COMPLIANCE COMMITTEE

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9 November 2010

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

Note by the secretariat

The report of the in-depth review of the fifth national communication of Denmark was published on 9 November 2010. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decision 4/CMP.4), the report is considered received by the secretariat on the same date. This report, FCCC/IDR.5/DNK, 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 in-depth review of the fifth national communication of Denmark

Parties included in Annex I to the Convention are requested, in accordance with decision 10/CP.13, to submit a fifth national communication to the secretariat by 1 January 2010. In accordance with decision 8/CMP.3, Parties included in Annex I to the Convention that are also Parties to the Kyoto Protocol shall include in their fifth national communications supplementary information under Article 7, paragraph 2, of the Kyoto Protocol. In accordance with decision 15/CMP.1, these Parties shall start reporting the information under Article 7, paragraph 1, of the Kyoto Protocol with the inventory submission due under the Convention for the first year of the commitment period. This includes supplementary information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. This report presents the results of the in-depth review of the fifth national communication of Denmark conducted by an expert review team in accordance with relevant provisions of the Convention and Article 8 of the Kyoto Protocol.

Contents

I. Introduction and summary

A. Introduction

1. For Denmark the Convention entered into force on 21 March 1994 and the Kyoto Protocol on 16 February 2005.[1] Within the burden-sharing agreement of the European Union (EU) for meeting commitments under the Kyoto Protocol, Denmark committed itself to reducing its greenhouse gas (GHG) emissions by 21.0 per cent compared with the base year[2] level during the first commitment period from 2008 to 2012. Meanwhile, Greenland, not being a part of the EU territory, committed itself to reducing its GHG emissions by 8.0 per cent compared with the base year level.

2. This report covers the in-country in-depth review (IDR) of the fifth national communication (NC5) of Denmark, coordinated by the UNFCCC secretariat, in accordance with the guidelines for review under Article 8 of the Kyoto Protocol (decision 22/CMP.1). The review took place from 21 to 26 June 2010 in Copenhagen, Denmark, and was conducted by a team of nominated experts from the UNFCCC roster of experts: Ms. Amrita Narayan Achanta (India), Mr. Domenico Gaudioso (Italy), Mr. Janis Rekis (Latvia) and Ms. Svetlana Dolgikh (Kazakhstan). Ms. Achanta and Mr. Gaudioso were the lead reviewers. The review was coordinated by Ms. Katia Simeonova and Ms. Xuehong Wang (UNFCCC secretariat).

3. During the IDR, the expert review team (ERT) examined each section of the NC5. The ERT also evaluated the supplementary information provided by Denmark as a part of the NC5 in accordance with Article 7, paragraph 2, of the Kyoto Protocol. In addition, the ERT reviewed the supplementary information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, which was provided by Denmark in its 2009 annual submission and elaborated further in its 2010 annual submission under Article 7, paragraph 1, of the Kyoto Protocol.

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

B. Summary

5. The ERT noted that Denmark's NC5 complies mostly with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications" (hereinafter referred to as the UNFCCC reporting guidelines). As required by decision 15/CMP.1, supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol[3] is provided in the NC5. The ERT acknowledged the Party's coherent and consistent reporting.

[1] The Convention was ratified by the Kingdom of Denmark, comprising Denmark, Greenland and the Faroe Islands, while the Kyoto Protocol was ratified with a territorial exclusion in respect of the Faroe Islands.

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

6. The supplementary information on the minimization of adverse impacts referred to in paragraph 3 above is mostly complete and transparent and was provided on time. During the review, Denmark provided further relevant information.

1. Completeness

7. The ERT noted that the NC5 covers all the sections and most of the mandatory elements required by the UNFCCC reporting guidelines, except for information on the procedures for the official consideration and approval of the inventory under the national system (see para. 22 below) and the identification of "new and additional" financial resources (see paras. 87 and 88 below). Denmark has provided an explanation in its NC5 as to why it has not identified "new and additional" financial resources, attributing this to a methodological difficulty. The ERT recommends that Denmark enhance the completeness of its reporting by providing this information in its next national communication.

2. Transparency

8. The ERT acknowledged that Denmark's NC5, including supplementary information provided under Article 7, paragraph 2, of the Kyoto Protocol, is mostly transparent and comprehensive. The NC5 provides clear information on all aspects of implementation of the Convention and its Kyoto Protocol. The ERT noted that the NC5 is structured following the outline contained in the annex to the UNFCCC reporting guidelines and supplementary information submitted under Article 7, paragraph 2, of the Kyoto Protocol is easily identifiable.

9. In the course of the review, the ERT formulated a number of recommendations that could help Denmark to further increase the transparency of its reporting, including in relation to policies and measures (PaMs) (see paras. 31 and 126 below), projections and the total effect of PaMs (see paras. 65, 66 and 68–70 below), vulnerability, climate change impacts and adaptation (see para. 83 below), financial resources and technology transfer (see para. 87 below) and research and systematic observation (see para. 97 below).

3. Timeliness

10. The NC5 was initially submitted on 31 December 2009, before the deadline of 1 January 2010 mandated by decision 10/CP.13. A revised version was submitted on 11 January 2010, and the review was based on that revised version.

II. Technical assessment of the reviewed elements

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

11. In its NC5, Denmark has provided a description of its national circumstances and has elaborated on the framework legislation and key policy documents on climate change. The NC5 also refers to the description of the national system provided in the national inventory report (NIR) of the Party's 2009 annual submission. Further technical assessment of the institutional and legislative arrangements for coordination and implementation of PaMs is provided in chapter II.B.1 of this report.

1. National circumstances

12. In its NC5, Denmark has provided a description of its national circumstances, and information on how these national circumstances affect GHG emissions and removals in Denmark, Greenland and the Faroe Islands and how national circumstances and changes in national circumstances affect GHG emissions and removals over time. Information has been provided on the structure of the Government, population, geography, the economy and relevant economic sectors. The ERT noted that, while the national circumstances were very well described in the NC5, the analysis of how these national circumstances and changes therein affect GHG emissions and removals could be further enhanced.

13. The ERT noted that there has been significant inter-annual variation in Denmark's total GHG emissions, owing to its electricity trading with neighbouring countries, which is influenced by the availability of hydropower, and to the variation in its winter temperatures over the years. This is why, for policy purposes, Denmark usually corrects its emissions to take into account its electricity trading and the variation in its winter temperatures. There was shown to have been a 14 per cent decrease in the Party's GHG emissions from 1990 to 2008 after such corrections had been made, compared with a 7.3 per cent decrease in emissions over the same period without such corrections being made. The ERT was also informed of the significant implications for GHG emissions of the potential construction in 2017 of the Alcoa aluminium smelter in Maniitsoq, Greenland, which would be run on hydropower.

14. Table 1 illustrates the national circumstances of the country by providing some indicators relevant to GHG emissions and removals. Between 1990 and 2008, total GHG emissions without emissions and removals from land use, land-use change and forestry (LULUCF) decreased by 7.3 per cent, total primary energy supply increased by 9.6 per cent only, while gross domestic product (GDP) grew by 43.3 per cent. This indicates much slower growth in energy supply than economic growth, and a decrease in associated GHG emissions. The successful decoupling of GHG emissions from economic growth was due largely to the significant change in the fuel supply mix from coal to natural gas and renewable energy, and to efficiency gains resulting from more widespread use of combined heat and power (CHP) and improved energy efficiency in the industrial, residential and household sectors. These changes and efficiency gains have resulted from policies that Denmark has implemented since the 1980s, driven initially by considerations related to energy security and, since 1990, also by climate change.

15. The Kingdom of Denmark is a constitutional monarchy, within which Greenland and the Faroe Islands are self-governing. The power of the State is divided between the legislative branch, the executive branch and the judicial branch. Legislative power lies with the Folketing (the Danish Parliament). Since 1953, Denmark has often had a minority government, necessitating the support of other political parties. To that end, the Government often enters into agreements with a majority of the parliamentary parties in order to ensure continuity and stability of policy, including energy and climate change policy. The overall responsibility for climate change policymaking lies with the Danish Ministry of Climate and Energy, which cooperates closely with other ministries, including the Ministry of the Environment, on climate issues. Denmark's implementation of the Kyoto Protocol is underpinned by its 2003 National Climate Strategy, sectoral policy strategies which take climate into consideration, and a number of initiatives that contribute to reducing GHG emissions. As part of the implementation of the EU climate and energy package of December 2008, the Government prepared a National Climate Strategy until 2020, with the intention of adopting it in 2010.

16. With regard to the other parts of the Kingdom of Denmark, Greenland has launched some PaMs for the energy sector in order to support the objective of the Convention and its Kyoto Protocol to reduce GHG emissions. In particular, these policies aim to further

increase the use of renewable energy and to promote environmentally sustainable energy. Similarly, the Government of the Faroe Islands initiated, in 2008, preparation of a climate strategy. In December 2009, a climate policy package was adopted by the Parliament of the Faroe Islands. Further legislative arrangements and administrative procedures, including those for the national system and the national registry, are presented in chapters II.A.2, II.A.3 and II.B of this report.

Table 1
Indicators relevant to greenhouse gas emissions and removals for the Kingdom of Denmark

	1990	*1995*	*2000*	*2005*	*2008*	*Change 1990–2000 (%)*	*Change 2000–2008 (%)*	*Change 1990–2008 (%)*
Population (million)	5.1	5.2	5.3	5.4	5.5	3.9	2.8	6.8
GDP (2000 USD billion using PPP)	119.1	133.7	153.9	163.8	170.7	29.2	10.9	43.3
TPES (Mtoe)	17.3	19.4	18.6	18.8	19.0	7.2	2.2	9.6
GDP per capita (2000 USD thousand using PPP)	23.2	25.6	28.8	30.2	31.1	24.4	7.9	34.2
TPES per capita (toe)	3.4	3.7	3.5	3.5	3.5	3.2	–0.6	2.6
GHG emissions without LULUCF (Tg CO_2 eq)	70.3	77.4	69.5	65.1	65.1	–1.1	–6.3	–7.3
GHG emissions with LULUCF (Tg CO_2 eq)	69.4	79.0	69.4	63.1	66.6	0.0	–4.0	–4.0
CO_2 emissions per capita (Mg)	10.5	11.9	10.3	9.6	9.5	–2.3	–7.9	–10.0
CO_2 emissions per GDP unit (kg per 2000 USD using PPP)	0.5	0.5	0.4	0.3	0.3	–21.5	–10.7	–29.9
GHG emissions per capita (Mg CO_2 eq)	13.7	14.8	13.0	12.0	11.9	–4.8	–8.9	–13.2
GHG emissions per GDP unit (kg CO_2 eq per 2000 USD using PPP)	0.6	0.6	0.5	0.4	0.4	–23.4	–15.6	–35.4

Sources: (1) GHG emissions data: Denmark's 2010 greenhouse gas inventory submission; the numbers shown relate to the Kingdom of Denmark (i.e. Denmark, Greenland and the Faroe Islands); (2) Population, GDP and TPES data: International Energy Agency; these data do not include Greenland and the Faroe Islands, but the contribution of Greenland and the Faroe Islands to the Kingdom of Denmark's total GHG emissions is very small, amounting to less than 1 per cent.

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.

17. Denmark has provided in its NC5 a summary of information on GHG emission trends for the period 1990–2007. This information is mostly consistent with the 2009 national GHG inventory submission, except for an error identified by the ERT with regard to the values provided for total carbon dioxide (CO_2) emissions including and excluding net CO_2 emissions from LULUCF for 2000. Summary tables, including trend tables for

emissions in carbon dioxide equivalent (CO_2 eq) (given in the common reporting format (CRF)), are also provided in an annex to the NC5.

18. In the Kingdom of Denmark, total GHG emissions excluding emissions and removals from LULUCF decreased by 7.3 per cent between the base year and 2008, whereas total GHG emissions including net emissions and removals from LULUCF decreased by 4.0 per cent. The decrease in total GHG emissions excluding LULUCF was attributed to the decrease in both nitrous oxide (N_2O) emissions, by 35.9 per cent, and CO_2 emissions, by 3.87 per cent. Over the same period, emissions of methane (CH_4) increased by just 1 per cent. Emissions of fluorinated gases (F-gases) accounted for only about 0.36 per cent of total GHG emissions in 1990, but for 1.11 per cent in 2008, indicating a 317.0 per cent increase in emissions of F-gases from 1990 to 2008, except for emissions of sulphur hexafluoride (SF_6), which declined.

19. Within the energy sector, the emission trend was underpinned by the decrease in CO_2 emissions from energy industries and other (residential and commercial sectors), which more than compensated for the notable growth in emissions from transport, where the trend in emissions largely followed economic growth over the years. The significant decrease in N_2O emissions was attributed to the decline in the use of synthetic fertilizers and a more efficient use of manure. Meanwhile, the almost stable trend in CH_4 emissions is defined by two countervailing tendencies: (a) the decrease in CH_4 emissions from landfills; and (b) the increase in emissions from energy production, owing to increasing use of gas engines. Analysis of drivers for GHG emission trends in each sector is provided in chapter II.B of this report. Table 2 provides an overview of GHG emissions by sector from the base year to 2008.

Table 2
Greenhouse gas emissions by sector in the Kingdom of Denmark, 1990–2008

Sector	*GHG emissions (Tg CO_2 eq)*						*Change (%)*		*Shares[a] by sector (%)*	
	1990	*1995*	*2000*	*2005*	*2007*	*2008*	*1990–2008*	*2007–2008*	*1990*	*2008*
1. Energy	53.5	61.3	54.2	51.6	54.6	51.6	–3.5	–5.5	76.1	79.3
A1. Energy industries	26.6	32.8	26.3	23.3	26.3	24.2	–9.2	–8.1	37.9	37.1
A2.Manufacturing industries and construction	5.6	6.0	6.2	5.8	5.9	5.4	5.4	–8.4	7.9	8.3
A3. Transport	10.9	12.2	12.5	13.5	14.4	14.2	30.4	–1.5	15.5	21.8
A4.–A5. Other	10.0	9.8	8.5	8.4	7.4	7.3	–26.7	–1.6	14.2	11.3
B. Fugitive emissions	0.3	0.5	0.7	0.6	0.5	0.5	47.0	–7.9	0.5	0.8
2. Industrial processes	2.2	2.7	3.2	2.3	2.4	2.1	–7.0	–12.1	3.2	3.2
3. Solvent and other product use	0.1	0.1	0.1	0.1	0.1	0.1	–31.8	–8.0	0.2	0.1
4. Agriculture	13.1	12.0	10.7	9.9	9.8	10.1	–23.4	2.7	18.7	15.5
5. LULUCF	–0.9	1.5	–0.2	–2.0	0.9	1.5	–265.0	64.7	–1.3	2.2
6. Waste	1.3	1.3	1.3	1.2	1.2	1.3	–2.3	1.5	1.8	1.9
7. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sector	*GHG emissions (Tg CO_2 eq)*						*Change (%)*		*Shares[a] by sector (%)*	
	1990	*1995*	*2000*	*2005*	*2007*	*2008*	*1990–2008*	*2007–2008*	*1990*	*2008*
GHG total with LULUCF	**69.4**	**79.0**	**69.4**	**63.1**	**69.0**	**66.6**	**–4.0**	**–3.5**	**NA**	**NA**
GHG total without LULUCF	**70.3**	**77.4**	**69.5**	**65.1**	**68.1**	**65.1**	**–7.3**	**–4.4**	**NA**	**NA**

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

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

[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.

20. With regard to the Party's GHG inventory, the ERT acknowledged that Denmark had incorporated many of the key recommendations made in the report of the individual review of the 2009 annual submission of Denmark (2009 annual review report (ARR)).[4] These included the aggregation of emissions data for all three parts of the Kingdom of Denmark for the purposes of the Convention, and the aggregation of emissions data for Denmark and Greenland for the purposes of the Kyoto Protocol.[5] Also, a full inventory has been prepared for the Faroe Islands. A number of further improvements have been made to the national inventory and these are elaborated in chapter II.A.2 of this report.

21. The ERT encourages Denmark to ensure that any other issues raised in the 2009 ARR which were also raised during the IDR of the NC5 are addressed in its next annual submission. During the review, the ERT assessed the emission trends reported in the Party's recently submitted 2010 annual submission and it has reflected the findings in this report. The ERT identified an error in the 2010 CRF table on the Kingdom of Denmark's hydrofluorocarbon (HFC) emissions in 2008. In response to the recommendations made by the ERT, Denmark resubmitted its CRF tables under the Convention on 26 July 2010.

2. National system

22. In accordance with decision 15/CMP.1, Denmark, in its NC5, has provided a description of how its national system is performing the general and specific functions defined in the guidelines for national systems under Article 5, paragraph 1 (decision 19.CMP.1). The description includes almost all the elements required in decision 15/CMP.1, except for a description of the procedures for the official consideration and approval of the inventory. Further details on the national system are provided in the Party's 2009 and 2010 NIRs.

23. The ERT took note of the recommendations made in the 2009 ARR in relation to the national system. The ERT noted that, following these recommendations, Denmark had made some efforts to improve and strengthen the national system with regard to the GHG emission inventory of Greenland, including by establishing an institutional agreement on

[4] FCCC/ARR/2009/DNK.

[5] In practical terms, this means the submission of a complete GHG inventory for Greenland and also the full integration of this inventory within the inventory of Denmark and Greenland for the purposes of the Kyoto Protocol. In previous submissions, Greenland's emissions were reported under category 7 other, which is not included among the sources listed in Annex A to the Kyoto Protocol, which are regulated under the Kyoto Protocol.

inventory preparation between the Government of Greenland and the National Environmental Research Institute (NERI), which became operational in 2010. This led to the improvements in the GHG emission inventory noted in paragraph 20 above. Information relating to relevant changes in institutional arrangements for inventory preparation, quality assurance/quality control procedures, methodologies, activity data (AD), emission factors (EFs), emission trends and uncertainty analysis for Greenland has been included in the 2010 NIR. Also, a key category analysis and an uncertainty assessment were prepared in an aggregated format for Denmark and Greenland and reported in the Party's 2010 NIR.

24. During the review, Denmark provided the ERT with additional information on the changes in the national system. These included changes made to the national system in order to estimate and report emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, in particular the setting up of a database and launching of a project to estimate and monitor major carbon stocks and carbon stock changes in forests, cropland and grassland, including the pools in soils, based on real-time temperatures. However, these changes in the national system mostly affected Denmark and it remained unclear to the ERT how soil carbon changes would be monitored in Greenland.

25. During the review, the ERT was informed that the availability of resources for inventory purposes was no longer an issue, unlike during the preparation of the Party's 2009 annual submission. The ERT noted the Party's efforts to strengthen the national system, and recommends that Denmark provide a description of the procedures for the official consideration and approval of its inventory in its next annual submission. The ERT encourages Denmark to improve the transparency of its national system for monitoring soil carbon changes in Greenland. The ERT concluded that the Party's national system continues to perform its required functions as set out in decision 19/CMP.1.

3. National registry

26. In its NC5, Denmark has provided information on its national registry, including a description of how its national registry performs the functions defined in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and how it adheres to the technical standards for data exchange between registry systems. Denmark also provided a reference to its 2009 annual submission, which contains a more detailed description of its national registry system. Denmark further provided to the ERT a reference to its 2010 NIR, which was considered in the preparation of the draft standard independent assessment report (SIAR) for 2010 submission. During the review, the ERT considered the draft SIAR, as the SIAR had not yet been finalized at the time of the IDR.

27. During the in-country review, Denmark provided the ERT with additional information on the structure of the registry database, which has remained largely unchanged since 2007. It also provided information on the staff that support the operation of the registry, reflecting their capacity to maintain the registry's functions. It further provided updated information and documentation, including the plan for the backing up of databases and applications, and information on the recording of changes to databases and other issues relating to the national registry. The ERT was informed that most of the issues raised in the 2009 ARR had been resolved in the preparation of the Party's 2010 annual submission and that any outstanding issues were resolved in the course of the preparation of the 2010 SIAR.

28. The ERT recommends that Denmark report, in its next national communication, on the results of any test procedures that might be available or are being developed with the aim of testing the performance, procedures and security measures of the national registry, and that the Party ensure that the documentation pertaining to its national registry is maintained and up to date.

29. The ERT concluded that Denmark's national registry has the capacity to ensure accurate accounting of Kyoto Protocol units, continues to perform the functions set out in the annex to decision 13/CMP.1 and annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1.

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

30. As required by the UNFCCC reporting guidelines, Denmark has provided in its NC5 comprehensive information on its package of PaMs implemented, adopted and planned in order to fulfil its commitments under the Convention and its Kyoto Protocol. The reporting of information on PaMs is organized by sector and by gas. For each sector Denmark has provided a textual description of the key PaMs and summary tables on PaMs with information on their status of implementation. Denmark has included in its NC5 information on how its framework policies for sustainable development are aiming to modify longer-term trends in anthropogenic GHG emissions and removals and how it is monitoring the progress of its PaMs in mitigating GHG emissions. In addition, the NC5 provides a full description of the Party's national legislative arrangements and administrative procedures relating to the implementation of the Kyoto Protocol, including activities under Article 3, paragraphs 3 and 4.

31. However, the reported information on PaMs does not fully reflect the efforts taken by Denmark since the 1980s to decouple energy consumption from economic growth and the resulting GHG emissions. Denmark did not provide in its NC5 quantitative estimates of the impacts of a number of its PaMs, either individually or collectively, or associated costs, and benefits not related to GHG mitigation. Also, information on PaMs is scattered between the main body of the NC5 and its annexes. The ERT therefore encourages Denmark to: improve the transparency of its reporting on PaMs by adhering more closely to the UNFCCC reporting guidelines when reporting on PaMs and their mitigation effects and associated costs; consider summarizing the more relevant information in the main body of its next national communication; and provide there any information that is missing from the NC5.

32. The NC5 provides comprehensive information on PaMs adopted both at the national level and in the context of the EU. Synergies and overlaps among PaMs at the national and EU levels are well explained. Limited information has been reported on the role played by regional and local governments in the implementation of PaMs. Some estimates of the effects of PaMs by sector and by gas reflect the results of Denmark's 2005 Effort Analysis,[6] which covers the effects of PaMs implemented in the period 1990–2001. The ERT commends the effort made by the Party to assess ex post the impact of implemented policies and to report relevant findings in its NC5. However, the ERT noted that this analysis is somewhat outdated and does not cover the PaMs implemented in the last decade (see paras. 77–79 below).

33. The NC5 mentions only one measure that could potentially increase CH_4 emissions, namely the requirement to assign impregnated wood to landfilling. As a result of the continuous evaluation of implemented PaMs, a number of PaMs reported in the fourth national communication (NC4) have since been discontinued, such as the 2001–2004

[6] Danish Environmental Protection Agency. 2005. *Denmark's CO_2 emissions – the effort in the period 1990–2001 and the associated costs*. Main report available at <http://www.mst.dk/udgiv/publikationer/2005/87-7614-587-5/pdf/87-7614-588-3.pdf> and annex report available at <http://www.mst.dk/udgiv/publikationer/2005/87-7614-589-1/html>.

Danish Allowance Scheme (replaced by the European Union emissions trading scheme (EU ETS) in 2005), some of the subsidies for renewable energy and CHP (replaced by other support measures), set-aside schemes in the agriculture sector introduced by past EU directives, support for gas recovery at landfills and cleaner products, and the tax on incineration of waste (replaced by the energy and CO_2 tax on waste incineration).

34. Denmark's experience is a clear example of how proactive policies on renewable energy and energy efficiency can help to attain the overarching energy policy objectives, such as energy security, environmental protection and economically viable energy production and consumption, and at the same time bring sizeable benefits in terms of GHG emission reductions. This experience is particularly noteworthy in terms of: the Party's use of fiscal instruments for environmental purposes (see paras. 40 and 41 below), including for promoting renewable energy sources (RES); its implementation of ambitious policies to promote energy efficiency; and its introduction of one of the first national allowance schemes in the world (see para. 39 below). Support provided by Denmark for the use of renewable energy helped it to build one of the biggest renewable energy sectors in the world in terms of its share in gross energy consumption (from 6.7 per cent in 1990 to 17.0 per cent in 2007). This support was focused, in the past, on wind power, which currently provides 19.7 per cent of electricity produced in Denmark and is well integrated into the power system without compromising security of supply. Currently, Denmark is reorienting its policy to promote RES, such as the wide use of wood in large-scale CHP production, offshore wind parks and biogas. Coherent efforts to promote energy efficiency have led to Denmark ranking among the top countries in the EU in terms of energy efficiency and to its energy intensity being around 35 per cent lower than the average of the member countries of the International Energy Agency (IEA). Table 3 provides a summary of the reported information on the PaMs of Denmark.

Table 3
Summary of information on policies and measures

Major policies and measures	*Examples/comments*
Policy framework and cross-sectoral measures	
Integrated climate programme	2002 National Strategy for Sustainable Development; 2003 National Climate Strategy; Government Platform 2007, including 'A Visionary Danish Energy Policy up to 2025'
Energy/electricity/emissions taxation	Energy and CO_2 taxes and several taxes on energy products and services (2.7 Tg CO_2, including 1.5 Tg CO_2 from the introduction of CO_2 taxes and the increase in energy taxes, and 1.2 Tg CO_2 from increased fuel taxes)
	Green owner tax on motor vehicles (0.6 Tg CO_2) and registration tax for new motor vehicles (0.6 Tg CO_2)
	Taxes on waste and emissions of HFCs and SF_6
Emissions trading	European Union emissions trading scheme (EU ETS) (5.2 Tg CO_2), which replaced the 2001–2004 Allowance Scheme for electricity producers
Support for research and development	Comprehensive and stable support for the promotion of new energy-technologies
Policies and measures by sector	
Energy	
Energy sector liberalization	Fully liberalized: integration with Nordic countries and north-German markets
Combined heat and power (CHP) generation	Priority for electricity from CHP and other mainly fiscal measures to promote CHP
	Support for decentralized CHP (0.4 Tg CO_2)

Major policies and measures	*Examples/comments*
	Grants for the conversion of old dwellings to CHP (0.2 Tg CO_2) and grants to promote connection to coal-fired CHP (0.1 Tg CO_2)
Renewable energy sources	Grants for private wind turbines (1.7 Tg CO_2)
	Support for electricity generation plants using wind turbines (0.5 Tg CO_2)
	Agreement on the use of biomass for electricity production (1.1 Tg CO_2)
	Mandatory installed capacity for use of biomass in large-scale CHP generation, and mandatory blending of biofuels in gasoline
	National Renewable Energy Action Plan under European Union (EU) directive 2009/28/CE
Energy efficiency improvements	Energy Saving Action Plan and Political Agreement on Energy-Saving Efforts
	Grants for energy savings in businesses (0.9 Tg CO_2)
	CO_2 tax rebates for investments in energy efficiency (0.6 Tg CO_2)
	Building labelling (0.4 Tg CO_2); certification of buildings and building codes
	Standards for and labelling of appliances
	Energy-efficiency obligations for energy utilities, and subsidies for the replacement of old boilers
Transport	
Vehicle and fuel taxes	Higher fuel taxes, annual tax on motor vehicles and registration tax
Agreements/partnerships	Agreement with the European, Japanese and Korean motor industries
Integrated transport planning	2009 political agreement on a Green Transport Vision; 2010 Government work plan ‘Denmark 2020’
Information campaigns	Information campaigns on fuel consumption of new cars and energy-efficient driving techniques
Industrial processes	
Integrated pollution prevention and control (IPPC)	EU IPPC directive, EU ETS and EU directive on fluorinated gases
	Global warming potential based taxes on fluorocarbons (0.4 Tg CO_2)
	Ban on fluorocarbons in new facilities and products, as of 1 January 2006 (0.4 Tg CO_2)
Agreements/partnerships	Climate change agreements with industry
Agriculture	
	EU Common Agricultural Policy; EU Nitrates Directive; EU Water Framework Directive
	Prescriptions for environmentally sensitive areas; Action Plans for the Aquatic Environment I & II; Action Plan for Sustainable Agriculture (2.2 Tg CO_2)
	Action Plan for the Aquatic Environment III (0.2 Tg CO_2)
	Energy Policy Agreement for biogas (0.5 Tg CO_2)
	EU directive on fertilizers, and Green Growth Plan (0.8 Tg CO_2)

Major policies and measures	*Examples/comments*
Forestry	
	2002 National Forest Programme: Sustainable Forest Management
	National objective since 1989 to double forested area within 100 years (from 10.3 per cent)
	Long-term conversion to near-to-nature forest management principles; subsidies scheme for private afforestation on agricultural land (0.120 Tg CO_2)
	Regulations and voluntary initiatives to support public afforestation (0.068 Tg CO_2)
Waste	
	Obligation to send combustible waste to be incinerated (0.3 Tg CO_2)
	Waste tax on landfilling; energy tax on incineration of waste; taxes on packaging; enforcement of EU legislation: target to increase recycling of plastic packaging waste
	Implementation of the EU landfill directive; new National Waste Strategy 2009–2012 (minimum of 65 per cent of waste to be recycled and maximum of 6 per cent of waste sent to landfill)
	New environmental technologies will be introduced for specific types of waste by the Strategy '10

Note: The greenhouse gas reduction estimates given for some measures (in parentheses) are reductions in CO_2 or CO_2 eq for 2010.

1. Policy framework and cross-sectoral measures

35. Several ministries are responsible for implementing climate-related policies in Denmark. Among them, the Ministry of Climate and Energy, the Danish Energy Agency (DEA), the Ministry of Taxation, and county and municipal authorities play an important role in implementing climate policy. DEA is responsible for the administration of the flexibility mechanism projects under the Kyoto Protocol and the EU ETS, as well as for the national registry. Since Denmark is an EU member State, its NC5 provides information on both national measures and measures transposed into national law from EU legislation. In several areas, such as for F-gas emissions, the national legislation is considerably more stringent than the corresponding EU legislation.

36. Since the late 1980s, a considerable number of policies for sustainable development and climate change mitigation have been implemented in Denmark, within the framework of the Government's Action Plan for Environment and Development, which was issued in 1988 as a follow-up to the Brundtland Report. Since 2001, these policies have focused on the cost-effective achievement of the Party's emission reduction target under the Kyoto Protocol and the related EU burden-sharing agreement through a combination of both cost-effective domestic measures and the use of the Kyoto Protocol mechanisms. Denmark's implementation of the Kyoto Protocol is based on its 2003 National Climate Strategy, sectoral policy strategies which take climate into consideration, and a number of initiatives that contribute to reducing GHG emissions.

37. In the follow-up to the 2003 National Climate Strategy, the Government stated, in its platform of November 2007 and in the 2008 political agreement on Danish energy policy for 2008–2011, that Denmark should be a green and sustainable society with a visionary climate and energy policy and an ambitious global climate strategy. The Government also established a long-term target to free Denmark completely from dependence on fossil fuels.

A number of concrete initiatives were included, at both the national and the international level. A number of interim targets for energy were established, including increasing the share of renewable energy in the total energy consumed to 30 per cent by 2020, reducing total energy consumption by 4 per cent by 2020 compared with the 2006 level, and doubling the public spending on research and development (R&D) in relation to energy technologies to reach 1 billion Danish kroner (DKK) annually by 2010. Efforts to mitigate GHG emissions in other sectors were underpinned in 2009 by new political agreements regarding transport (the Green Transport Vision), agriculture (the Green Growth Plan) and taxes (the Tax Reform). A list of major sectoral plans which have implications for the reduction of GHG emissions is presented in section 4.1.1 of the Party's NC5.

38. As for the period after 2012, in the context of implementing the EU climate and energy package, adopted in December 2008, the Danish Government prepared a National Climate Strategy until 2020, with a view to adopting this new strategy in 2010. According to the aforementioned climate and energy package, the EU is committed to reducing its overall emissions to at least 20 per cent below the 1990 level by 2020, and is ready to scale up this reduction to as much as 30 per cent under a new global climate change agreement, subject to other developed countries making comparable efforts. Denmark officially supports an increase in the CO_2 reduction target of the EU from 20 to 30 per cent, regardless of other developed countries' decisions. Under the directives implementing the aforementioned agreement, the EU is committed to reducing its overall emissions from the sectors covered by the EU ETS (ETS sector) to 21 per cent below the 2005 level by 2020. In the sectors not covered by the EU ETS (non-ETS sector), Denmark is committed to reducing its emissions by 20 per cent from 2005 to 2020. The Danish National Climate Strategy until 2020 is expected to contain provisions relating to how the mid-term target for 2020 for the non-ETS sector will be reached. As for the Party's long-term targets, on 15 October 2010 the Climate Commission published a report containing specific recommendations for freeing Denmark completely from dependence on fossil fuels in line with the objective set in the Government's policy document entitled *A Visionary Danish Energy Policy up to 2025*. As a response to that report, the Government expects to be able to present, by the end of the year, a strategy for gaining Denmark's independence from fossil fuels.

39. Denmark's policy portfolio is comprehensive, diverse and makes the optimal use of practically all policy instruments, such as taxes, subsidies and emissions trading, government support and financial incentives, regulations, standards and building codes, as well as voluntary agreements, which play a smaller role now than they have in the past decade. Three complementary, cross-cutting policies are at the heart of Denmark's portfolio, namely, in the short term, the EU ETS and the use of taxes and other fiscal instruments and, in the long term, providing support for R&D. The EU ETS plays a crucial role in the achievement of Denmark's emission reduction target under the Kyoto Protocol, having replaced a domestic cap-and-trade scheme for power plants that was in place between 2001 and 2004. The EU ETS covers 374 Danish installations, accounting for nearly 50 per cent of Denmark's emissions. According to the National Allocation Plan, annual emission allowances have been cut from 33.5 Tg CO_2 in the first phase (2005–2007) to 24.5 Tg CO_2 in the second phase (2008–2012). The emission reduction compared with the 'business as usual' projections for the ETS sector is estimated at 5.2 Tg CO_2, which represents the largest contribution of a single measure to meeting the Party's Kyoto Protocol target. The remaining gap in relation to the target, of 7.8 Tg CO_2, is expected to be covered by emission reductions in the non-ETS sector, using various instruments, and credits from the clean development mechanism (CDM), joint implementation (JI), and the accounting for LULUCF activities (see para. 82 below).

40. Denmark has a long tradition of using taxes and other fiscal instruments for environmental purposes, in particular to promote renewable energy and energy efficiency

and to reduce GHG emissions. In addition to the tax imposed on mineral oil, in accordance with EU legislation, Denmark has introduced special taxes on coal, natural gas, town gas, electricity, motor vehicles, and waste disposed in landfills and incinerated. Denmark is among the few countries that has introduced taxes on emissions of CO_2, HFCs and SF_6. Denmark has regularly assessed the impact of fiscal instruments and has adapted its tax structure to its different policy objectives. The existing system is currently under review, with a view to ensuring coordination with the EU ETS and to promoting biofuels and electric vehicles in the transport sector. In contrast to in the 1990s, when some of the tax revenue was channelled back into industry for environmental purposes, currently all tax revenue goes to the general state budget.

41. The introduction of CO_2 taxes and the increase in energy taxes in the late 1990s contributed a reduction in annual emissions of about 1.5 Tg CO_2 eq in 2001. The socio-economic cost of this reduction was estimated at DKK 325/t. The increased fuel taxes in the late 1990s contributed a reduction in annual emissions of about 1.2 Tg CO_2 eq in 2001. The socio-economic cost of this reduction was estimated at DKK 775/t. The contributions of the CO_2 taxes, the increase in energy taxes and the increased fuel taxes are estimated to remain in the period 2008–2012 at the same levels as in 2001. The introduction of the green owner tax in 2001 led to an approximate 2 per cent reduction in CO_2 emissions from cars (0.158 Tg CO_2 eq). In the period 2008–2012, the average reduction in CO_2 emissions from cars is expected to increase to 7 per cent (0.540 Tg CO_2 eq).

42. Denmark supports the promotion of new energy-technologies by providing targeted support for R&D. This support has been comprehensive and relatively stable. It has led, among other things, to Denmark ranking among the world leaders in relation to wind energy technologies, creating substantial employment, increasing Denmark's share in the world market and, thus, increasing its export revenue. Priorities set by the political agreement on Danish energy policy for 2008–2011 for the different support schemes include reducing dependence on fossil fuels, increasing use of renewable energy and increasing energy efficiency. The overall allocation for energy-related R&D was DKK 750 million in 2009, with plans for a substantial increase to DKK 1 billion in 2010.

2. Policies and measures in the energy sector

43. Between 1990 and 2008, GHG emissions from energy industries decreased by 9.2 per cent (2.5 Tg CO_2 eq). This decrease was mainly driven by a change in the fuel mix from coal to natural gas and by the increase in the share of RES. Emissions also declined in other energy subsectors, in particular in the residential and commercial subsectors by 26.7 per cent (2.7 Tg CO_2 eq), owing largely to an increased share of households' demand for heating being met through the use of district heating, including CHP, and to the growing use of waste and biomass in CHP plants. Emissions from the industrial sector showed only a slight decline, by 3.9 per cent (0.2 Tg CO_2 eq), owing mainly to the recent economic recession. On the other hand, emissions from the transport sector steadily increased between 1990 and 2008, by 30.4 per cent (3.3 Tg CO_2 eq), in line with a steady increase in the use of diesel (with only a small drop in fuel consumption by trucks and buses in 2008), whereas the consumption of gasoline by passenger cars has been declining since 1999.

44. Denmark has described in its NC5 a comprehensive set of specific PaMs in the energy sector aimed at reducing GHG emissions. This is the result of a great political commitment to energy issues, which dates back to the 1980s. In the context of past and current policies, Denmark has set an objective of being among the top three most energy-efficient member countries of the Organisation for Economic Co-operation and Development (OECD) by 2020, as well as of being among the top three with the greatest growth in their share of renewable energy by 2020, according to the 2010 government plan

entitled *Denmark 2020: Knowledge > Growth > Prosperity > Welfare.*[7] The key policy objectives for the energy sector in Denmark are to ensure cost-effectiveness, security of supply, consideration of the environment and efficient use of energy through the regulation of energy markets, under the conditions of a fully liberalized energy sector.

45. ***Energy supply.*** The share of different fuels in Denmark's primary energy supply has changed since 1990, with an increase in the share of natural gas and renewables, mainly replacing coal, whereas oil consumption has not changed significantly. These changes have been influenced by the following instruments: (a) taxes on energy products (mineral oil, gas, coal and electricity) and CO_2; (b) a broad portfolio of measures to support RES (tenders for offshore wind plants, fixed feed-in tariffs for biogas, a premium in addition to market prices for onshore wind turbines, use of biomass and waste at large power plants, other types of subsidies for heat pumps, solar heating and connection to district heating); and (c) a mandatory installed capacity for use of biomass by large-scale CHP plants and the mandatory blending of biofuels in gasoline (see para. 52 below).

46. One of the main explanations for Denmark's relatively stable energy consumption and the decoupling thereof from economic growth is the Party's share of electricity generation from CHP plants. Since 1979, both the legislation that introduced a National Heat Plan and related municipal heat plans have promoted the development of extensive district-heating networks. This has been supplemented by the supply of heat produced by primary and small-scale CHP plants, waste incineration plants and biomass-fired district-heating stations. CHP has also been promoted by the tax system, partly through grants to support electricity production by small-scale CHP plants and partly by prioritizing the electricity produced by small-scale CHP plants. Currently, approximately 60 per cent of the demand for heating in the residential sector and almost 50 per cent of the overall demand for heating in Denmark is supplied by district heating. In 2007, approximately 33 per cent of the district heating was produced from RES and 16 per cent from biodegradable waste. At present, more than half of Denmark's domestic demand for electricity is met by electricity from CHP plants; however, the potential for further use of CHP appears limited.

47. ***Renewable energy sources.*** The 2008 political agreement on energy reached among political parties in Denmark established a target for a reduction in the use of fossil fuels by at least 15 per cent by 2025, and set the goal that 20 per cent of the total energy consumed in 2011 should be from RES, increasing to at least 30 per cent by 2025.

48. The contribution of RES to the total energy consumed increased from 50 PJ in 1990 to 140 PJ in 2007, with no increase in 2008 or 2009. A further increase up to 200 PJ is projected until 2014, with the contribution forecast to stabilize somewhat thereafter. In 2007, wind power provided 19.7 per cent of electricity produced and accounted for 24.1 per cent of electricity generation capacity in Denmark, a significantly higher proportion than in any other country. However, installed capacity for wind power did not significantly increase between 2003 and 2008. This was the result of major changes in the structure of subsidies for RES towards more market-oriented approaches: electricity from wind turbines and other RES plants is now sold under market conditions and the previous support scheme, whereby consumers had an obligation to purchase the electricity at a fixed settlement price, has been replaced by financial support in the form of a price supplement on the electricity's market price.

49. In accordance with Denmark's most recent plans, the contribution of RES to electricity generation, heating and transport between 2010 and 2020 is expected to grow by

[7] Danish Government. 2010. *Denmark 2020: Knowledge > Growth > Prosperity > Welfare*. Available at <http://www.stm.dk/publikationer/arbprog_10_uk/index.htm#Denmark_2020_Knowledge__growth__prosperity__welfare.pdf>.

65 per cent, 20 per cent and 700 per cent, respectively. The EU targets for the shares of renewable energy in Denmark by 2020 are 30 per cent of total energy consumed and 10 per cent of the energy consumed in the transport sector (see para. 37 above). Denmark's commitment to achieving these targets is confirmed in the Danish National Renewable Energy Action Plan, which was submitted to the European Commission in June 2010. Also, options for strengthening the Party's policies to promote RES are included in the description of measures applied in the Danish renewable energy policy. These policies will be further developed when a new political agreement for energy for the period after 2011 is prepared. However, the latest annual projections show that there is some uncertainty as to Denmark's ability to comply with the aforementioned EU targets, as the Party seems to have a gap of 1.7 percentage points in relation to the total energy consumption target and a gap of 4 percentage points in relation to the transport target. The new challenges for Denmark in the context of the development of RES over the next decade stem from the need to achieve the targets set while ensuring a shift in the RES portfolio towards the use of biomass, in particular wood, in large-scale CHP production, offshore wind parks, windmills on land, biogas, individual heat pumps, and second-generation biofuels in the transport sector.

50. ***Residential and commercial sectors.*** In Denmark, approximately 60 per cent of the demand for heating in the residential sector and almost 50 per cent of the overall heating demand is supplied by district heating (thus, the related emissions are reported under energy supply). This situation is a result of the above-described PaMs (see para. 46 above), as well as of activities supported by the Electricity Saving Trust aimed at realizing the conversion from electric heating to district heating and use of natural gas. Denmark's heat consumption has been quite constant for a number of years: the impact of the increase in the number of households and in the area heated was fully compensated by the drop in consumption/m^2 by 45 per cent between 1975 and 2008. Household appliances have also become much more efficient. However, the consumption of electricity by appliances has risen steadily since 1996, although this has not been as rapid as the increase in the number of appliances.

51. As a continuation of current policy, the main policy instruments expected to further increase end-use energy efficiency in the residential and commercial sectors are: energy and CO_2 taxes, building codes, certification of buildings, standards for and labelling of appliances, obligations for energy utilities to carry out energy-saving initiatives, subsidies for the replacement of old boilers, campaigns to promote energy savings in buildings, and the setting up of the Knowledge Centre for Energy Savings. Most of these instruments were addressed in the 2008 political agreement (see para. 37 above).

52. ***Transport sector.*** Emissions from transport steadily increased between 1990 and 2008 and are expected to continue to grow. By far the most effective instrument in the transport sector is the annual motor vehicle tax which is based on energy consumption as opposed to weight and has been in place since 1 July 1997. New motor vehicles are also subject to a registration tax based on energy consumption. Denmark's current tax structure, based on high taxes on cars and fuel and a lack of incentives for car fleet renewal (car-scrapping subsidies are at their lowest level in Denmark among the OECD countries), partly explains why Denmark has one of the lowest rates of car ownership in the EU. However, the circulating fleet is rather old, which has a negative impact on fuel consumption and the associated emissions. The 2008 political agreement on energy set a 5.75 per cent target for the share of biofuels in the fuel consumed for land transport, which is expected to result in some drop in GHG emissions in 2009 and 2010. It also introduced exemptions from charges until 2012 for hydrogen-powered cars and electric vehicles. A green transport agreement was reached in January 2009, targeted at simultaneously improving mobility and creating a sustainable transport system. The 2010 government plan entitled *Denmark 2020: Knowledge > Growth > Prosperity > Welfare* envisages a revision

of the taxation system, with a view to promoting electric vehicles. Despite the prevalent high levels of taxes, mitigation of transport emissions remains a challenge in Denmark.

53. ***Industrial sector.*** Despite having a number of energy-intensive industries, Denmark's energy use per unit of value added in manufacturing is among the lowest of the OECD countries. Energy consumption in the industrial sector has remained broadly stable since 1975, despite a 55 per cent increase in production. This is the result chiefly of energy and CO_2 taxes, voluntary agreements and energy management systems in the past and, more recently, of the EU ETS. A scheme for voluntary agreements was introduced in 1993 and 1996, which envisaged the introduction of a CO_2 tax and, in conjunction, a tax rebate for investments in energy efficiency. As of 1 January 2010, the coverage of the scheme has been reduced, as no CO_2 or energy taxes are foreseen for fuel usage for installations covered by the EU ETS and, in the future, agreements will only cover electricity and heating plants. Business and industry outside the scope of the EU ETS are subject to a higher CO_2 tax, which creates an incentive for energy-intensive installations to join the EU ETS. Studies by DEA show that there is still potential to increase energy efficiency in the industrial sector, by as much as 25 per cent compared with the current level.

3. Policies and measures in other sectors

54. Between 1990 and 2008, GHG emissions from sectors other than the energy sector (industrial processes, including solvent and other product use, agriculture and waste) decreased by 18.6 per cent (3.1 Tg CO_2 eq), owing mainly to a drop by 23.4 per cent (3.0 Tg CO_2 eq) in emissions from the agriculture sector, while emissions from the other sectors did not show significant changes.

55. ***Industrial processes.*** GHG emissions from industrial processes have remained at an almost constant level since 1990; in 2008, the level of emissions was 0.8 per cent (0.1 Tg CO_2 eq) higher than in 1990. Currently, CO_2 constitutes the major part of the GHG emissions in this sector, since nitric acid production, the main source of N_2O, was phased out between 2004 and 2005. Currently, the EU directive on integrated pollution prevention and control and legislation to reduce F-gas emissions are the two policies in place in Denmark to reduce industrial process emissions. The Danish legislation on F-gases, which is considerably more stringent than the corresponding EU legislation, includes a statutory order on the phasing out of HFCs, perfluorocarbons (PFCs) and SF_6, a consumer tax on these substances and support for the use of alternatives.

56. On 15 July 2002, Denmark introduced a regulation banning the import, sale and use of HFCs, PFCs and SF_6 (new and recovered) and of new products containing these gases, with a number of exemptions foreseen for specific usages and for mall systems. This regulation affected, in particular, their use in refrigeration. However, after an initial decrease in 2002–2003, the consumption of HFCs for refrigeration increased again, owing to the phase out of hydrochlorofluorocarbon-22 in new refrigeration systems introduced in 2001 and the related boom in refrigeration systems using HFCs during the period 2002–2004. The regulation changed after 1 January 2007: now all new, larger installations with stocks of HFCs exceeding 10 kg are banned, and alternative refrigeration technologies based on the use of CO_2, propane and butane and ammonia have been introduced. In March 2001, a tax on imports of HFCs, PFCs and SF_6 was introduced, with the level of taxation calculated on the basis of the global warming potential (GWP) of the substance, with an upper limit of DKK 400/kg. Financial and technical support for the use of alternatives is also provided, for instance through the establishment of a knowledge centre for HFC-free cooling, which disseminates knowledge and offers technical assistance.

57. ***Agriculture.*** Emissions from this sector declined by 23.4 per cent (3.0 Tg CO_2 eq) between 1990 and 2008, mainly as a result of decreases in emissions from enteric fermentation, use of synthetic fertilizers and from nitrogen leaching, while emissions from

manure management increased slightly. Agriculture is a highly regulated sector in Denmark, with policies based on the EU Common Agricultural Policy and the related EU Nitrates Directive and EU Water Framework Directive. These policies are implemented through consultation with local administrations, farmers and research institutes, under strict administrative control. Past efforts were based on the need to protect water from contamination by nitrates by reducing leaching of nutrients, while at the same time reducing GHG emissions (Action Plans for the Aquatic Environment I, II and III), which delivered reductions of 2.4 Tg CO_2 annually. The most recent policies are included in the Green Growth Plans 2009 and 2010, where environmental efforts and support for economic growth are given due consideration. These plans are expected to further reduce GHG emissions from the agriculture sector by about 0.8 Tg CO_2 annually. Half of this reduction is expected to be derived from the green, market-based restructuring of nitrogen regulations, based on the introduction of a tax or, alternatively, of a system of tradable nitrogen quotas. Production and use of biogas will also be supported. Specifically, up to 50 per cent of livestock manure will be used to produce green energy by 2020. The production of energy from crops will also be increased, through tax deductions and grant schemes for planting perennial energy crops.

58. ***Forestry*.** The LULUCF sector, which was a net sink in 1990 (–0.9 Tg CO_2), became a net source in 2008 (1.5 Tg CO_2), owing mainly to a decrease in the total soil carbon stock. Despite rising temperatures, it seems that this decrease has been followed by a stabilization, and it now seems possible to maintain the soil carbon stock at its current level. The national forest policies are based on sustainable forest management principles, including the long-term conversion to near-to-nature forest management principles. A national objective to double the country's forested area within 100 years (which accounted for 10.3 per cent of the country's total area in 1989) has been set.

59. On afforestation and deforestation, the Party's Rural Development Plan 2007–2013 supports afforestation on private agricultural lands through the provision of grants. This plan is expected to support the establishment of 750 ha forest annually in designated areas. At the same time, the recent Green Growth Plan has set objectives for the period 2010–2015 of establishing approximately 800 ha new public forest near cities and approximately 6,900 ha new private forests by means of subsidies. Denmark elected to account for changes in carbon stocks as a result of the management of cropland and grazing land, in accordance with Article 3, paragraph 4, of the Kyoto Protocol. Measures relevant to increasing the carbon content of soil are included in the Party's NC5 and were elaborated further during the review. A national system for monitoring changes in carbon stocks is already in place for mainland Denmark, but Greenland is yet to be covered by a similar system. The ERT noted that, owing to uncertainties concerning future climate conditions and changes in agricultural practices and land use, it is not possible to make a reliable estimate at this stage of the possible contribution of the management of cropland and grazing land to the achievement of Denmark's Kyoto Protocol target in the period 2008–2012.

60. ***Waste management*.** The level of GHG emissions from the waste sector has remained almost constant since 1990. Policies in the waste sector include the implementation of relevant EU directives, such as the packaging directive and the landfill directive, and the achievement of related targets. A number of economic instruments were introduced in the 1970s, 1980s and 1990s, such as the volume-based (1977) and weight-based (1998) taxes on packaging, aimed at reducing the amount of packaging used, and the waste tax (1987), aimed at diverting waste to recycling. An obligation to send combustible waste to be incinerated was introduced in 1997, corresponding to a ban on landfilling. The new National Waste Strategy for 2009–2012 is based on three pillars: resource policy, climate policy and protection of the environment and human health. It has established targets of a minimum of 65 per cent of waste to be recycled and a maximum of 6 per cent to

be sent to landfill. The Strategy '10, which was released on 17 June 2010 as the second part of the Waste Strategy for 2009–2012, introduces new initiatives for preventing waste, promotes the development of environmental technologies in the waste sector and includes a capacity plan for waste disposal plants.

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

61. In its NC5, Denmark has 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 Denmark strives to implement its commitments under Article 3, paragraph 14, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, as reported in the 2010 annual submission, is presented in chapter II.I of this report.

62. The NC5 provides information not reported elsewhere on how Denmark endeavours to implement PaMs under Article 3 in such a way as to minimize adverse effects on other countries. It provides comprehensive coverage of the adverse effects of climate change, including on the least developed countries (LDCs), whereas the information reported on effects on international trade and social, environmental and economic impacts on other countries, especially developing country Parties, is very limited.

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

63. In its NC5, Denmark has provided comprehensive information on its projections for all GHG emissions, following the Intergovernmental Panel on Climate Change (IPCC) sector and source categories, under a 'with measures' scenario, which includes implemented and adopted measures. Updated projections were prepared and published in May 2010, which were considered by the ERT in conjunction with the review of the projections reported in the NC5.

1. Projections overview, methodology and key assumptions

64. The GHG emission projections provided by Denmark in the NC5 are sufficiently detailed and include a 'with measures' scenario until 2025, presented relative to actual inventory data for 1990, 1995, 2000, 2005, 2006 and 2007. Projections are presented on both a sectoral and a gas-by-gas basis for all gases, namely CO_2, CH_4, N_2O, PFCs, HFCs and SF_6 (treating PFCs and HFCs collectively in each case). Projections are presented by sector following the IPCC sector and source categories, which makes this information fully compatible with that in the Party's GHG inventory. Projections are also provided in an aggregated format for each sector as well as for a national total, using GWP values. Emission projections related to fuel sold to ships and aircrafts engaged in international transport were reported separately and not included in the totals. Information on projection methodologies, which are presented separately for each sector, key underlying assumptions and results are also reported in a clear and transparent manner. Diagrams illustrating the results of the projections are provided.

65. However, the ERT noted that the sector categories used in the projections section of the Party's NC5 are not fully consistent with those used in the PaMs section as required by the UNFCCC reporting guidelines. For instance, in the PaMs section, CRF and IPCC source categories 1.A.2, 1.A.4a, 2 and 3 (see table 4.1 of the NC5), which are included in

different IPCC source sectors (energy, industrial processes and solvent and other product use) are aggregated for the business sector; whereas, in the projections section, the projections for these source categories are provided according to the IPCC sector categories. The ERT therefore encourages Denmark to follow, in its next national communication, a consistent structure in relation to the sector categories used in both the PaMs and the projections section of its NC5.

66. As required by the UNFCCC reporting guidelines, the 'with measures' scenario reported in the NC5 encompasses the effect of all implemented and adopted PaMs until 2009. However, a 'with additional measures' scenario is not provided. The ERT therefore encourages Denmark to provide such an additional scenario in its next national communication.

67. NERI compiles the Party's emission projections on the basis of a number of sector-specific projections of AD that are submitted by relevant national institutions. Projections for the energy sector were calculated using a combination of the top-down macroeconomic model EMMA (for calculating final energy consumption by energy type and sector, except for transport) and the technical-oriented economic bottom-up optimization model RAMSES (for calculating electricity and district heat production). The RAMSES model also simulates electricity prices on the Nordic electricity market and the degree of exchange of electricity among the Nordic countries. Projections for the transport sector were made taking into account changes in demand for transportation and associated energy consumption, and using detailed dynamic EFs that reflect the evolution in the technology mix. For road transport, emissions were projected using the methodology included in the European COPERT III model as well as updated data on fuel consumption and EFs from the latest version of COPERT, namely COPERT IV. Emissions from other mobile sources were projected partly using the detailed method described in the European Monitoring and Evaluation Programme (EMEP)/core inventory of air emissions (CORINAIR) Emission Inventory Guidebook.[8]

68. The methodology applied to make projections for the non-energy sectors, namely solvent and other product use, agriculture, waste and LULUCF, follows the methods used in the preparation of the Party's national inventory. Emissions from the industrial processes sector were projected based on assumptions of AD and EFs, taking into consideration, where relevant, changes in technology. Overall, there is continuity in terms of the modelling framework between the Party's NC4 and NC5. The organization of work on projections and inter-agency cooperation in Denmark is commendable, as it allows for the update of projections on an annual basis, thereby reflecting any changes in GHG inventory estimates and any new policy developments. The ERT encourages Denmark, in its next national communication, to provide information on the strengths and weaknesses of the modelling framework as well as on changes, if any, in methodology.

69. The level of emissions in Denmark depends on economic activity in all sectors, energy prices and technologies. It also depends on the overall policy framework on climate change and the environment, as well as on policies in the energy, agriculture, forestry and waste sectors. Among the most important assumptions used for the projections are the GDP growth rates predicted by the Ministry of Finance and used for the estimates of economic development, and the future energy prices forecast by IEA. Information on key assumptions and parameters, including macroeconomic and energy price indicators, is presented in the NC5 in a comprehensive and transparent manner. According to information provided by Denmark during the review, higher values for economic and population growth as well as higher energy prices (for oil, coal and natural gas) were used in the NC5 compared with

[8] EMEP/CORINAIR. 2007. *Emission Inventory Guidebook*. Available at <http://www.eea.europa.eu/publications/EMEPCORINAIR5/page002.html>.

those used in the NC4. For example, an oil price of EUR 43.6/barrel at year 2000 level was used in the NC5 compared with EUR 18.4/barrel at year 2000 level in the NC4. The ERT encourages Denmark, in its next national communication, to elaborate on the major changes in assumptions and results between subsequent national communications.

70. A sensitivity analysis to estimate the impact of key drivers and PaMs on emission levels was conducted for key sectors. The analysis showed that further sizeable reductions in CO_2 emissions (4.5 Tg in 2010) can be achieved only by setting relatively high prices for oil, natural gas, coal and CO_2 allowances. While these emission reductions could affect the overall emission trend, they will not necessarily have an impact on the annual emissions from the energy sector, given that these emissions fluctuate depending on the amount of electricity that is exported, which, in turn, depends on the availability of hydropower in the Nordic market (see para. 13 above). A sensitivity analysis to estimate the impact of different assumptions of GDP growth on the level of emissions was not conducted; therefore, the ERT encourages Denmark to provide such a sensitivity analysis in its next national communication, given the importance of GDP as a driver for emission growth.

2. Results of projections

71. Key results of the Party's GHG emission projections are provided in table 4 and the emission trends illustrated in the figure below. The information provided in table 4 and the figure below demonstrates that Denmark is expected to meet its target under the Kyoto Protocol by a combination of domestic efforts, use of flexibility mechanisms and use of accounting for activities under Article 3, paragraphs 3 and 4. In addition, Denmark has allocated a reserve of DKK 450 million for the possible acquisition of additional JI and CDM credits, in order to hedge against the risk of its emission levels turning out to be higher than estimated in the existing projections.

Table 4
Summary of greenhouse gas emission projections for Denmark

	Greenhouse gas emissions (Tg CO_2 eq per year)	*Changes in relation to base year level (%)*	*Changes in relation to 1990 level (%)*
Inventory data 1990[a]	69.7	–0.5	NA
Inventory data 2008[a]	64.6	–7.6	–7.2
Kyoto Protocol base year[b]	70.0	NA	0.5
Kyoto Protocol target[b]	55.4	–20.9	–20.5
Projections in the NC5			
'Without measures' projections for 2010[c]	96.3	37.6	38.2
'With measures' projections for 2010[d, e]	66.9	–4.4	–4.0
Gap in relation to the Kyoto Protocol target[e]	0.8	1.2	NA
'With measures' projections for 2020[d]	55.9	–21.1	–20.8
Updated projections: 2010[f]			
'With measures' projections for 2010[e]	60.5	–13.5	–13.1
Gap in relation to the Kyoto Protocol target[e]	0.3	0.5	NA
'With measures' projections for 2020[f]	56.2	–20.7	–20.3

Abbreviations: NA = not applicable, NC5 = fifth national communication.

[a] *Source*: Denmark's 2010 greenhouse gas (GHG) inventory submission; the values are aggregates for Denmark and Greenland excluding land use, land-use change and forestry (LULUCF).

[b] *Source*: Based on the initial review report contained in document FCCC/IRR/2007/DNK.

[c] *Source*: Denmark's 2005 Effort Analysis (as referenced in the Party's NC5); Greenland's average annual emissions are included.

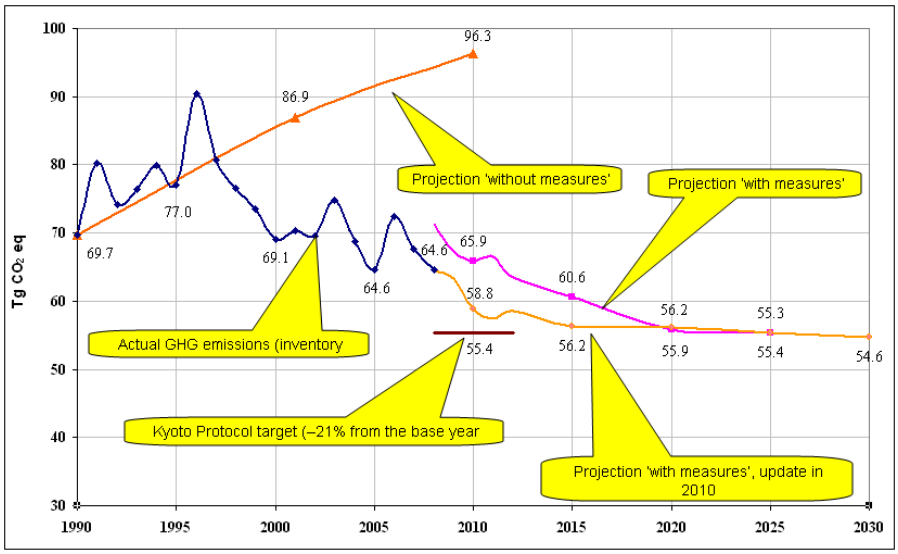
[d] The values include Greenland, assuming annual emissions at a constant 0.67 Tg CO_2.

[e] The gap in relation to the Kyoto Protocol target is calculated as the difference between (a) the average annual level of emissions for 2008–2012 according to the 'with measures' projections, minus credits from the Kyoto Protocol mechanisms and the accounting for LULUCF activities, and (b) the Kyoto Protocol target. These credits were estimated to be worth 10.7 Tg CO_2 eq annually in the NC5 and 4.8 Tg CO_2 eq annually in the updated projections.

[f] Updated projections provided by Denmark during the in-depth review; the projections are for GHG emissions excluding LULUCF.

72. The projections in the NC5 for the 'with measures' scenario show that Denmark's total emissions without LULUCF are expected to amount to an average 66.9 Tg CO_2 eq annually for the period 2008–2010. This suggests that there will be a reduction deficit that will need to be made up for Denmark to be able to meet its Kyoto Protocol target. The projected gap between Denmark's actual emission level and its target for the period 2008–2012, according to the projections in the NC5, is an average 11.5 Tg CO_2 eq annually. If credits from activities under Article 3, paragraphs 3 and 4, and the planned use of Kyoto Protocol mechanisms (10.7 Tg CO_2 eq) are taken into account, then this gap is reduced to just 0.8 Tg CO_2 eq.

Greenhouse gas emission trends and projections in Denmark



Sources: (1) Data for the years 1990–2008: Denmark's 2010 greenhouse gas inventory submission (excluding land use, land-use change and forestry (LULUCF)); (2) Data for the years 2009–2030: Denmark's fifth national communication (excluding LULUCF) and updated projections provided by Denmark during the in-depth review.

Note: Data for the years 2013–2030 include Greenland's emissions, assuming annual emissions at a constant 0.67 Tg CO_2. *Abbreviation*: GHG = greenhouse gas.

73. The contributions of the different gases to the Party's overall emission projections are as follows: total emissions of CO_2 and N_2O are projected to decrease, with a greater reduction in N_2O emissions (by 36 per cent in 2010 compared with the 1990 level) than in CO_2 emissions (by 2 per cent). Total CH_4 emissions are expected to increase by 1 per cent

in 2010 compared with the 1990 level. The projections for CO_2, N_2O and CH_4 are in accordance with the most recent inventory data (see para. 18 above). Emissions of F-gases from industrial processes will decrease from 2005 to 2015 by about 26 per cent, as a result of stricter regulations on their use.

74. During the review, Denmark provided the ERT with its most recent projections, which were published in May 2010. Average annual emissions for the period 2008–2012 under the 'with measures' scenario are expected to amount to 60.5 Tg CO_2 eq, which is lower than reported in the NC5 by 6.4 Tg CO_2 eq. These latest projections reflect the most recent economic and policy developments in Denmark (i.e. the reduction in GDP and total energy consumption in 2009 compared with in 2008, by 4.9 per cent and 5.0 per cent, respectively) and include updates of some key parameters (e.g. fuel prices). In particular, these projections reflect the significant decrease in emissions from the transport and business sectors, and the Party's expectation that less electricity will be exported as a result of the economic recession. Importantly, these projections also reflect the expected effects of additional measures adopted by the Danish Government since the preparation of the Party's NC5, namely the Green Growth Plan for the agriculture sector and the provision of support for the replacement of individual oil-based furnaces with modern, low-emitting heating systems. According to these most recent projections, the gap in relation to the Kyoto Protocol target is just 0.3 Tg CO_2 eq.

75. Within the framework of the EU climate and energy package, Denmark has a target to reduce its GHG emissions from the non-ETS sector by 20 per cent (approximately 7.5 Tg CO_2 eq) by 2020 compared with the 2005 level. In 2005, emissions from the non-ETS sector amounted to 37.4 Tg CO_2 eq and accounted for approximately 59 per cent of the Party's total GHG emissions. The updated 'with measures' projections show a reduction deficit of 4.4 Tg CO_2 eq, given that Denmark's GHG emissions from the non-ETS sector in 2020 are expected to amount to 34.2 Tg CO_2 eq. This suggests that there is a need for further efforts by the Party to reduce its GHG emissions; on 15 October 2010 the Climate Commission published a report containing specific recommendations in this regard (see para. 38 above).

76. In the case of both the projections included in the NC5 and the most recent updated projections, the Party's total emissions in 2020 are expected to amount to around 56 Tg CO_2 eq, while, according to the most recent projections, in 2030 total emissions are expected to amount to 55 Tg CO_2 eq. This represents a decrease in emissions of around 21 per cent by 2020 compared with the 1990 level and keeping emissions broadly at the same level thereafter.

3. Total effect of policies and measures

77. In annex B to its NC5, Denmark has presented the estimated and expected total effect of implemented PaMs for the period 2008–2012, based on its 2005 Effort Analysis. This study assessed the effects of the most important environment- and energy-related policy measures implemented in the period 1990–2001. The effect of the measures implemented in that period was evaluated in relation to the actual level of emissions in 2001, and in relation to the expected average annual emissions in the period 2008–2012, by aggregating the individual effects of PaMs and comparing this with a baseline scenario from Denmark's 2003 National Climate Strategy. The information is presented in terms of actual GHG emission reductions (on a CO_2 eq basis) in 2001 and as an average for the period 2008–2012. The results of the Effort Analysis indicate that the level of emissions during the period 2008–2012 would be about 15.6 Tg higher than according to the 'with measures' projections prepared in 2003.

78. Concerning emission reductions by sector, according to the Effort Analysis, PaMs implemented in the energy sector will deliver by far the largest emission reductions,

followed by PaMs implemented in the agriculture and transport sectors, which will deliver almost equal emission reductions to each other. Table 5 provides an overview of the effects of PaMs by sector and the total effect of PaMs implemented until 2001 as reported by Denmark. An estimate of the effect of individual PaMs implemented during the period 2002–2009 is not provided.

79. While the ERT considered the information from the Effort Analysis helpful in understanding the scale of, and relative contribution of the different sectors to, the emission reduction by means of policies implemented between 1990 and 2001, it noted that this information is rather outdated, does not cover policies that were central to Danish climate policy at the time of preparation of the Party's NC5 and is also not comparable with the projections data in the NC5. In addition, while Denmark provided sufficient detail on its PaMs in the NC5, the quantitative estimates of the effects on emissions of its PaMs could be presented in a more comprehensive and transparent manner.

Table 5
Projected effects of implemented policies and measures in 2010

Sector	*Effect of measures implemented in the period 1990–2001 (Tg CO_2 eq)*	*Relative value (% of 1990 emissions)*
Energy (without CO_2 from transport)	11.0	15.8
Transport – CO_2	1.7	2.4
Industrial processes	0.4	0.6
Agriculture	1.9	2.7
Land-use change and forestry	NA	NA
Waste management	0.5	0.7
Total	**15.6**	**22.3**

Source: Denmark's fifth national communication (NC5).

Note: The total effect of implemented policies and measures is taken from the Party's 2005 Effort Analysis (presented in annex B to its NC5).

Abbreviation: NA = not available.

4. Supplementarity relating to mechanisms pursuant to Articles 6, 12 and 17

80. Denmark, in its NC5, has provided sufficient information on how its use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action. During the review, the ERT was provided with further information on supplementarity. In particular, Denmark explained that to define[9] supplementarity, as required by the European Commission, it took into account 50 per cent of the difference between the projected emissions in 2010 (prepared in 2005)[10] and the Kyoto Protocol target

[9] 29.11.2006, COM(2006) 725 final, COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND TO THE EUROPEAN PARLIAMENT on the assessment of national allocation plans for the allocation of greenhouse gas emission allowances in the second period of the EU Emissions Trading Scheme accompanying Commission Decisions of 29 November 2006 on the national allocation plans of Germany, Greece, Ireland, Latvia, Lithuania, Luxembourg, Malta, Slovakia, Sweden and the United Kingdom in accordance with Directive 2003/87/EC.

[10] The latest projected GHG emission level for 2008–2010 is lower than that projected in 2005; therefore, the result of calculating 50 per cent of the remaining gap between the latest projected emission level and the Kyoto Protocol target will be lower than that estimated on the basis of the projection from 2005. However, the definition used by the European Commission is a one-time

(average annual emissions for the period 2008–2012). This difference was estimated at 17.7 Tg CO_2 eq, with 50 per cent of it thus amounting to 8.85 Tg CO_2 eq.

81. According to information provided during the review, the goal of the Danish Government is to use, for compliance, up to 4.7 Tg CO_2 eq worth of credits annually, while, in 2010, the plan was to use 3.7 Tg CO_2 eq worth of credits/year (18.5 Tg in the period 2008–2012). The lower estimate reflects the most recent emission projections, which were lower by 6.5 Tg CO_2 eq than those reported in the NC5. In accordance with the EU Linking Directive,[11] companies that are included in the EU ETS can meet their emission reduction target by reducing emissions, by acquiring emission allowances from the market and by using carbon credits. Denmark's companies can use up to 4.16 Tg CO_2 eq/year (20.8 Tg CO_2 eq for the period 2008–2012) worth of carbon credits, which is 17 per cent[12] of their annual cap (24.5 Tg). The overall use of carbon credits by the Government and by companies included in the EU ETS is not, therefore, expected to exceed 44 per cent of the Danish effort to reduce emissions, which is less than the 50 per cent threshold used by Denmark to define supplementarity.

82. The Danish Government contributed to 'starting up' the market for CO_2 credits by allocating approximately DKK 1.46 billion for the development of JI and CDM projects and the purchase of credits in the period 2003–2009. Denmark allocated an additional DKK 225 million in its 2010 budget for sustainable JI and CDM projects. In total, this investment has supported the launch of 70 projects (49 CDM projects and 21 JI projects) in 15 countries, focusing mainly on renewables, energy efficiency, the shift away from using fossil fuels, and other technological innovations. The resulting credits should amount to 3.7 Tg CO_2 eq annually from 2008 to 2012. Denmark allocated an additional DKK 225 billion in its 2010 budget for sustainable JI and CDM projects, which could result in an additional 2 Tg CO_2 eq worth of credits in total.

D. Vulnerability assessment, climate change impacts and adaptation measures

83. In its NC5, Denmark has provided comprehensive information on the expected impacts of climate change in the country, vulnerability and relevant adaptation options. Most of the reported information reflects the key directions and implementation of the Danish strategy for adaptation to a changing climate that was launched in 2008. While appreciating the amount and quality of the information reported on impacts, vulnerability and adaptation, the ERT noted that this section of the national communication could be made more readable and comprehensive by improving the structure of the information presented and by highlighting the information on the latest developments. The information on vulnerability and adaptation to climate change presented in the NC5 is summarized in table 6.

84. The Danish Government supports a large interdisciplinary research project to assess the impact of climate change in all relevant sectors. Coastal zone management is one of the priority areas for the Government in terms of climate change adaptation, owing to increasing groundwater levels, increasing run-off, more flash floods, rising sea levels, greater storm surges and more paved surfaces. According to its NC5, Denmark could also

calculation based on all EU member states projections from 2005 in order to have a fixed number as the basis for approval of National Allocation Plans under the EU ETS in 2006-2007.

[11] Directive 2004/101/EC of the European Parliament and of the Council of 27 October 2004 amending Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community, in respect of the Kyoto Protocol's project mechanisms.

[12] Approved JI/CDM limit (percentage of allocation) according to the Party's National Allocation Plan.

benefit from climate change; for example, warmer winters will have positive impacts owing to the reduced need for ice-breaking and winter maintenance and a reduced demand for heating. New medium-term scenarios and new tools were used for the vulnerability assessments reported in the NC5, including the Danish Adaptation Portal, and the Sea Water On Terrain system for the assessment of the vulnerability of, and adaptation options for, coastal zones. However, the ERT noted that little consideration has so far been given to the vulnerability of fragile and sensitive ecosystems in Greenland and the Faroe Islands.

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

Vulnerable area	*Examples/comments/adaptation measures reported*
Agriculture and food security	*Vulnerability*: The overall effects of climate change are estimated to be advantageous; however, altered disease and insect patterns are expected. More precipitation in winter combined with higher water temperatures is expected to increase the risk of oxygen depletion. Flooding and rising groundwater levels will restrict cultivation along some fjords and watercourses. Higher summer temperatures will increase demand for irrigation of sandy soils, while the increased CO_2 content of the atmosphere in the growing season will increase demand for fertilizers and pesticides
	Adaptation: Dissemination of current knowledge on the nature and extent of climate changes to both the agricultural business and the associated research and consulting sector
Biodiversity and terrestrial natural ecosystems	*Vulnerability*: A number of types and species of nature are expected to be weakened, disappear or become extinct. As a result, certain ecosystems could be less stable and thus more vulnerable to invasive species. However, a slight increase in biodiversity is expected in the future
	Adaptation: Most Danish regulation of natural ecosystems is based on European Union (EU) directives
Coastal zones	*Vulnerability*: Low-lying coastal areas are exposed to increases in both sea level and drainage from the land
	Adaptation: Improvement of all aspects of coastal zone management, and roadshows to present knowledge on possibilities for adaptation
Fisheries and marine ecosystems	*Vulnerability*: A possible weakening of the Gulf Stream and changes in the role of oceans in absorbing CO_2 will result in changes in ocean acidification. In addition, increases in water temperature, precipitation and run-off from land, changing wind patterns and acidification of the oceans are expected to change the structure and function of marine ecosystems. Also, the promotion of new types of pathogenic bacteria and toxic algae is expected
	Adaptation: Taking into account current uncertainties in the assessment of potential climate change impacts, the focus has been on monitoring systems and research that will support the development of timely adaptation measures. Fisheries are regulated through common EU policies
Forests	*Vulnerability*: Warmer and drier summers are expected to increase the risk of forest fires and the introduction of new pests or the propagation of existing known pests. Norway Spruce is the most vulnerable species to climate change, owing to more frequent droughts in summer and increasing temperatures and precipitation in winter
	Adaptation: Implementation of near-to-nature forestry concepts by replanting robust tree species and updating the list of species and provinces on a continuous basis
Human health	*Vulnerability*: Warmer summers and more heat waves are expected to

Vulnerable area	*Examples/comments/adaptation measures reported*
	increase the risk of sunstroke and dehydration and promote greater growth of toxic algae and some saltwater bacteria. Dust mites and mould growth in buildings, problems with drinking water and a rise in pollen allergies are expected to increase climate-related health risks
	Adaptation: Preventative medicine, alteration of the monitoring system for infectious diseases and provision of advice about behavioural changes with respect to minimizing climate-related health risks. The municipalities are developing 'rescue preparedness' plans
Buildings, infrastructure and economy	*Vulnerability*: More frequent and stronger storms, water encroachment, and increased precipitation, groundwater levels, temperatures and wind speeds are expected to enhance the risk of deterioration of indoor climate, thereby reducing the lifespan of buildings, roads and railway lines. Reduced heating in winter, increased cooling in summer and a gradual increase in the cost of annual insurance premia are expected as a result of climate change impacts
	Adaptation: New regulations regarding the energy framework in the building code; increased European and Danish wind load standards; more efficient indoor climate control; improved functional standards for sewer systems; district-cooling systems under establishment; new financial instruments for risk transfer
Water resources	*Vulnerability*: In the summer period, heavy downpours and longer periods without precipitation or even of drought are expected to increase demand for water. Expected changes in precipitation patterns, with fewer, but more intense rain events, will affect surface drainage. More precipitation in winter will increase groundwater levels. Water quality will be affected by the intrusion of salt water
	Adaptation: The first generation of water plans under the EU Water Framework Directive is under development. These plans will consist of specific adaptation measures

85. In its NC5, Denmark has reflected the robustness of the country with respect to its ability to cope with future climate changes as a result of good planning and regulation, well-developed irrigation and warning systems, and public awareness of the risks of extreme weather events. Denmark informed the ERT of an adaptation strategy launched in 2008, which is based on a flexible and cost-effective approach, whereby all stakeholders take responsibility for adaptation within their competencies (foreseeing an autonomous approach). In addition, a new strategy against invasive species and an adaptation strategy for the transport sector were developed in 2009 and 2010, respectively. The Government of Greenland is currently planning a series of studies on climate change and adaptation.

86. The strategy for Danish cooperation with developing countries in the area of environment includes climate change adaptation. For example, the strategy includes the provision of support for adaptation efforts through capacity-building (for example, a climate change programme for Viet Nam was launched in 2008) and the creation of opportunities for the development of CDM projects. The Danish Climate and Development Action Programme involves 17 partner countries in the significant integration of climate change adaptation and disaster risk reduction in country-based and sectoral programmes. The support provided by Denmark to developing countries for adaptation has increased significantly since 2005.

E. Financial resources and transfer of technology, including information under Articles 10 and 11 of the Kyoto Protocol

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

87. The information provided in the NC5 covers most of the issues on which information is required under the Convention and its Kyoto Protocol. However, the ERT noted that Denmark did not provide the required information on what "new and additional" financial resources it has provided pursuant to Article 4, paragraph 3, or a clarification of how it has determined such resources as being "new and additional". The ERT recommends that Denmark enhance the completeness of its reporting by including this missing information in its next national communication.

88. In its NC5, Denmark has provided details on measures taken to give effect to its commitments under Article 4, paragraphs 3, 4 and 5, of the Convention as required by the UNFCCC reporting guidelines and under Article 11 of the Kyoto Protocol, as required by the "Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol" (hereinafter referred to as the Article 7 guidelines). The NC5 refers to official development assistance (ODA) amounting to DKK 14.4 billion in 2008. This corresponds to 0.82 per cent of the Party's gross national income (GNI) (0.88 per cent of GNI in 2009), and Denmark is encouraging other countries to meet the United Nations objective of providing ODA corresponding to 0.7 per cent of their GNI. However, in the NC5, Denmark has indicated methodological difficulties in defining what "new and additional" financial resources it has provided pursuant to Article 4, paragraph 3, of the Convention; hence, as in the NC4, it has not included such a definition in the NC5. During the review, Denmark noted that there is no internationally agreed definition of what constitutes "new and additional" financial resources. The Party further noted that the budget for its Climate Pool (see para. 91 below) is additional to the ODA that it already provides and that the amount of this budget is above the United Nations objective.

89. Denmark has also provided detailed information on the assistance it has made available for each year during the period 2005–2008 to developing country Parties that are particularly vulnerable to the adverse effects of climate change to help them meet the costs of adaptation to those adverse effects. The primary agency involved with multilateral developmental assistance and climate-related finance is the Department for Environment, Energy and Climate, in the Danish Ministry of Foreign Affairs. The Danish Strategy for Environmental Work in Developing Countries (2004–2008) and the 2005 Climate and Development Action Programme are the key strategy documents relating to climate-related assistance. The former is in the process of being replaced (by the Freedom Strategy) and there has been a change in focus over time, with an increased focus on mitigation, adaptation, water management, and disaster preparedness and management. The latter programme is expected to be replaced at the end of 2010, with climate screening remaining an integral part of the new programme and other key elements remaining unchanged. It was clear to the ERT that Denmark was looking to explore the synergies between the challenges of climate change and development.

90. Denmark has further provided information on its financial resources related to the implementation of the Convention provided through bilateral, regional and other multilateral channels (including some coverage of other conventions). In particular, it has provided information on its financial contributions to the Global Environment Facility (GEF) during the period 2005–2008. Denmark's contribution to the GEF amounts to DKK 310 million (USD 51.7 million) for the fourth replenishment of the GEF (2006–2010), while the pledge for GEF 5 (2011–2014) amounts to DKK 400 million (USD 66.7 million).

91. The ERT noted the existence of a multilateral/bilateral fund under ODA targeting climate change projects, referred to as the Climate Pool, with an overall budget of DKK 1.5 billion for the 2008–2012 period. In the context of the Copenhagen Accord, Denmark has allocated resources for fast-track financing that are balanced between adaptation and mitigation and directed to vulnerable countries, primarily in Africa. Among the projects envisaged for funding are: (a) mitigation projects, such as for forestry (reducing emissions from deforestation and forest degradation in developing countries), technology needs assessments (estimated support of DKK 40 million) and energy (Climate Investment Fund – Strategic Renewable Energy Programme); (b) adaptation and capacity-building projects (Climate Investment Fund – Pilot Program for Climate Resilience); and (c) assistance for developing countries to participate in climate negotiations, the Least Developed Countries Fund, support from or for civil society and bilateral programmes.

92. Denmark has also reported its contribution to the Adaptation Fund (specifically for the multi-donor administrative trust fund set up to cover the administrative costs of the Adaptation Fund prior to the generation of resources from the sale of carbon credits) established in accordance with decision 10/CP.7. Denmark informed the ERT that an amount of USD 0.5 million had been contributed to the multi-donor administrative trust fund, which is among the highest contributions to the fund. Denmark also stated, however, that the unspent balance (USD 0.24 million) was returned following the closure of the trust fund and that this balance was unlikely to be contributed to the Adaptation Fund, owing to appropriation rules. Denmark does not currently make any contribution to the Adaptation Fund itself, although its position may change in 2011 or 2012 if the criteria with regard to fast-track financing and vulnerability of recipients are met.

93. Bilateral and regional assistance is currently directed to Bhutan, Bolivia, Egypt, Nepal, Nicaragua, Cambodia, China, Indonesia, Malaysia, Mozambique, South Africa, Tanzania, Thailand, Viet Nam and Zambia, with the assistance to Egypt, Malaysia and South Africa being phased out. While the NC5 states that the environment is incorporated into a number of sectoral programmes, such as in relation to water, energy, agriculture and fisheries, there is no specific mention of climate change. With regard to bilateral and regional assistance provided to developing countries for the implementation of the Convention, Denmark has used the OECD Rio markers on mitigation and adaptation, which cover all Rio Conventions. In accordance with these data, for the period 2005–2008, Denmark spent DKK 1.1 billion on mitigation and DKK 500 million on adaptation. While the ERT questioned the validity of the direct use of these data as they are not limited to the UNFCCC, Denmark explained that these data were used to assess the extent of the mitigation or adaptation component of the activities granted assistance. In the future, Denmark intends to use the OECD marker on climate change that was adopted in January 2010 for its reporting. Table 7 summarizes information on financial resources and technology transfer.

2. Activities related to transfer of technology, including information under Article 10 of the Kyoto Protocol

94. In its NC5, Denmark has provided all the required information in accordance with the UNFCCC reporting guidelines, including information on its support for technology transfer in relation to the implementation of a broad range of activities, including ‘soft’ and ‘hard’ components. Denmark supports technology transfer mainly through bilateral and multilateral initiatives, as well as through the private sector. Bilateral initiatives include the Danish Climate and Development Action Programme (containing the same elements as the EU plan) and the Danish Strategy for Environmental Work in Developing Countries on climate change. Multilateral initiatives for technology transfer include cooperation with many agencies in the United Nations system and international institutions. The CDM has been identified by Denmark as an efficient approach to developing, applying and

disseminating environmentally friendly technologies, know-how, and procedures and processes that can influence climate change. Denmark actively supports better regional distribution of CDM projects, including to the LDCs. Denmark acknowledges that, to a considerable extent, technology transfer cannot be separated from other development cooperation activities supported by it, and that very often there is no clear dividing line between 'soft' and 'hard' technologies.

Table 7
Summary of information on financial resources and technology transfer
(Millions of Danish kroner)

	Years of disbursement				*Pledge*
	2006	*2007*	*2008*	*2009*	*2010*
Official development assistance (ODA)	13 289	13 945	14 486	15 023	15 221
ODA as a percentage of gross national income	0.80	0.81	0.82	0.88	0.83
Climate-related aid in bilateral ODA	487.5	824.1	917.6	976.6[a]	–
Climate-related support programmes	IE	IE	IE	IE	–
Contributions to the GEF (USD million)	77.6	77.6	77.6	77.6	–
Pledge for fifth GEF replenishment	–	–	–	–	400
Activities implemented jointly	IE	IE	IE	IE	–
JI and CDM under the Kyoto Protocol	(2003–2006) 730	200	149.3	102.8	500
Climate Investment Funds	–	–	–	65	126
FCPF	–	–	–	30	–
UNREDD	–	–	–	10	33
LDCF[b]	–	–	–	–	80
Other[c]	–	–	–	–	69

Abbreviations: CDM = clean development mechanism, FCPF = Forest Carbon Partnership Facility, GEF = Global Environment Facility, IE = included elsewhere, JI = joint implementation, LDCF = Least Developed Country Fund, UNREDD = United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries.

[a] Provisional data – final verification not yet completed.

[b] Earlier contributions to LDCF in 2002 and 2005, totalling 94.1 million Danish kroner.

[c] Earlier contribution to Special Climate Change Fund in 2005 of 50 million Danish kroner.

95. The ERT was informed that Denmark supports technology transfer mainly in the energy sector. This support includes elements such as energy planning, including plans for use of renewable energy, establishment of large wind farms, renovation of power stations, promotion of energy efficiency and promotion of the sustainable use of biomass as a fuel. The ERT noted with appreciation five prominent examples of technology transfer activities reported in the NC5, namely support for the development of the energy sectors of Burkina Faso, China, Egypt and Nepal, and coastal zone management in Viet Nam. The ERT encourages Denmark to further improve the quality of its reporting by reporting specifically on success and failure stories in relation to technology transfer in its next national communication.

96. In its NC5, Denmark has reported on technology transfer activities undertaken by the private sector. The Danish Government provides incentives for Danish private-sector involvement in technology transfer activities, including by providing mixed credits and by

supporting several programmes and funds, such as the Business-to-Business Programme, with an additional component on the environment, the Partnership Facility Programme and the Industrialization Fund for Developing Countries.

F. Research and systematic observation

97. Denmark has provided in its NC5 information on its actions relating to research and systematic observation, and addressed both domestic and international activities, including its participation in the World Climate Research Programme (WCRP), the Global Climate Observing System (GCOS) and the IPCC. The NC5 also reflects action taken to support related capacity-building in developing countries. Denmark has further provided a report on GCOS activities. The ERT noted the substantial efforts of Denmark in the improvement of all observation networks, including management of climate data, and of climate information, including the development of climate change indicators. While appreciating the amount and quality of the information reported in the NC5, the ERT noted that the Party could make this section of the national communication more readable by highlighting new developments.

98. The ERT noted numerous ongoing research activities in Denmark, including research on atmospheric and coupled atmospheric and oceanic processes, the natural variability of the climate on all timescales and the role of basic physical and chemical processes in the climate system, climate modelling, and the effects of climate change on nature and ecosystems. Several national universities as well as the Danish Meteorological Institute (DMI) are involved in various national and international economic research and networking projects for assessments of climate change impacts on the economy, including possibilities for evaluating mitigation and adaptation, and the development of technologies to reduce GHG emissions and to adapt to climate change. Denmark contributes to a wide range of international projects under WCRP, such as the Climate and Cryosphere Project and the Climate Variability and Predictability Project.

99. DMI carries out systematic terrestrial, oceanographic and stratospheric observations related to climate changes. This includes the most recent Programme for Monitoring of the Greenland Ice Sheet, which was established in 2007. Denmark carries out observations of climate parameters under the World Meteorological Organization's programmes and subprogrammes. Denmark participates fully in the GCOS Surface Network, the GCOS Upper Air Network, and the Global Ozone Observing System as part of the Global Atmosphere Watch. Furthermore, Denmark is a member State of the European Organisation for the Exploitation of Meteorological Satellites and the European Space Agency, and participates in other networks including solar ultraviolet radiation and stratospheric ozone stations, and networks in relation to upper air strata measurements and ice observations. In addition, Denmark participates in the Global Terrestrial Network by contributing to the Global Precipitation Climatology Centre, the Global Runoff Data Centre and the Glacier Monitoring Network. It contributes very actively to the European Climate Assessment & Dataset through the active participation of DMI in the European Climate Support Network of the Network of European Meteorological Services.

100. Denmark has provided assistance to several African countries to strengthen their capacity for research and systematic observation. For example, DMI assisted Ghana in building its capacity to use climatic seasonal forecasts to improve its strategies for cultivating crops in West Africa. DMI also helped Zambia to prepare the proposal for a bilateral project providing support for capacity-building.

G. Education, training and public awareness

101. In its NC5, Denmark has provided information on its actions relating to education, training and public awareness at both the domestic and the international level. In comparison with in the NC4, the Party has provided more detailed information on the level of institutional involvement. The Ministry of Education has led initiatives for primary and lower secondary education, youth education programmes and tertiary education on climate issues. Education and training for the general public on climate change are provided through websites by the Government and universities.

102. A prominent example of action taken by the Party to raise public awareness in relation to climate change is the 'One tonne less' campaign, launched by the Ministry of Climate and Energy in 2007. The campaign was organized as a public–private partnership and information was disseminated through partners (companies, institutions, municipalities and non-governmental organizations), thus ensuring greater outreach. The campaign ended in 2009 and was supported by public funds totalling DKK 11 million. The main goal of the campaign was to invite everybody to be part of the change and to increase their understanding and acceptance of political decisions through enhanced public awareness and the promotion of personal initiatives, such as the replacement of old electrical appliances with new energy-efficient ones. During the campaign, a variety of elements and tools were used, such as websites, celebrity appearances and partner activities, as well as the CO_2 calculator (which calculates CO_2 emissions on the basis of personalized data and makes suggestions as to how to cut emissions).

103. The evaluation of the campaign showed encouraging results in terms of enhanced knowledge, attitude, changes in habits and behaviour, and, importantly, willingness to do more. The lessons learned will be used by Denmark in implementing its next measures for raising public awareness in the country. These will be implemented by the Centre for Energy Savings, which was set up on 1 January 2010 at DEA and is expected to run similar campaigns in the future. The evaluation of the campaign also showed that such a campaign could easily be replicated in other countries. In general, public awareness in relation to climate change is high in Denmark, which helps to build consensus on the implementation of climate change mitigation measures.

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

104. Denmark has provided most of the supplementary information under Article 7, paragraph 2, of the Kyoto Protocol in its NC5. The supplementary information is placed in different sections of the NC5 and the Party's 2009 and 2010 annual submissions. Table 8 provides an overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol as well as references to the NC5 chapters in which this information is provided. The technical assessment of this information is contained in the relevant sections of this report.

Table 8
Overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

Supplementary information	*Reference*
National system in accordance with Article 5, paragraph 1	NC5, chapters 1.2.6 and 3.3
National registry	NC5, chapters 1.2.7 and 3.4

Supplementary information	*Reference*
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	NC5, chapter 5.3
Policies and measures in accordance with Article 2	NC5, chapters 1.3.4 and 4.3
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	NC5, chapter 4.2
Information under Article 10	NC5, chapter 7.5
Article 10(a)	NC5, chapter 3.3
Article 10(b)	NC5, chapters 4.2 and 6.3
Article 10(c)	NC5, chapter 7.4
Article 10(d)	NC5, chapter 8
Article 10(e)	NC5, chapter 9
Financial resources	NC5, chapters 7.1–7.3

Note: Based on the table in annex A2 to Denmark's fifth national communication, p.341.

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

105. Denmark reported the information requested in section H. Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the annex of decision 15/CMP.1 as part of its 2009 annual submission and elaborated this further in its 2010 annual submission. Additional information was provided to the ERT during the in-country review.

106. The 2010 NIR provides information on actions undertaken by Denmark to minimize adverse impacts in accordance with Article 3, paragraph 14. The focus is on the assessment of the impact of policies at the EU level on third countries and on trade and investment flows with these countries, including the reporting elements listed in paragraph 24 (a–f) of the Article 7 guidelines, and on how the EU gives priority, in implementing its commitments under Article 3, paragraph 14, to specific actions.

107. As, in many instances, national PaMs in Denmark go beyond policies at the EU level, the ERT found that the reporting, covering policies at the EU level, was not sufficient. Based on the information provided in other sections of the NC5 (for instance, in chapter 7) and during the review, the ERT noted that there are some examples specific to Denmark which the Party can report in the context of Article 3, paragraph 14.

108. In particular, the 2010 NIR and the additional information provided during the review presented several initiatives of Denmark aiming to minimize adverse impacts, including providing assistance to developing country Parties which are particularly vulnerable to climate change. Denmark has provided some information on the assistance being provided to the LDCs and most vulnerable countries after climate screening. Climate screening has, in turn, led to projects in relation to capacity-building, mainstreaming of climate change, forest management, strengthening the link between climate change adaptation and disaster risk reduction, and coastal and water resource management.

109. A number of initiatives aiming to strengthen the capacity of developing countries to improve energy efficiency in upstream and downstream activities relating to fossil fuels, or to provide support for the transfer of more efficient fossil fuel technologies, such as support for technology transfer from China to Bangladesh, were also mentioned.

110. The ERT considered the information reported in the Party's 2010 NIR and NC5 to be mostly transparent and complete. The ERT recommends that Denmark: (a) explore further steps in implementing Article 3, paragraph 14, and Article 2, paragraph 3, including

through further research; and (b) report, in its next NIR and national communication, information on Article 3, paragraph 14, and Article 2, paragraph 3, that fully meets the requirements of the UNFCCC reporting guidelines, in particular by including information on action taken to minimize the adverse impacts of the implementation of response measures, including domestic policies, on developing country Parties, and on how it gives priority to such actions.

III. Conclusions and recommendations

111. The ERT concludes that, in general, the NC5 provides a good overview of the national climate policy of Denmark. The information provided in the NC5 includes almost all the mandatory information required by the UNFCCC reporting guidelines and all elements of the supplementary information under Article 7 of the Kyoto Protocol. During the review, Denmark provided additional information on all areas covered by its national communication, in particular on the most recent policies and strategies, as well as updated projections.

112. The Kingdom of Denmark's total emissions excluding emissions and removals from LULUCF were estimated to have decreased by 7.3 per cent between 1990 and 2008, whereas total GHG emissions including net emissions and removals from LULUCF decreased by 4 per cent over the same period. The ERT noted that the overall decrease in GHG emissions was due mainly to a significant change in the fuel mix from coal to natural gas and renewable energy, more widespread use of CHP and improved energy efficiency. The decrease was also due to measures to limit nitrogen emissions from agriculture included in Denmark's Action Plans for the Aquatic Environment.

113. In the NC5, Denmark presents GHG projections for the period from 1990 to 2025 under a 'with measures' scenario, including the effects of currently implemented PaMs. The ERT noted that the organization of work on projections and inter-agency cooperation in Denmark is commendable, as it allows for the update of projections on an annual basis, thus reflecting any changes in GHG inventory estimates and any new policy developments.

114. According to the 'with measures' scenario, the Party's level of GHG emissions is expected to be 4.4 per cent lower in 2010 than in the base year, and to continue to decrease thereafter, to be 21.1 per cent lower in 2020 than in the base year. Therefore, Denmark cannot meet its Kyoto Protocol target by domestic actions alone. The projected gap between Denmark's actual emission level and its target for the first commitment period (2008–2012) is an average 11.5 Tg CO_2 eq annually for this period. If planned credits from activities under Article 3, paragraphs 3 and 4, and the Kyoto Protocol mechanisms are taken into account, this gap is reduced to 0.8 Tg CO_2 eq. According to the updated 'with measures' projections provided during the review, the gap between Denmark's actual level of emissions and its Kyoto Protocol target is expected to be equal to 0.3 Tg CO_2 eq, which is much lower than that reported in the NC5.

115. Denmark's NC5 contains information on how its use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action. During the review, Denmark provided further information on how it defines supplementarity. According to the Party's estimation, its overall use of carbon credits will not exceed 44 per cent of the overall effort by Denmark to achieve its Kyoto Protocol target.

116. A considerable number of policies that either address the reduction of GHG emissions directly or have the reduction of GHG emissions as an ancillary benefit have been implemented in Denmark since the 1980s and high priority has been given to energy and climate change in the overall political agenda. Also, there has been a good balance

between comprehensive current policy, with a focus on economic instruments and direct support from the Government, and demanding long-term objectives.

117. Denmark's current strategies and measures are in line with those adopted at the EU level, but in several areas, such as for F-gas emissions, the national legislation is considerably more stringent than the corresponding EU legislation. Within the framework of the EU climate and energy package, the achievement of the 20 per cent emission reduction target by 2020 compared with the 2005 level for emissions from the non-ETS sector, and of the 30 per cent target for the contribution of renewables to the total energy consumed, will represent an important milestone in the climate and energy policy of Denmark. With regard to the longer term, beyond 2020, the Climate Commission is expected to provide advice on a new national strategy for freeing Denmark completely from dependence on fossil fuels.

118. Denmark is a highly cohesive society, with a high level of political commitment to climate change issues. Policies are adopted after extensive consultations with stakeholders, often on the basis of political agreements among parliamentary parties, and their implementation is closely monitored to allow for the adjustment of the portfolio of PaMs. On this basis, Denmark has great potential to set more ambitious goals, beyond those established at the EU level. However, the transition from the current approaches, which delivered in accordance with the Party's current policy objectives, to new, more market-oriented approaches introduces new challenges for the achievement of more stringent targets in the future. In this context, assessing costs and effects of PaMs will become increasingly important as it will play a crucial role in the Party's implementation of new cost-effective policy approaches.

119. Denmark contributed ODA amounting to DKK 14.4 billion in 2008 (0.82 per cent of GNI), which is above the United Nations objective of 0.7 per cent of GNI. Denmark also contributed to GEF 4 (DKK 310 million) and pledged DKK 400 million for GEF 5. In addition, Denmark contributed USD 0.5 million to the multi-donor administrative trust fund associated with the Adaptation Fund. During the review, the ERT was informed of a multilateral/bilateral fund under ODA targeting climate change projects, referred to as the Climate Pool, with an overall budget of DKK 1.5 billion for the 2008–2012 period. This pool is allocated in accordance with the principles of the Copenhagen Accord, comprises fast-track financing and is balanced between adaptation and mitigation and directed to vulnerable countries, particularly in Africa.

120. Danish technology transfer activities include 'soft' and 'hard' components and occur mainly through bilateral and multilateral initiatives, as well as through the private sector. Most of the transferred technologies are to the energy sectors of partner countries. Denmark cooperates with many agencies in the United Nations system and international institutes on this issue and actively supports better regional distribution of CDM projects, including to LDCs. It also strives to develop, apply and disseminate environmentally friendly technologies and know-how.

121. Denmark considers vulnerability and options for adaptation to climate change in all relevant sectors, with particular attention paid to coastal zone management. Its strategy for adapting to climate change is based on a flexible and cost-effective approach, with all stakeholders taking responsibility, thus foreseeing autonomous adaptation. Little consideration has been given so far to the vulnerability of fragile and sensitive ecosystems in Greenland and the Faroe Islands. The support provided to developing countries for adaptation has increased significantly since 2005.

122. Denmark has made a substantial contribution to research and observation networks related to climate change at both the national and the international level, is making efforts to improve the system for the monitoring of the Greenland ice sheet and fully participates

in GCOS activities. The ERT noted the substantial efforts of Denmark in the improvement of all observation networks, including management of climate data, and of climate information, including the development of climate change indicators. Elements of climate change are well integrated into many educational programmes in Denmark. Public education and training on climate change are taking place mainly through websites. Public awareness in relation to climate change issues is generally high and the Government's environment-related policies are accepted by the general public.

123. The ERT concluded that Denmark's national system continues to perform its required functions as set out in decision 19/CMP.1; and that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol. During the review, the ERT was provided with updated information and documentation, including the plan for the backing up of databases and applications, and information on the recording of changes to databases and other issues relating to the national registry.

124. 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 provided by the Party in its 2009 and 2010 annual submissions is mostly complete and transparent. The ERT encourages Denmark to further enhance the reporting on Article 3, paragraph 14, including by indicating the prioritization of the action taken in implementing its commitments under Article 3, particularly steps taken to minimize the adverse impacts of the implementation of domestic policies on developing country Parties.

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

(i) Provide a description of the procedures for the official consideration and approval of the inventory;

(ii) Provide any results of test procedures that might be available or are being developed with the aim of testing the performance, procedures and security measures of the national registry;

(iii) Provide a definition of "new and additional" financial resources pursuant to Article 4, paragraph 3.

126. The ERT encourages Denmark to undertake a number of improvements regarding the transparency and completeness of its reporting; the most important of these are that Denmark:

(i) Provide a quantitative estimate of the impacts of each individual policy or measure, or collection of PaMs, presented;

(ii) Provide an assessment of the effects of PaMs consistent with the information presented in the main body of the NC5, possibly by aggregating PaMs at a level at which their effects can be more easily determined;

(iii) Provide more detailed information on the costs of PaMs;

(iv) Provide an overview of the effects of PaMs by sector and the total effect of PaMs which were implemented just before the drafting of the national communication;

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

(v) Provide ‘with additional measures’ projections;

(vi) Further enhance its reporting on the minimization of adverse impacts and the effects of response measures to climate change, in particular by including information on action taken to minimize the adverse impacts of the implementation of response measures, including domestic policies, on developing country Parties, and on how it gives priority to such actions.

IV. Questions of implementation

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

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>.

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

FCCC/SBI/2007/INF.6/Add.1. Compilation and synthesis of fourth national communications, Add.1: Policies, measures, past and projected future greenhouse gas emission trends of Parties included in Annex I to the Convention. Available at <http://unfccc.int/resource/docs/2007/sbi/eng/inf06a01.pdf>.

FCCC/SBI/2007/INF.6/Add.2. Compilation and synthesis of fourth national communications, Add.2: Financial resources, technology transfer, vulnerability, adaptation and other issues relating to the implementation of the Convention by Parties included in Annex I to the Convention. Available at <http://unfccc.int/resource/docs/2007/sbi/eng/ inf06a02.pdf>.

FCCC/ARR/2009/DNK. Report of the individual review of the annual submission of Denmark submitted in 2009. Available at <http://unfccc.int/resource/docs/2010/arr/dnk.pdf>.

FCCC/IRR/2007/DNK. Report of the review of the initial report of Denmark. Available at <http://unfccc.int/resource/docs/2007/irr/dnk.pdf>.

FCCC/IDR.4/DNK. Report of the centralized in-depth review of the fourth national communication of Denmark. Available at <http://unfccc.int/resource/docs/2007/idr/dnk04.pdf>.

Fourth national communication of Denmark. Available at <http://unfccc.int/resource/docs/ natc/dennc4.pdf>.

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

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

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Peder Lundquist and Ms. Eva Jensen (Ministry of Climate and Energy), Mr. Jacob Vastrup, Mr. Erik Rasmussen, Mr. Karim Arfaoui, Mr. Søren Houen, Mr. Sigurd Lauge Pedersen, Ms. Ulla Blatt Bendtsen, Mr. Erik Tang, Ms. Stine Leth Rasmussen, Mr. Bjarne Juul-Kristensen, Mr. Lars Hasselager Olsen, Mr. Peter O. Bach, Ms. Anne Lund Bender, Mr. Povl Frich, Mr. Aksel Beck and Mr. Asger Olesen (Danish Energy Agency), Ms. Lone Smith Simonsen (Government of Greenland, Ministry of Housing, Infrastructure and Transport), Mr. Herálvur Joensen (The Faroe Islands Home Rule, Permanent Representative in Copenhagen), Mr. Kim Neven (Danish Forest and Nature Agency), Mr. Steen Gyldenkærne, Mr. Ole-Kenneth Nielsen, Ms. Marianne Thomsen, Mr. Morten Winther and Mr. Leif Hoffmann (National Environmental Research Institute), Mr. Anders Fuglsig Larsen (Ministry of Taxation), Mr. Geert Aagaard Andersen, Mr. Erik Næraa-Nicolajsen, Mr. Christoffer Bertelsen and Mr. Jacob Skude Rasmussen (Ministry of Foreign Affairs), Ms. Anna Louise Kristiansen (Ministry of Transport), Mr. Mikkel Aaman Sørensen and Ms. Lone Lykke Nielsen (Danish Environmental Protection Agency), Mr. Anders Christiansen (Ministry for Food, Agriculture and Fisheries), Ms. Vivian Kvist Johannsen, Mr. Lars Vesterdal and Mr. Thomas Nord-Larsen (Danish Centre for Forest, Landscape and Planning, University of Copenhagen), Mr. Ole Bøssing Christensen and Mr. Claus Kern-Hansen (Danish Meteorological Institute), Mr. Andreas Peter Ahlstrøm (Geological Survey of Denmark and Greenland), Mr. Troels Dam Christensen (Danish 92 Group – umbrella organization for green non-governmental organizations in Denmark), Mr. Tarjei Haaland (Greenpeace), Ms. Nethe Veje Laursen (Confederation of Danish Industry), Ms. Charlotte Søndergren (Danish Energy Association), Mr. Jacob Stahl Otte (Danish Petroleum Association) and Ms. Anette Engelund Friis (Danish Agriculture and Food Council). Additional material on updated policies and measures, greenhouse gas projections, the national registry and recent climate policy developments in Denmark was also provided by the Party:[1]

Denmark's CO_2 emissions – the effort in the period 1990-2001 and the associated costs, Report from the Danish EPA, No. 2, April 2005 (Main report <http://www.mst.dk/udgiv/publikationer/2005/87-7614-587-5/pdf/87-7614-588-3.pdf> and Annex report: <http://www.mst.dk/udgiv/publikationer/2005/87-7614-589-1/html>).

Danish Government, 2010. Denmark 2020: knowledge>growth>prosperity>welfare.

Danish Energy Agency, 2010. Denmark's Update on GHG Projections and Questionnaires on Expected Use of Credits from Sinks and the Use of the Kyoto Mechanisms.

EMEP/Corinair (2007): Emission Inventory Guidebook. 3rd edition, prepared by the UNECE/EMEP Task Force on Emissions Inventories and Projections, 2007 update. Available at: http://www.eea.europa.eu/publications/EMEPCORINAIR5/page002.html (13-04-2009).

Report of the review of the initial report of Denmark, 2007. Available at <http://unfccc.int/documentation/documents/advanced_search/items/3594.php?rec=j&priref=600004484#beg>.

The Kingdom of Denmark's Report on Assigned Amount - under the Kyoto Protocol, 2006. Available at <http://unfccc.int/files/national_reports/initial_reports_under_the_kyoto_protocol/application/pdf/aareporttounfccc-20dec2006.pdf>.

[1] Reproduced as received from the Party.