercial sectors***. A major success story of Sweden's climate policy is the replacement of a large share of fossil fuels with renewables in district heating since the 1970s. As a result GHG emissions from residential and commercial buildings were reduced from approximately 8,800 kt/year in 1990 to approximately 1,400 kt/year in 2011. The key policy instrument to promote the use of renewable energy in the residential and commercial sector is the energy and carbon tax with levels that have increased over time (see para. 47 above). According to Sweden's estimates, fossil fuel-based heating will be phased out altogether in the residential sector with current instruments by 2030, whereas there would still have been a certain proportion of fossil fuels left if the energy and carbon tax levels had remained at 1990 levels.

61. The energy efficiency regulations for new buildings were tightened as of 1 January 2012. With this change, alterations and extensions of existing buildings are also covered by the building regulations, although the requirements normally only apply to the altered part of a building. A review of the implementing rules for these regulations is taking place in 2014. Minimal performance standards for household appliances are in line with the EU ecodesign directive.

62. ***Transport sector***. Between 1990 and 2011, emissions from transport increased slightly, by 3.6 per cent and continued to account for a large share of 32.5 per cent of Sweden's total emissions in 2011. The steadily increasing demand for domestic transportation since 1990 has been met mainly through an increase in road transportation. However, recent research has indicated that since 2006 the number of passenger-kilometres seems to have stabilized owing to slower economic growth, an increase in fuel prices and taxes, and remarkably also an increase in the awareness of the impact of road transport on GHG emissions and the environment in general. GHG emissions from this sector have been decreasing a little in recent years owing to the decrease in demand in transportation, the increasing share of biofuels and a rebate system for energy-efficient cars. The estimated emission reductions in 2010 due to the fuel tax and the increased use of biofuels amount to some 2,000 kt and 1,800 kt CO_2 eq, respectively.

63. The Government of Sweden set an ambitious goal of making the country's vehicle fleet free of fossil fuel use by 2030 and has, therefore, adopted a programme to further tighten policy instruments. This programme includes: a) increased levels of energy and carbon taxation, which provide incentives for a more climate-efficient transport sector; b) a strategy to encourage the increased use of vehicle biofuels; c) a carbon-differentiated vehicle tax; d) ever-more stringent EU requirements regarding the CO_2 emissions of new cars, and e) requirements regarding long-term community and infrastructure planning, which will enable the implementation of a more climate-efficient transport system.

64. The ERT noted that these measures might not be sufficient to achieve the Government's goal of a vehicle fleet not dependent on fossil fuels by 2030. In this context, Sweden reported that an inquiry to define its priority of a vehicle fleet not dependent on fossil fuels by 2030 and to identify ways of realizing it was, therefore, set up. The results from this inquiry will feed into the general assessment of "how the vision for Sweden with no GHG net emissions by 2050 can be achieved" to be carried out in 2015, where the 2030 target will be an important milestone.

65. Emissions from bunker fuels used for international shipping and aviation amounted to around 8,276.54 kt CO_2 eq in 2011 and have increased by 128.8 per cent compared with the 1990 level. Emissions from aviation bunker fuels used for flights within the EU are covered under the EU ETS from 2012 onwards. Fuel consumption in the international maritime transport sector and related emissions have experienced the greatest increase. Sweden has been pressing for measures to limit international aviation emissions and for the International Civil Aviation Organization (ICAO) to assume a principal role in this matter. In addition, Sweden has assisted the International Maritime Organization (IMO) in the development of a design index for newly built ships.

66. ***Industrial sector***. In 2011, emissions from fuel combustion in industry amounted to around 9,514.50 kt CO_2 eq, which is 21.1 per cent lower than the 1990 level. The main instruments that have influenced these emissions are, at the EU level, the EU ETS and, at the national level, the energy and carbon taxes, the green electricity certificate system, the PFE (see para. 59 above) and the rules of the Environmental Code – the latter being a requirement to use the 'best available technology'. Emissions from the industrial sector are dominated by emissions from installations included in the EU ETS. Manufacturing industries are subject to a much lower carbon tax than the residential sector, but as of 1 January 2011, the carbon dioxide tax for manufacturing industries outside the EU ETS was raised from 21 per cent to 30 per cent of the standard rate. From 2015, a further increase to 60 per cent of the standard rate has been decided.

67. Emissions from Sweden's installations covered under the EU ETS equated to around 33 per cent of total GHG emissions in Sweden over the period 2005–2012. About 80 per cent of these emissions came from industrial installations and some 20 per cent from electricity and district heating installations. Sweden's breakdown differs substantially from the breakdown for the EU ETS as a whole, where emissions from energy supply installations (about 60 per cent) are greater than emissions from industrial installations (about 40 per cent). The national carbon tax for industry covered by the EU ETS has been withdrawn from 2011 and replaced by the EU minimum tax on energy for industry.

4. Policies and measures in other sectors

68. Between 1990 and 2011, GHG emissions from industrial processes (including solvent and other product use), agriculture and waste decreased by 13.9 per cent (2,648.04 kt CO_2 eq), mainly owing to reductions in emissions from the agriculture and waste sector.

69. ***Industrial processes***. Between 1990 and 2011, GHG emissions from the industrial processes sector increased by 5.2 per cent (330.71 kt CO_2 eq), mainly owing to the

requirement of the EU ETS and the Environmental Code that 'best available technology' be used. Since 2013, emissions from the industrial processes sector have been almost entirely covered by the EU ETS. Emissions of fluorinated gases are regulated through EC regulations and directives. Combined process emissions vary from year to year, with values depending on economic conditions, transformations in the industrial structure and the use of F-gases.

70. ***Agriculture***. Between 1990 and 2011, emissions from the agriculture sector decreased by 13.6 per cent (1,226.59 kt CO_2 eq), mainly owing to the decrease in the number of dairy cows and the decreased use of mineral fertilizer and manure. Emissions of CH_4 and N_2O account for a significant share (around 20 per cent) of Sweden's GHG emissions not covered by the EU ETS. In 2011, emissions of CH_4 and N_2O from agriculture represented 12.7 per cent of Sweden's total GHG emissions.

71. There are relatively few policy instruments to date that are directly aimed at limiting GHG emissions in the agriculture sector in Sweden. Interest in reducing the sectoral climate impact has, however, increased, and the Government has taken a number of initiatives in recent years to limit the use of fossil fuels in the sector and to increase knowledge and encourage measures that lead to reduced GHG emissions from manure management and land use.

72. The ERT noted that in 2010, the Swedish Board of Agriculture presented proposals for an action programme to reduce nutrient losses and GHG emissions from agriculture. During the period 2011–2016, the Board affirmed that the greatest decrease of GHG emissions from agriculture can be achieved through the production and use of renewable energy. Although the programme was not implemented in its entirety, the Board was assigned by the Government the task of assessing further policies and measures to reduce GHG emissions from agriculture.

73. ***LULUCF***. The LULUCF sector was a net removal of 35,231.66 kt CO_2 eq in Sweden in 2011 and net GHG removal decreased by 5.3 per cent since 1990. The net removals ranged between 27,000 and 38,000 kt CO_2/year over this period. The inter-annual variation in this period is due to inter-annual variations in forest felling interlinked with variations in the demand for timber products.

74. Sweden's most important PaMs in the forestry sector are the provisions on forest stewardship in the Forestry Act and on land drainage in the Environmental Code. In addition, Sweden has provisions on nature reserves and habitat protection in the Environmental Code as well as nature conservation agreements. As part of the 'Forest Kingdom' initiative, central government advice to the forestry sector has been stepped up, with a SEK 10 million increase in funding per year over the period 2012–2015. The Swedish Forest Agency has mounted information campaigns on forestry and climate change with support from the Rural Development Programme ('Forestry in a changed climate' and 'Forest owners and climate'), and runs a project aimed at making greater use of forests for bioenergy purposes.

75. Beyond the mandatory accounting of emissions and removals of GHGs under Article 3, paragraph 3, of the Kyoto Protocol, Sweden has elected to account for forest land management under Article 3, paragraph 4, of the Kyoto Protocol. Sweden follows the criteria that apply to the definition of forest land according to the Food and Agriculture Organization of the United Nations and the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. A methodology and database for calculating the changes in carbon stocks have also been developed.

76. ***Waste management***. Between 1990 and 2011, GHG emissions from the waste sector, mostly CH_4 emissions, decreased by 49.9 per cent (1,708.69 kt CO_2 eq). CH_4 emissions from waste have steadily declined since the early 1990s.

77. The significant decrease in CH_4 emissions from the waste sector is mainly attributed to the municipal waste planning requirements introduced in 1991, a tax on waste sent to landfill introduced in 2000, and a ban on the landfilling of separated combustible and organic material introduced in 2002 and 2005, respectively. Also, the introduction of producer responsibility for sorting different groups of articles, such as packaging, waste paper, stationery and tyres, has contributed to a rise in recycling. It is anticipated that emissions from landfills will continue to decline over the next decade.

5. Policies and measures related to implementation of commitments under the Kyoto Protocol

78. Sweden reported on its package of PaMs adopted, implemented and elaborated in achieving its commitment under the Kyoto Protocol.

79. The NC6 includes information on how Sweden promotes and implements the ICAO/IMO decisions to limit emissions from aviation and marine bunker fuels.

80. In its NC6, Sweden reported information on how it strives to implement PaMs under Article 2 of the Kyoto Protocol in such a way as to minimize adverse effects, including the adverse effects of climate change and effects on international trade and social, environmental and economic impacts, on other Parties, especially developing country Parties. Further information on how Sweden strives to implement its commitments under Article 3, paragraph 1, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, as reported in Sweden's NIR of its 2013 annual submission, is presented in chapter III.B below.

81. Sweden's policy for global development (PGD), impacts assessments – especially at the EU level and for several interdisciplinary research initiatives under way – together with Sweden's increasing use of bioenergy are all examples of how Sweden is striving to avoid social, environmental and economic impacts on other Parties. In its NC6, Sweden emphasize that its wide-ranging climate strategy has a design that fundamentally seeks to minimize the risk of adverse effects.

C. Projections and the total effect of policies and measures, including information on supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol

82. In its NC6, Sweden has provided comprehensive information on its projections for GHG emissions, including CO_2, CH_4, N_2O, perfluorocarbons (PFCs), hydrofluorocarbons (HFCs) and sulphur hexafluoride (SF_6). New projections of emissions and removals of GHGs were produced for the NC6 compared with the NC5, which are the same as those reported to the EU in 2013. The projections are based on the policy instruments that were implemented and adopted up to the end of 2011. The projections reference scenario builds on a series of assumptions, all of which are subject to uncertainty. These projections were presented and discussed during the review.

1. Projections overview, methodology and key assumptions

83. The GHG emission projections provided by Sweden in the NC6 include a 'with measures' (reference scenario) and a 'with additional measures' scenario for 2015, 2020 and 2030. Projections are presented on a sectoral basis, using the same sectoral categories

used in the PaMs section and on a gas-by-gas basis for the following GHGs: CO_2, CH_4, N_2O and F-gases (PFCs, HFCs and SF_6 taken together). Projections are also provided in an aggregated format for each sector as well as for a national total, using global warming potential values. Emission projections related to fuel sold to ships and aircraft engaged in international transport were reported separately and not included in the totals.

84. Detailed projections by gas and by sector are presented for the 'with measures' scenario. For the 'with additional measures' scenario, projections are only presented for total GHG emissions.

85. The ERT noted that Sweden did not follow the recommendation made in the review report of the NC5 to provide disaggregated projections for F-gases in its NC6. However, the ERT noted that disaggregated projections of fluorinated gases up to 2030 are provided in Sweden's first biennial report (BR1). Therefore, the ERT reiterates the recommendation made in the review report of the NC5 to provide disaggregated projections for the F-gases in its next national communication.

86. One of the scenarios reported on by Sweden in its NC6, with 1990 as the base year, is the 'with measures' scenario which includes all policies that have been implemented up to 2011. Sweden also reported on a 'with additional measures' scenario, which includes planned policies and measures as well as those already adopted. In the latter scenario, one key driver for the reduction of emissions is the promotion of biofuels in the road transport sector. Presented calculations also show that the quota obligation scheme introducing low blend biofuels, as included in the 'with additional measures' scenario is expected to reduce emissions in the range of 200–500 kt CO_2 eq per year in the period from 2015 to 2030.

87. The ERT noted that Sweden has provided tabular information on all reported scenarios in its NC6. In order to improve the quality of its reporting, the ERT encourages Sweden to also provide diagrams illustrating emission trends and projected GHG emissions in its next national communication. These diagrams, following the requirements of the UNFCCC reporting guidelines on NCs, should be presented showing unadjusted inventory data and a 'with measures' projection, for the period 1990 (or another base year, as appropriate) to 2030. Additional diagrams for the 'without measures' and 'with additional measures' scenarios may also be presented.

88. The methodology used to prepare the projections has briefly been described in an annex to the NC6. Different approaches and models used to calculate the projections for different sectors include, in addition to the models used in the NC5, the MARKAL-Nordic Energy System Model, the Environmental Medium Term Economic Model of the Swedish Economy (EMEC), the Swedish Agricultural Sector Model (SASM), the Hugin calculation system, a model developed by the IPCC for the waste sector and Sweden's demand and supply model.

89. To enhance the transparency of the reporting in the projections section, the ERT encourages Sweden to provide concise information on any overlap or on synergies that may exist between the different models used when assessing the effects of different PaMs and their methodology and approach.

90. Sweden has provided updated key assumptions following the recent economic development, including all potentially important variables for the energy, energy industries, and industrial combustion, residential and commercial/institutional sectors and for the transport sector with a considerable level of detail in an annex to NC6. Most of the assumptions have been changed since NC5 except for the lifespan of nuclear power plants, which is 60 years. Gross domestic product is assumed to increase by 2.6 per cent/year between 2010 and 2020 and 1.9 per cent/year between 2020 and 2030. The price of crude oil is projected to be USD 112/barrel and USD 128/barrel for the period 2020 and 2030, respectively. Electricity certificates (new renewable electricity) have been projected to be

25 TWh by 2020. In the transport sector, the price of ethanol (E85) is assumed to be lower than that of petrol and a growing share of cars that can be run on biofuels and a declining share of petrol-engine cars were reported but no precise prices for biofuels were provided.

2. Results of projections

91. Sweden's total GHG emissions excluding LULUCF are reported to be 61,447.45 kt CO_2 eq in 2011. Sweden's total GHG emissions excluding LULUCF in 2020 and 2030 are projected to be 59,200 and 57,300 kt CO_2 eq, respectively, under the 'with measures' scenario, which is a decrease respectively of 18.6 per cent and 22.1 per cent compared with 1990 and 5.3 per cent and 6.8 per cent, respectively, below the level in 2011. For the 'with additional measures' scenario, emissions in 2020 and 2030 are lower than those in the 'with measures' scenario by around 800 and 300 kt CO_2 eq. The key results of Sweden's GHG emission projections reported in the NC6 are provided in table 5 below, and the emission trends are illustrated in the figure below.

92. For the first commitment period of the Kyoto Protocol (2008–2012), the EU has committed to reducing GHG emissions on average to 8 per cent below the base year emissions level. Within the EU burden-sharing agreement for meeting commitments under the Kyoto Protocol, Sweden committed itself to limiting the growth in its GHG emissions to 4 per cent in relation to the base year level during the first commitment period, from 2008 to 2012.

93. The ERT acknowledged that, according to the emission trends and projections presented in Sweden's NC6, Sweden is on track to exceed this target through domestic actions alone, without the use of the mechanisms under the Kyoto Protocol (see para. 105 below). Preliminary data show that Sweden is expected to exceed its target under the first commitment period of the Kyoto Protocol (75,037.71 kt CO2 eq per year, as an average for 2008–2012) by some 11,100 kt CO2 eq. This margin will become wider if credits from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol are taken into account. Overall, activities under Article 3, paragraphs 3 and 4, are expected to result in removals of an average of 2,130 kt CO_2 eq per year, or 10,650 kt CO_2 eq for the entire period that could be issued as removal units. If that is the case, the margin could be increased to 13,300 kt CO_2 eq annually.

94. For the second commitment period, from 2013 to 2020, of the Kyoto Protocol as amended by decision 1/CMP.8, Sweden will, as part of the EU, take on a quantified economy-wide emission reduction target jointly with all EU member States to reduce its GHG emissions when the amendment enters into force. In accordance with decision 1/CMP.8, the EU and its member States will jointly reduce their GHG emissions by at least 20 per cent in relation to the base year level during the second commitment period. In accordance with decision 2/CMP.8, Sweden is expected to submit to the secretariat, by 15 April 2015, a report to facilitate the calculation of its assigned amount pursuant to Article 3, paragraphs 7bis, 8 and 8bis, of the Kyoto Protocol for the second commitment period and to demonstrate its capacity to account for its emissions and assigned amount. With the review of the report to facilitate the calculation of Sweden's assigned amount, the base year level and the target for the second commitment period under the Kyoto Protocol will be determined.

95. The quantified economy-wide emission reduction target under the Convention is a joint target for 2020 for the EU and its 28 member States and Iceland. Sweden will, as part of the EU, take on a quantified economy-wide emission reduction target jointly with all EU member States to reduce its GHG emissions by 2020. The EU and its member States have communicated an independent quantified economy-wide emission reduction target of a 20 per cent emission reduction by 2020 compared with 1990 levels.

96. Sweden's projections estimate 59,200 kt CO_2 eq as its 2020 emissions levels, which is a reduction of some 18.6 per cent from the 1990 level. These projections suggest that Sweden will continue contributing to EU-wide emission reductions and to the achievement of the EU targets under the Convention and the Kyoto Protocol.

97. In the context of the EU climate and energy package, under which Sweden's target is to reduce its GHG emissions from the non-EU ETS sector by 17 per cent by 2020, or, after the EU decision on adjustments, to around 36,400 kt CO_2 eq in 2020 (45,500 kt CO_2 eq was emitted in 2005). According to the projections in the 'with measures' scenario, the non-EU ETS emissions are estimated to reach 35,400 kt CO_2 eq in 2020, corresponding to a around 22.0 per cent reduction from the 2005 level. The ERT noted that this suggests that Sweden is expected to meet, and possibly exceed its target by approximately 1,000 kt CO_2 eq, under the 'with measures' scenario. In the 'with additional measures' scenario, which includes additional measures at both the EU and national levels, Sweden's emissions in 2020 are projected to be a further 500 kt CO_2 eq lower.

98. In addition to the 17 per cent target for the non-EU ETS sector set at the EU level, Sweden has assumed a national target for this sector of reducing emissions by 2020 to 40 per cent below the 1990 level. Sweden plans to achieve its national target for the non-EU ETS sector using additional PaMs and climate investment in other countries (e.g. carbon credits obtained from the Kyoto Protocol mechanisms). Projections in Sweden's NC6 indicate that Sweden is also on track to achieve its domestic target, especially since one third of this reduction, about 6,700 kt CO_2 eq, can be achieved by means of investment in emission reductions in other countries. Sweden reported that it will undertake an in-depth evaluation of progress towards its target in 2015.

99. By gas, in the 'with measures' scenario, CO_2 emissions are projected to decrease from the 1990 level by around 15 per cent by 2020 and around 18 per cent by 2030. CH_4 emissions are projected to decrease from the 1990 level by some 42 per cent by 2020 and by some 47 per cent by 2030. N_2O emissions are projected to decrease to the same degree by 2020 and 2030: by around 24.0 per cent from the 1990 level. Fluorinated gases are projected to decrease from the 1990 level by some 2 per cent by 2020 and 35 per cent by 2030. In 2011, emissions of CO_2 accounted for about 79 per cent of total Swedish GHG emissions and their share is projected to remain rather constant, amounting to around 82 per cent in 2025 and 2030. The CO_2 uptake from LULUCF is projected to remain at an annual average of 29,100 kt CO_2 eq between 2011 and 2020 and of 25,600 kt CO_2 eq between 2011 and 2030.

100. The projected emission levels under different scenarios and information on the Kyoto Protocol targets and quantified economy-wide emission reduction target are presented in table 5 and the figure.

Table 5
Summary of greenhouse gas emission projections for Sweden

	Greenhouse gas emissions (kt CO_2 eq per year)	*Changes in relation to the base-year[a] level (%)*	*Changes in relation to the 1990 level (%)*
Kyoto Protocol base year for the first commitment period (2008–2012)[b]	72 151.65	NA	–0.8
Kyoto Protocol target for the first commitment period (2008–2012)[b]	75 037.71	+4.0	+3.1
Kyoto Protocol target for the second commitment period (2013–2020)[c]	Not available yet		

	Greenhouse gas emissions (kt CO_2 eq per year)	*Changes in relation to the base-year[a] level (%)*	*Changes in relation to the 1990 level (%)*
Quantified economy-wide emission reduction target under the Convention[d]	Not available yet		
Inventory data 1990[e]	72 750.39	+0.8	NA
Inventory data 2011[e]	61 447.45	–14.8	–15.5
Average annual emissions for 2008–2011[e]	62 470.14	–14.1[e]	–13.4
'Without measures' projections for 2020[f]	85 300	+18.2	+17.3
'With measures' projections for 2020[f]	59 200	–18.0	–18.6
'With additional measures' projections for 2020[f]	58 600	–18.8	–19.5
'Without measures' projections for 2030[f,g]	82 900	+14.9	+14.0
'With measures' projections for 2030[f]	57 300	–20.6	–21.2
'With additional measures' projections for 2030[f]	57 000	–21.0	–21.6

[a] "Base year" in this column refers to the base year used for the target under the Kyoto Protocol, while for the target under the Convention it refers to the base year used for that target.

[b] The Kyoto Protocol base year level of emissions for the first commitment period (2008–2012) is based on the initial review report contained in document FCCC/IRR/2007/SWE.

[c] The Kyoto Protocol target for the second commitment period (2013–2020) is a joint target for the European Union and its 28 member States and Iceland. The target is to reduce emissions by 20 per cent by 2020 compared with the base year (1990) level. The target for sectors not covered by the European Union Emissions Trading System is 17 per cent for Sweden under the European Union effort-sharing decision.

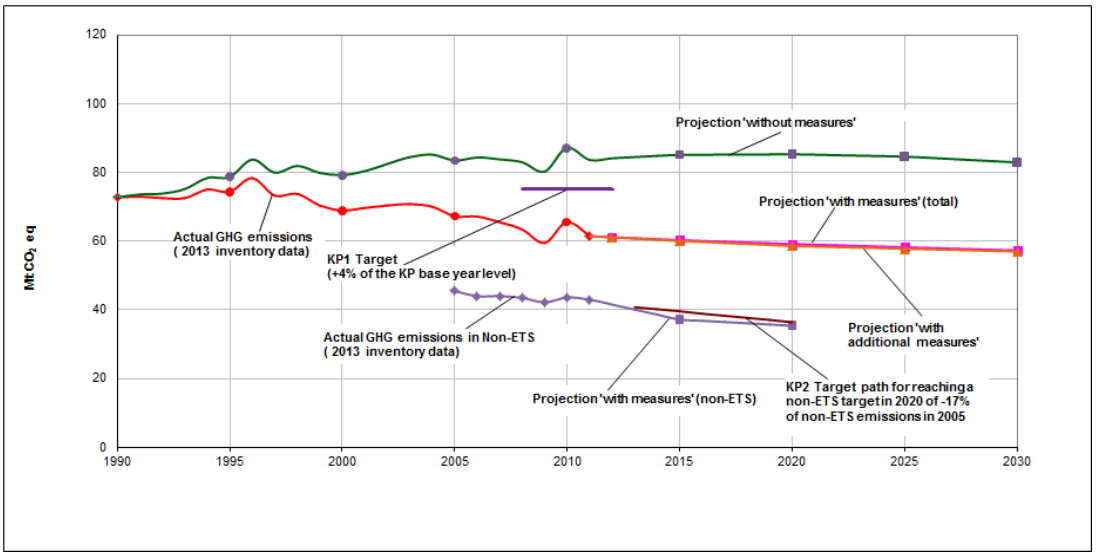
[d] Quantified economy-wide emission reduction target under the Convention is a joint target for the European Union and its 28 member States. The target is to reduce emissions by 20 per cent by 2020 compared with the base-year (1990) level.

[e] Sweden's 2013 greenhouse gas inventory submission; the emissions do not take into account land use, land-use change and forestry. Changes in per cent are in relation to base year for the first commitment period of the Kyoto Protocol.

[f] Sweden's sixth national communication and first biennial report.

[g] Estimate by the expert review team based on additional information provided by Sweden during the review of Sweden's sixth national communication and first biennial report and the assumption that the effects in sectors other than electricity and district heating in 2030 will be similar to the effects in 2020.

Greenhouse gas emission projections



Sources: (1) Data for the years 1990–2011: Sweden's 2013 greenhouse gas inventory submission; the emissions are without land use, land-use change and forestry; (2) Data for the years 2012–2030: Sweden's sixth national communication and first biennial report; the emissions are without land use, land-use change and forestry.

Note: An individual target for Sweden for the second commitment period of the Kyoto Protocol has not been established. Sweden will, as part of the European Union (EU), take on a quantified economy-wide emission reduction target jointly with all EU member States to reduce its greenhouse gas (GHG) emissions when the amendment enters into force. In accordance with decision 1/CMP.8, the EU and its member States will jointly reduce their GHG emissions by at least 20 per cent in relation to the base-year level during the second commitment period. Under the EU climate and energy package, this target will be met by the EU and its member States through a 21 per cent reduction from 2005 in GHG emissions from installations under the European Union Emissions Trading System (EU ETS) and a 10 per cent reduction in GHG emissions from 2005 in the non-ETS sectors (primarily transport, some industrial processes, agriculture and waste). According to the EU burden sharing of the non-ETS target, Sweden is to reduce its GHG emissions outside the EU ETS by 17 per cent between 2005 and 2020 and to follow a particular target trajectory in 2013–2020 established in EU legislation. The target trajectory reported in the sixth national communication is also shown in the figure together with historical and projected (the 'with measures' projection) GHG emissions in the non-ETS.

Abbreviations: ETS = emissions trading scheme, GHGs = greenhouse gases, KP1 = first commitment period of the Kyoto Protocol, KP2 = second commitment period of the Kyoto Protocol.

3. Total effect of policies and measures

101. In its NC6, Sweden presents in graphical format the estimated (1990–2011) and expected (2012–2020) total effect of PaMs implemented and adopted since 1990 on the basis of the estimated (2010) and expected (2015, 2020 and 2030) effects of some individual PaMs or groups of PaMs as shown in table 4 and on the basis of interpolations/extrapolations. For the economic instruments, the information is also presented in terms of GHG emissions avoided or sequestered, by sector (on a CO_2 eq basis), in 2015 and 2020 in tabular format.

102. Sweden does not present the estimated and expected total effect of implemented and adopted PaMs by gas, as required by the UNFCCC reporting guidelines on NCs. However, the ERT noted that Sweden, in its reporting of the effects of individual PaMs or groups of PaMs, attributed the effect to one particular GHG in most cases. The estimated and expected total effect of implemented and adopted PaMs in terms of GHG emissions avoided or sequestered is presented, in the form of a graph, for 1995, 2000, 2005 and 2010 only.

103. The ERT therefore recommends that Sweden present the estimated and expected total effect of implemented and adopted PaMs by gas on a CO_2 eq basis and improve the transparency of its reporting by also presenting the estimated total effect of implemented and adopted PaMs in tabular format for the years 1995 and 2000. The ERT further encourages Sweden to improve the transparency of its reporting by also presenting the estimated and expected total effect of implemented and adopted PaMs in tabular format for the years 2005, 2010 and beyond.

104. Sweden reported that the total estimated effect of implemented economic PaMs is 22,600 kt CO_2 eq for 2015 and 23,600 kt CO_2 eq for 2020. The ERT noted that if the reported effects of all individual PaMs are taken into account in 2020, the total effect in 2020 can be estimated at 24,700 kt CO_2 eq. According to the information reported in the NC6, PaMs implemented in the energy sector (electricity and district heating) will deliver the largest emission reductions, followed by the effect of PaMs implemented in the transport and waste sectors. The most effective PaMs and drivers behind GHG emission reductions are described in chapter II.B above. Table 6 provides an overview of the total effect of PaMs as reported by Sweden.

Table 6
Projected effects of planned, implemented and adopted policies and measures in 2020 and 2030

Sector	*Effect of implemented and adopted measures (kt CO_2 eq)*	*Relative value (% of 1990 emissions in the sector/total)*	*Effect of planned measures (kt CO_2 eq)*	*Relative value (% of 1990 emissions)*	*Effect of implemented and adopted measures (kt CO_2 eq)*	*Relative value (% of 1990 emissions in the sector/total)*	*Effect of planned measures (kt CO_2 eq)*	*Relative value (% of 1990 emissions)*
	2020				*2030*			
Energy (without CO_2 from transport)	17 100	49.2	NA	NA	16 100	46.3	NA	NA
Transport – CO_2	5 000	26.5	500	2.6	NA	NA	300	1.6
Industrial processes	700	11.1	NA	NA	NA	NA	NA	NA
Agriculture	NA	NA	NA	NA	NA	NA	NA	NA
Land-use change and forestry	NA	NA	NA	NA	NA	NA	NA	NA
Waste management	1 900	55.5	NA	NA	NA	NA	NA	NA
Total	**24 700**	**34.0**	**500**	**0.7**	**16 100**	**22.1**	**300**	**0.4**

Source: Sweden's sixth national communication and first biennial report.

Note: The total effect of implemented and adopted policies and measures is defined as the sum of the effects of all reported implemented and adopted policies and measures; the total effect of planned policies and measures is defined as the difference between the 'with measures' and 'with additional measures' scenarios.

Abbreviation: NA = not available.

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

105. Sweden in its NC6 provided information on how its use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action. The ERT noted that Sweden does not plan to use the market-based mechanisms to meet its Kyoto Protocol target – neither for the target in the first commitment period nor for the target in the second commitment period. However, Sweden's aim is to achieve in the period 2002–2020 a reduction of at least 40,000 kt CO_2 eq through international climate initiatives under the joint implementation (JI)/clean development mechanism (CDM) programme.

106. In its 2009 climate and energy bill, Sweden envisages achieving part of its domestic target for the non-EU ETS sector of a 40 per cent emissions reduction in 2020 compared with 1990 levels through climate investments in other EU member States and/or through Kyoto Protocol mechanisms. Sweden reported in its NC6 that, in order to do so, it plans to count emission reductions of up to 6,700 kt CO_2 eq from international climate initiatives under the CDM and JI programme towards its domestic target.

107. During the review, Sweden provided additional information, elaborating on its plan to use 6.7 million credits from Sweden's JI/CDM activities towards meeting its domestic target in 2020. It further clarified that no decision has been made on the use of the 33.3 million remaining credits, which are expected to be in excess of the credits Sweden will have generated through its JI and CDM activities from 2002 to 2020.

D. Provision of financial resources and technology transfer to developing country Parties, including information under Articles 10 and 11 of the Kyoto Protocol

1. Financial resources, including "new and additional" resources and resources under Article 11 of the Kyoto Protocol

108. In its NC6, Sweden provided information on provision of support required under the Convention and its Kyoto Protocol.

109. Sweden provided details on measures taken to give effect to its commitments under Article 4, paragraphs 3–5, of the Convention as required by the UNFCCC reporting guidelines on NCs and under Article 11 of the Kyoto Protocol, as required by the "Guidelines for the preparation of information required under Article 7 of the Kyoto Protocol".

110. The previous review report recommended that Sweden 'be more transparent in its description of what it considers as "new and additional" financial resources'. In the NC6, Sweden has indicated what "new and additional" financial resources it has provided, pursuant to Article 4, paragraph 3, of the Convention. Sweden refers to the common definition used by many countries, that is "the climate financing should be additional to the international development aid goal of 0.7 per cent of gross national income (GNI)". Since Sweden's development cooperation has for many years been around 1.0 per cent of GNI, all climate financing could be viewed as "new and additional".

111. During the review, Sweden provided further clarifications on the provision of financial resources, in particular the proportion of climate-specific contributions as a fraction of the official developmental assistance (ODA). The ERT was satisfied with Sweden's rationale for using this definition and noted its attempts at defining "new and additional". The ERT recommends that Sweden include this information on the proportion of climate-specific contributions as a fraction of the ODA, determining "new and additional" financial resources, in its next national communication to increase the transparency of its reporting.

112. In 2010 Sweden adopted a guiding policy framework for environmental and climate change related issues in development cooperation, and set an overarching objective to achieve a better environment, sustainable use of natural resources, stronger resilience to environmental impact and climate change in developing countries. Sweden's development efforts under this framework policy are focused on the following issue areas:

(a) Strengthened institutional capacity in public administration;

(b) Improved food security and sustainable use of ecosystem services;

(c) Improved water resources management and greater access to safe water and basic sanitation;

(d) Increased access to sustainable energy sources;

(e) Sustainable urban development.

113. Climate change is a key issue in all of these areas; Sweden is working towards integrating climate change considerations in a variety of sectors, such as energy, water and sanitation; agriculture and forestry; food security; infrastructure; and health and education.

114. Sweden has described in its NC6 how its resources address the adaptation and mitigation needs of Parties not included in Annex I to the Convention. In this context, Sweden has stated that enhancing synergies among adaptation, mitigation and poverty reduction activities is pivotal. Sweden has reported that tracking of financial resources has been performed through follow-up on the specific budget allocation for the Special Climate Change Initiative and by using the 'Rio markers' for climate change mitigation and adaptation. During the review, Sweden provided additional information, elaborating on how it attributed resources to mitigation, adaptation and cross-cutting issues. The ERT commends Sweden for the clear and objective methodology it adopted in tracking finances for adaptation and mitigation using the Rio Markers.

115. In its NC6, Sweden has also provided detailed information on the assistance it has provided to developing country Parties that are particularly vulnerable to the adverse effects of climate change to help them to meet the costs of adaptation to those adverse effects. Furthermore, Sweden has provided information on financial resources related to the implementation of the Convention provided through bilateral, regional and other multilateral channels, including the Global Environment Facility (GEF).

116. The ERT noted that Sweden contributed almost half of its development assistance through international multilateral development bodies and funds, such as multilateral specialized bodies, international and regional organizations, and banks and institutes, with a view to influencing their climate change related work in various sectors.

117. Sweden has provided information on its financial contribution to the Adaptation Fund, established in accordance with decision 10/CP.7. From 2010 to 2012, Sweden provided an annual sum of SEK 100 million. With regard to the most recent financial contributions to enhance the implementation of the Convention by developing countries, Sweden provided support for the start-up process of the Green Climate Fund amounting to USD 0.7 million. With regard to fast-start finance for enhancing the implementation of the Convention by developing countries, Sweden's contribution amounted to about USD 1.2 billion for 2010–2012. The ERT noted that this contribution makes Sweden one of the largest per capita contributors to the fast-start finance initiative for assistance to developing countries.

118. Sweden has also provided information on the financial contributions it made to the GEF during 2009–2012. Of the total contribution to the GEF of USD 128.7 million, approximately 30 per cent was for climate-related projects.

119. The ERT noted that about half of Sweden's development assistance is channelled to developing countries and countries with economies in transition, as bilateral ODA.

120. The Swedish International Development Cooperation Agency (Sida) plays an important role in channelling bilateral aid to developing countries, for example to Bolivia (Plurinational State of), Burkina Faso, Cambodia, Kenya, Mali, Mozambique, and the United Republic of Tanzania. Sida provides specific climate change contributions and climate change integration at the sector level, including for transfer of technology, capacity-building and research cooperation. The ERT noted that in 2012, through Sida, Sweden

provided USD 358 million in climate-specific contributions through bilateral, regional and other channels. This is an increase of 66.5 per cent compared with 2009. The ERT commends Sweden for its increase in climate-specific contributions.

121. In its NC6, Sweden has reported on private sector financial support, which it sees as pivotal to effectively increasing both mitigation and adaptation efforts in developing countries. Through Sida, Sweden established a risk-sharing mechanism for sustainable business ventures that have a strong potential to reduce poverty in developing countries. Also, Sweden enhances financial flows from the private sector to climate change activities in developing countries by providing development loans and guarantees, in the context of development cooperation, and environmental loans focusing on improved energy efficiency and renewable energy, management of water, sewage and waste, and transportation.

122. Table 7 below summarizes information on financial resources and technology transfer.

Table 7
Summary of information on Sweden's provision of financial support to developing countries in 2009–2012
(Millions of United States dollars)

	Years of disbursement			
Allocation channel of public financial support	*2009*	*2010*	*2011*	*2012*
Official development assistance.	4 600	4 500	5 600	5 200
Fast start finance	NA			1 200 for 2010–2012
Total climate-specific contributions through multilateral channels, including:	175.6	103.6	151.9	105.8
Climate specific contributions to the GEF	9.2	27[a]	11.7	9.1
Contributions to the GCF				0.7
Climate-specific contributions through bilateral, regional and other channels	215	274	324	358

Note: Additionally (not reflected in the table above), Sweden contributes significant amounts of core funding to several multilateral organizations, much of it for climate change activities), and is actively engaged in a number of other multilateral specialized bodies, international and regional organizations, banks and institutes, with a view to influencing their climate change work in various sectors.

Abbreviations: GCF = Green Climate Fund, GEF = Global Environment Facility, NA = not available.

[a] Including 30.0 per cent of Sweden's total contribution to the Global Environment Facility (GEF), since 30.0 per cent of GEF funding is allocated to climate-related projects, and an extra USD 18.4 million as part of the Special Climate Change Initiative.

2. Technology transfer, including information under Article 10 of the Kyoto Protocol

123. Sweden has provided in its NC6 well-organized information on activities related to the transfer of technology and notable activities by the public and private sectors. A detailed review of reported information is provided in chapter II.D.3 of the report of the technical review of the first biennial report.

124. In its NC6, Sweden has provided information on its obligations under Article 10 of the Kyoto Protocol. The information provided is complete and transparent.

125. Sweden also reported activities related to technology transfer, including success and failure stories, and its activities for financing access by developing countries to 'hard' or 'soft' environmentally sound technologies. Furthermore, Sweden has reported in textual format on the steps taken to promote, facilitate and finance the transfer of technology and to

support the development and enhancement of endogenous capacities and technologies of developing countries. During the review, Sweden explained how in particular 'failure stories' provide useful lessons learned. The ERT appreciates this information and encourages Sweden to report, where feasible, more fully on success and failure stories in technology transfer.

126. In its NC6, Sweden distinguished between activities undertaken by the public sector and those undertaken by the private sector. Increased participation by the private sector was evidenced from 'exports' over 2009–2011. During the review, Sweden provided additional information that further clarified the differentiation between activities undertaken by the public and private sectors, and highlighted how Sweden encouraged technology transfer through the private sector. The ERT commends Sweden for the examples provided. The ERT understands that the government's role in this process is mainly catalytic and recommends that Sweden increase the transparency of its reporting by providing examples of technology transfer enabled through public and private financing, and indicating the extent of transfer activities in its various projects and programmes.

127. The NC6 outlined the various initiatives the Swedish Government, through entities such as the Swedish Energy Agency, the Swedish Agency for Economic and Regional Growth and the Swedish Trade and Invest Council, has undertaken under its environmental technology strategy, targeting research and exports, to make Sweden a 'green-tech pioneer'. In this context, Sweden has reported in its NC6 that it has signed cooperation agreements focusing on environmental and energy technology with a number of developing countries, including Brazil, China and India.

128. During the review, Sweden clarified that its definition of technology encompasses hard and soft technologies, as well as building capacity in developing countries to receive, use and develop technology. The ERT commends Sweden for this information and recommends that it provide further information on its support for the development and enhancement of endogenous capacities and technologies of developing countries, together with examples of such activities, to further improve the transparency of its reporting.

129. In its NC6, Sweden has provided information on how it has provided capacity-building support for mitigation, adaptation and technology. It provides examples of capacity-building activities done in partnership with national institutions and is aimed at enhancing research, training and empowerment of local communities. The ERT acknowledges that capacity-building is an integral part of most of the programmes and activities and, to further improve the transparency of its reporting, encourages Sweden to provide greater clarity on the extent of such activities.

E. Vulnerability assessment, climate change impacts and adaptation measures

130. In its NC6, Sweden has provided the required information on the expected impacts of climate change in the country and on adaptation options. Table 8 summarizes the information on vulnerability and adaptation to climate change presented in the NC6.

Table 8
Summary of information on vulnerability and adaptation to climate change

Vulnerable area	*Examples/comments/adaptation measures reported*
Forestry and agriculture	*Vulnerability*: the change in climate and the lengthening of the growing season will bring production advantages for forestry and agricultural activities, but also some problems and risks of pests, fungi, rotten roots and forest fires; an expected rise in

Vulnerable area	*Examples/comments/adaptation measures reported*
	temperature and precipitation may lead to insect harassment for reindeer; ice accumulation under the snow will make it difficult for the reindeer to find food
	Adaptation: a number of government agencies work in collaboration to achieve greater knowledge, stronger collaboration and organization among the public agencies to establish and develop preparedness for climate change risks; knowledge of the effects of climate change and scope for action is conveyed to forest owners and farmers; supplementary feeding for reindeers may be necessary
Biodiversity and natural ecosystems	*Vulnerability*: a warmer climate shifts the climatic and vegetation zones northwards and changes the reproduction patterns, population distribution and sizes of animals and plants; temperature rise and decreased salinity due to higher freshwater input to the Baltic Sea will change the coastal biodiversity
	Adaptation: the National Knowledge Centre for Climate Change compiles and disseminates data to support decisions and tools for climate change adaptation
Fisheries	*Vulnerability*: increased risk of extinction for Baltic herring, cod and salmon due to temperature rise in sea water, combined with a decrease in salinity; cold-water species will be replaced by warm-water species
	Adaptation: no specific adaptation measure is reported
Human health	*Vulnerability*: extremely high temperatures during the summer may particularly affect vulnerable groups like the elderly and people with cardiovascular and lung diseases; an extended growing season may increase the production and spread of pollen producing species, which will lead to an increase in pollen allergies; high summer temperatures may increase the risk of infections spread through food and water; floods may contaminate water resources posing risks to human health
	Adaptation: a heatwave warning system was launched in 2012; the National Knowledge Centre for Climate Change compiles and disseminates data to support decisions and tools for climate change adaptation
Infrastructure and economy	*Vulnerability*: rise in precipitation and flows will entail flooding and landslides, affecting the road networks and railways; rising sea levels may have adverse effects on ports and harbours
	Adaptation: the Building and Planning Act was amended; the Floods Directive is implemented through an Ordinance; mapping of stability and flood risks has been implemented; risks of landslides, washing-away and flooding in the road and rail networks have been surveyed and necessary measures taken
Water resources	*Vulnerability*: water resources are expected to decrease in south-eastern parts of the country; flooding may have negative impacts on water supply and quality of water in lakes and water courses; risk of eutrophication due to increased leaching of nutrients and humus; rise in sea levels may mean risk of salt water intrusion into water sources close to coasts
	Adaptation: a number of flood management and control measures are planned at county or municipality level, in particular, regulation of flow of water, raising the minimum level for construction and investment in pump systems
Supply and use of energy	*Vulnerability*: the heating requirement in winter will be lower due to temperature rise, but greater cooling will be required in summer; hydropower production will be favoured by increased water inflow; wind power production is expected to increase due to expected rise in the energy content of the winds in Baltic region; bioenergy production is expected to increase since the climate will be milder and the growing season will be longer; heavy rains may cause dam bursts with large-scale repercussions for society
	Adaptation: work to replace overhead power lines with underground cables for electricity distribution has been intensified

131. In the NC6, the focus is primarily on vulnerability. Sweden reported that new studies have been conducted at the Rossby Centre of the Swedish Meteorological and Hydrological Institute (SMHI) using the Regional Atmospheric Climate Model, leading to more extensive data. The results are in line with the ones already presented in the NC5. In 2012, Sweden established a National Knowledge Centre for Climate Change Adaptation to accumulate and disseminate information across the country. Analysis shows a rise in temperatures in winter months especially in northern parts of the country due to shrinking snow cover. According to the results of the scenarios, precipitation increases throughout the country, except for some areas in the south in the summer months. For northern and south-western parts of the country, an increased water supply is evident. Increased risk of flooding will affect the whole of the country.

132. The ERT notes that Sweden has strengthened local and regional work by tasking county administrative boards with preparing regional action plans for climate adaptation by 30 June 2014.

133. In its NC6, Sweden did not provide information on its cooperation with developing countries on their preparations for adaptation to the impacts of climate change under this chapter. However, it did provide the relevant information in chapter 7 – on financial resources and transfer of technology – and also provided additional information during the review. Sweden reported that it implements development cooperation with developing countries, focusing on improved food security, sustainable use of ecosystem services, improved water resources management, greater access to safe water and basic sanitation, increased access to sustainable energy resources and sustainable urban development. Partner countries include Bangladesh, Bolivia (Plurinational State of), Burkina Faso, Cambodia and Mali, which are exposed to a high climate risk combined with high vulnerability. To increase the transparency of its reporting, the ERT recommends that Sweden provide brief information or cross references on cooperation with developing countries in preparing for adaptation to the impacts of climate change under this chapter in its next NC.

F. Research and systematic observation

134. In its NC6, Sweden has provided information on its actions relating to research, the Global Climate Observing System (GCOS) and the International Geosphere–Biosphere systematic observation, and addressed both domestic and international activities, including the World Climate Research Programme (WCRP), the Integrated Carbon Observation Programme and the IPCC. The NC6 also reflects action taken to support related capacity-building in developing countries. Furthermore, Sweden has provided a summary of information on GCOS activities.

135. In its NC6, Sweden reported that it contributes to many global, European, Nordic, and national research and systematic observation activities. The Party is engaged in scientific research activities through the IPCC, WCRP, GCOS and the International Geosphere–Biosphere Programme, at the global level. Sweden is funding a project headed by the Stockholm Environment Institute about threshold effects to report on resilience in the Arctic. Sweden supports EU cooperation and participates in many different projects on climate change through its Rossby Centre and several universities.

136. These collaborations include EC-Earth (the European Centre for Medium Range Weather Forecasts' Earth System Model), the European Research Area Networks, the Joint Programming Initiative, the Joint Baltic Sea Research and Development Programme, the Nordic Centre of Excellence for Strategic Adaptation Research, and the Nordic Climate Change Adaptation Research Network.

137. The ERT acknowledges that Sweden has a well-developed system of environmental monitoring. Sweden monitors the changes in carbon balance, biomass, land use, atmospheric conditions, seas, runoff and other climate-related parameters to support and contribute information to various networks and inventories. Sweden considers research initiatives as key to success in the lifetimes of future generations and, to achieve this, they provide free data and open access for international exchange.

138. According to its NC6, Sweden's overall ambitions for research and development are to strengthen the country's long-term competitiveness and to promote sustainable growth, as expressed in the latest bill, Research and Innovation, applying to 2013–2016. The bill contains financial support to long-term initiatives in cutting edge research, a larger volume of basic resources to higher-education institutions (HEIs), and major investments in life sciences and energy systems that are sustainable in long term. Central government and public agencies are the largest funders of academic research, along with the Mistra Research Foundation. Almost two thirds of publicly funded research is carried out by HEIs, others include industrial research institutes and some sectoral agencies.

139. Sweden also provides support for climate-related research in developing countries through the Swedish International Development Cooperation Agency. Sida funds climate-related research in several countries and supports initiatives and networks, including research on forestry, agriculture, fishing, food, ecosystem resilience, vulnerability and adaptation, in particular, the modelling of water supplies under climate change in Africa, the Arctic, China, India and South America to strengthen early warning systems and capacity to prevent and resolve conflicts. An international collaboration concerning adaptation is underway in Viet Nam. The Mistra Urban Futures Programme is conducting research on sustainable urban development in cooperation with platforms in Shanghai (China), Kisumu (Kenya) and Cape Town (South Africa).

140. In its NC6, Sweden reported that it contributes to GCOS through SMHI, with long-term observations and measurements of parameters, including essential climate variables. Sweden also contributes to the development of new infrastructure for global observation systems and services based on remote sensing by Copernicus (formerly Global Monitoring for Environment and Security (GMES)). Sweden also contributes to several international programmes which report to GCOS, in particular the Climate Change Initiative of the European Space Agency, World Weather Watch of the World Meteorological Organization, the European Marine Observation and Data Network, the Global Terrestrial Observing System and the Global Runoff Data Centre.

G. Education, training and public awareness

141. In the NC6, Sweden has provided information on its actions relating to education, training and public awareness at both the domestic and international levels. Compared with the NC5, the Party provided more extensive information on the role of local and central agencies' actions in education, training and public awareness.

142. The NC6 emphasized that communicating knowledge of climate change and related measures is a key part of efforts in Sweden. Many actors are involved in this process, ranging from public agencies to non-governmental organizations (NGOs). At the national level, SEPA has the function of coordinating, monitoring and evaluating Sweden's progress towards its objectives, and also supporting other stakeholders in their environmental efforts.

143. Several agencies, organizations, municipalities, businesses and politicians discuss a wide range of climate change issues at the 'Climate Forum' Seminar held by SEPA annually. The Swedish Energy Agency, the Swedish Consumer Agency, the Swedish Forest Agency, the Swedish Board of Agriculture, the Swedish Meteorological and Hydrological

Institute, the Swedish Transport Administration and the Swedish Defence Research Agency have several initiatives and networks to develop and disseminate relevant information to the general public at national and regional levels. Sweden also reaches the general public and researchers alike through museums, adult education associations and NGOs. The latest public survey conducted by SEPA in 2009 indicates that the Swedish population remain willing to reduce their own greenhouse gas emissions.

144. Sweden has sustainable development and climate change issues in the curricula and syllabuses in schools, along with the Eco-Schools programme, the Green Flag Award and information campaigns. Between 2007 and 2012, Sweden ran information campaigns within the framework of its international training programme 'Climate Change – Mitigation and Adaptation', targeting public administrations, NGOs, universities or companies, reaching some 440 participants from about 50 countries. Sweden also took part in the United Nations Regional Initiative for the Assessment of the Impact of Climate Change on Water Resources and Socio-Economic Vulnerability in the Arab Region between the years 2011 and 2013, by contributing in regional climate modelling and simulation of hydrological effects.

145. Swedish NGOs play an active role in public debate on climate change, by creating discussion platforms and by initiating discussions on specific climate change related issues. Special initiatives are in place to increase public participation in climate work, through activities ranging from answering online questions to engaging in open discussions. NGOs often establish web-based forums or appeals where the public can express their opinions. The ERT commends the comprehensive information provided and encourages Sweden to continue its diverse activities on education, training and public awareness.

III. Summary of reviewed supplementary information under the Kyoto Protocol

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

146. Supplementary information provided by Sweden under Article 7, paragraph 2, of the Kyoto Protocol in its NC6 is mostly complete. The supplementary information is located in different sections of the NC6. Table 9 provides an overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol as well as references to the NC6 chapters in which this information is provided.

147. The technical assessment of the information reported under Article 7, paragraph 2, of the Kyoto Protocol is contained in the relevant sections of this report.

Table 9
Overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

Supplementary information	*Reference to the sixth national communication*
National registry	Annex 4
National system	Annex 3
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Chapter 5.7
Policies and measures in accordance with Article 2	Chapter 4.2

Supplementary information	*Reference to the sixth national communication*
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	Chapter 4.1
Information under Article 10	Annex 3 and chapters 4.2, 4.3, 6.1, 6.4, 7.5, 8.2.6, 8.3 and 9.5.5
Financial resources	Chapters 7.2.2, 7.3 and 7.4

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

148. Sweden has reported the information requested in section H, "Minimization of adverse impacts in accordance with Article 3, paragraph 14", of the annex to decision 15/CMP.1 as a part of its 2013 annual submission. It has reported how it gives priority to the actions taken to implement its commitments under Article 3, paragraph 14, of the Kyoto Protocol. During the review, Sweden provided the ERT with the additional information on how it strives to implement its commitments under Article 3, paragraph 1, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention. The ERT considers the reported information to be transparent and mostly complete. The ERT commends Sweden for the additional information provided and recommends that it continue exploring and reporting on the adverse impacts of the response measures and also include in its next annual submission information on any changes that have occurred compared with the information reported in its last annual submission.

149. The 2013 and previous NIRs and the additional information provided during the review presented several initiatives of Sweden aimed at minimizing adverse impacts. Under Sweden's PGD, all policy areas are to interact in a way that the country can make an effective contribution to equitable and sustainable global development. To promote sustainable development, several research initiatives are conducted to understand the social, economic and ecological impacts. In particular, special sustainability criteria have been developed for the import of biofuels under the European Union directive on renewables.

150. Sweden has reformed its energy markets and phased out market imperfections. In this regard, fossil fuels used outside the EU ETS are subject to a carbon dioxide tax to reflect the external costs. Sweden contributes to technology development in developing countries through CDM projects and development assistance, particularly on energy efficiency technologies and the introduction of renewable energy. Sweden also assists developing countries, which are dependent on fossil fuel consumption through research programmes on renewable energy technologies coordinated by the Asian Institute of Technology; education on sustainable energy technology in partnership with universities in Ethiopia, Mozambique, Uganda and the United Republic of Tanzania; and support for photovoltaic technologies for energy services to rural areas in Zambia.

IV. Conclusions and recommendations

151. The ERT conducted a technical review of the information reported in the NC6 of Sweden according to the UNFCCC reporting guidelines on NCs. The ERT concludes that the NC6 provides a good overview of the national climate policy of Sweden. The NC6 includes most of the mandatory information required by the UNFCCC reporting guidelines on NCs and all the elements of the supplementary information under Article 7 of the Kyoto

Protocol. During the review, Sweden provided further relevant information, including further information on national circumstances (see para. 16 above), the national system (see para. 24 above), provision of financial resources (see para. 111 above), technology transfer (see para. 125 above), and the minimization of adverse impacts on developing country Parties (see para. 148 above).

152. Sweden's emissions for 2011 were estimated to be 15.5 per cent below its 1990 level excluding LULUCF and 26.3 per cent below including LULUCF. Emission decreases were driven by the replacement of oil with biomass in district heating and a switch to heat pumps and pellet-fired boilers in the residential and services sector; a reduction in the number of cattle and a decrease in the use of both mineral fertilizers and manure in agriculture; as well as an increase in the utilization of landfill gas for energy and the imposition of a ban on the landfilling of organic waste. The onset of the economic crisis significantly affected industrial output, transportation activities and related emissions in the period 2008–2010.

153. The ERT noted that despite the significant economic growth of 57.8 per cent in GDP between 1990 and 2011, Sweden achieved notable emission reductions of 15.5 per cent over the same period and thus achieved a decoupling of total GHG emissions from economic growth. This is a commendable accomplishment given that electricity production is largely based on nuclear and hydropower and options for fuel switching from carbon-intensive fuels for electricity generation are very narrow.

154. In the NC6, Sweden presents GHG projections for 2015, 2020, 2025 and 2030 in tabular format and with interpolated annual estimates 2012–2020 for graphical presentation. Three scenarios are included: baseline ('without measures') scenario; 'with measures' and 'with additional measures' scenarios. In relation to the 1990 level excluding LULUCF, the projected change in GHG emissions until 2020 under the 'without measures', 'with measures' and 'with additional measures' scenarios, are +17.3, –18.6 and –19.5 per cent, respectively.

155. The GHG inventory data until 2011 indicate that Sweden can meet its Kyoto Protocol target for the first commitment period 2008–2012, which is an emission increase of a maximum of 4 per cent. Preliminary data show that Sweden is expected to exceed its target under the first commitment period of the Kyoto Protocol (75,037.71 kt CO2 eq per year, as an average for 2008–2012) by some 11,100 kt CO2 eq per year on an average. The ERT noted that Sweden is on track to meet and exceed this target through domestic actions alone, without the use of the mechanisms under the Kyoto Protocol. For 2020, the projections indicate that Sweden's GHG emissions in the non-trading sectors will stay below Sweden's EU non-ETS target trajectory for 2013–2020: the 2020 target is 17 per cent below the 2005 level, while the projections show around 22.0 per cent reduction by 2020. The Swedish Government has set up a domestic milestone target which is a 40 per cent reduction in non-ETS emissions from 1990 to 2020. The 'with measures' projection indicates that this domestic target can also be met if, in addition to the PaMs, one third of the credits from Sweden's JI/CDM-programme is used.

156. The NC6 contains information on how its use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action. Sweden is not planning to make use of the Kyoto Protocol mechanisms to meet its Kyoto Protocol targets, but may use them to attain to the domestic target for 2020.

157. Sweden is on track to meet its commitments for the first commitment period of the Kyoto Protocol with existing measures alone. The most important PaMs to meet these commitments are the energy and carbon taxes as well as the EU ETS. The effect of these key measures has been complemented by the effect of a number of other measures, such as the green electricity certificate system that promotes the use of renewables, the

improvement of energy efficiency in energy-intensive industry and in the building sector, legislative measures such as the ban on the landfilling of household organic waste, and targeted support provided for research and development.

158. The 2009 climate and energy bill sets ambitious climate and energy targets for the period ending in 2020. Also, the bill specifies the long-term goal that, in 2050, Sweden will release zero net emissions into the atmosphere. To achieve this long-term goal, the Government of Sweden has adopted a programme to further tighten its policy instruments. New PaMs may also have to be put in place to achieve this long-term goal. An in-depth evaluation of progress towards the ambitious domestic 2020 target will be undertaken by the Government in 2015.

159. In its NC6, Sweden has provided information on the provision of support required under the Convention and its Kyoto Protocol. Sweden continues to be among countries that provide more than 0.7 per cent of their GNI in ODA. Climate change related finance is an integral part of its ODA. Compared with 2009, in 2012 Sweden increased its climate-specific contributions through bilateral, regional and other channels significantly, by 66.5 per cent, to a total of USD 358 million. The greatest share of Sweden's bilateral and regional contributions for the period 2009–2012 is allocated to adaptation measures, focussing on interventions in the water and agriculture sectors, disaster risk management, health, education and research.

160. Technology transfer activities are important components of Sweden's development support. They include both 'soft' and 'hard' components and are implemented mainly through bilateral and multilateral initiatives and by the private sector. In this context, Sweden has signed cooperation agreements focusing on environmental and energy technology with a number of developing countries, including Brazil, China and India. Although the share of the private sector contribution compared to that of the public contribution was not very clear, the ERT's understanding was that the role of the Swedish Government in this process is mainly catalytic.

161. In the NC6, Sweden focuses on vulnerability and adaptation options in all relevant sectors, with particular attention placed on infrastructure, flood management and information dissemination networks. Since the responsibility for the practical action is located at the municipal level, Sweden, tasked regional agencies with preparing regional action plans for climate adaptation by 30 June 2014. The information provided in NC6 is complete and mostly transparent.

162. In the NC6, Sweden has provided comprehensive information on education, training and public awareness programmes and initiatives at domestic and international level. The ERT notes that communicating knowledge of climate change related measures is a key issue for Sweden and it is well disseminated through the country by a range of different stakeholders. As reported in NC6, Sweden contributes to an array of national, regional, European and global observation systems by providing atmospheric, terrestrial and oceanic data, and it actively participates in GCOS. Sweden also reported information on the support provided for research initiatives and networks in developing countries.

163. Supplementary information under Article 7, paragraph 1, of the Kyoto Protocol on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol is provided by the Party in its 2013 and previous annual submissions.

164. In the course of the review, the ERT formulated several recommendations relating to the completeness and transparency of Sweden's reporting under the Convention and its Kyoto Protocol. The key recommendations[7] are that Sweden:

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

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

(i) Information on, or references to, relevant legislative arrangements and enforcement and administrative procedures for all PaMs reported (see para. 29 above);

(ii) Disaggregated projections for F-gases (see para. 85 above);

(iii) Estimated and expected total effect of implemented and adopted PaMs by gas on a CO_2 eq basis (see para. 103 above);

(iv) Information on any changes that have occurred compared with the information reported in its last submission on how it gives priority to the actions taken to implement its commitments under Article 3, paragraph 14, of the Kyoto Protocol regarding the minimization of adverse impacts of response measures to climate change (see para. 148 above);

(b) Improve the transparency of reporting by including in the next national communication the following information:

(i) A clear subdivision by gas for each sector in the reporting of PaMs (see para. 37 above);

(ii) An estimate of the total effect of PaMs, in accordance with the 'with measures' definition and compared with a situation without such PaMs in terms of GHG emissions, also in tabular format for the years 1995 and 2000 (see para. 103 above);

(iii) Information on the proportion of climate-specific contributions as a fraction of the ODA, determining "new and additional" financial resources (see para. 111 above);

(iv) Information on technology transfer through public and private financing and information on the extent of transfer activities in its various projects and programmes (see para. 126 above);

(v) Information on Sweden's support to the development and enhancement of endogenous capacities and technologies of developing countries, including examples of such activities (see para. 128 above);

(vi) In the chapter on vulnerability assessment, climate change impacts and adaptation measures a brief description of – or cross reference to – information on cooperation with developing countries in preparing for adaptation against the impacts of climate change (see para. 133 above).

V. Questions of implementation

165. During the review, the ERT assessed the NC6, including supplementary information provided under Article 7, paragraph 2, of the Kyoto Protocol and reviewed information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, with regard to timeliness, completeness, transparency and adherence to the UNFCCC reporting guidelines on NCs. No question of implementation was raised by the ERT during the review.

Annex

Documents and information used during the review

A. Reference documents

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications". FCCC/CP/1999/7. Available at <http://unfccc.int/resource/docs/cop5/07.pdf>.

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories". FCCC/CP/1999/7. Available at <http://unfccc.int/resource/docs/cop5/07.pdf>.

"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol". Decision 15/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>.

"Guidelines for review under Article 8 of the Kyoto Protocol". Decision 22/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>.

"Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention". Annex to decision 23/CP.19. Available at <http://unfccc.int/resource/docs/2013/cop19/eng/10a02.pdf#page=20>.

FCCC/SBI/2011/INF.1. Compilation and synthesis of fifth national communications. Executive summary. Note by the secretariat. Available at <http://unfccc.int/resource/docs/2011/sbi/eng/inf01.pdf>.

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FCCC/SBI/2011/INF.2. Compilation and synthesis of supplementary information incorporated in fifth national communications submitted in accordance with Article 7, paragraph 2, of the Kyoto Protocol. Note by the secretariat. Available at <http://unfccc.int/resource/docs/2011/sbi/eng/inf02.pdf>.

FCCC/ARR/2013/SWE. Report of the individual review of the annual submission of Sweden submitted in 2013. Available at <http://unfccc.int/resource/docs/2014/arr/swe.pdf>.

FCCC/IRR/2007/SWE. Report of the review of the initial report of Sweden. Available at <http://unfccc.int/resource/docs/2007/irr/swe.pdf>.

FCCC/IDR.5/SWE. Report of the in-depth review of the fifth national communication of Sweden. Available at < http://unfccc.int/resource/docs/2011/idr/swe05.pdf>.

Sixth national communication of Sweden. Available at <http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/swe_nc6_resubmission.pdf>.

2013 GHG inventory submission of Sweden. Available at <http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/7383.php>.

B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Maja Cederlund (Swedish Environmental Protection Agency), including additional material on updated policies and measures, greenhouse gas projections, the national registry and recent climate policy developments in Sweden. The following documents[1] were also provided by Sweden:

Ministry of the Environment, Ministry of Enterprise, Energy and Communications. 2009. *En sammanhållen klimat- och energipolitik* (An Integrated Climate and Energy Policy). Klimat Prop. 2008/09:162. Stockholm. Available in Swedish at <http://www.regeringen.se/content/1/c6/12/27/78/4ce86514.pdf> and available in English at <http://www.government.se/content/1/c6/12/34/66/1a1aa683.pdf>.

Finansdepartementet. 2009. *Vissa punktskattefrågor med anledning av budgetpropositionen för 2010*, Prop. 2009/10:41. Stockholm. Available in Swedish at <http://www.regeringen.se/sb/d/108/a/134192>.

National Institute of Economic Research. 2008. *En samhällsekonomisk granskning av Klimatberedningens handlingsplan för svensk klimatpolitik*, NIER: SPECIALSTUDIE NR 18, JUNI 2008 UTGIVEN AV KONJUNKTURINSTITUTET. Stockholm. Available in Swedish at <http://www.konj.se/5.70c52033121865b13988000112299.html>; summary available in English at <http://www.konj.se/download/18.70c52033121865b13988000113120/Specialstudie_18_Comprehensive+Summary.pdf>.

National Institute of Economic Research. 2012. *Miljö, ekonomi och politik 2012* (Analysis of Govt. Bill Prop. 2009/10:41). Stockholm, NIER. pp. 47–49. Available in Swedish at <http://www.konj.se/744.html>.

The Swedish National Audit Office. 2012. *Klimatrelaterade skatter – Vem betalar?*, RiR 2012:1 - Riksrevisionen granskar: Hållbar utveckling – Klimat. Stockholm. Available in Swedish at <http://www.riksrevisionen.se/sv/rapporter/Rapporter/EFF/2012/Klimatrelaterade-skatter--Vem-betalar/>.

Organisation for Economic Co-operation and Development (OECD). 2011. *OECD Economic Surveys: SWEDEN 2011*. Paris: OECD. Available at <http://browse.oecdbookshop.org/oecd/pdfs/product/1011011e.pdf>.

Näringsdepartementet. 2013. *Fossilfrihet på väg* (Fossil-free Road Transport), Statens offentliga utredningar (SOU 2013:84). Stockholm. Available in Swedish at <http://www.regeringen.se/sb/d/17075/a/230739> and Summary in English available at <http://www.sou.gov.se/content/1/c6/21/33/36/aa2e5cb3.pdf>.

The Swedish Government, 2014. *Förslag till statens budget för 2014: Areella näringar, landsbygd och livsmedel*. Stockholm. Available in Swedish at: <http://www.regeringen.se/content/1/c6/22/37/09/4d48e26d.pdf>; information on the

[1] Reproduced as received from the Party.

adoption of the bill is available in Swedish at <http://www.riksdagen.se/sv/Dokument-Lagar/Utskottens-dokument/Betankanden/Arenden/201314/FiU10/>.

Statistics Sweden. 2012. *The Future Population of Sweden 2012–2060*. Stockholm. Available at <http://www.scb.se/statistik/_publikationer/BE0401_2012I60_BR_BE51BR1202ENG.pdf>.

The Swedish Ministry for Foreign Affairs. 2010. *Policy for Environmental and Climate Issues in Swedish Development Cooperation 2010–2014*. Stockholm: [Publisher?] Available at <http://www.government.se/content/1/c6/15/64/98/24249736.pdf>.

Swedish International Development Cooperation Agency (Sida). 2011. *Adapting to a Changing Climate – The Swedish Government's Special Climate Change Initiative 2009–2012*. Stockholm: Available at <http://energy6.net/download.php?id=22430>.

Sida. 2013. *Final Report on the Swedish Government's Special Climate Change Initiative 2009–2012: Bilateral and Regional Interventions*. Stockholm: Available at <http://www.sida.se/Global/About%20Sida/V%c3%a5ra%20%c3%a4mnesomr%c3%a5den/%c3%96vers%c3%a4ttning%20DHO63_6th%20version_31Jan14.pdf>.