



**Report of the technical review of the sixth national communication
of Denmark**

Note by the secretariat

The report of the technical review of the national communication of Denmark was published on 26 August 2014. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decisions 4/CMP.4 and 8/CMP.9), the report is considered received by the secretariat on the same date. This report, FCCC/IDR.6/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.



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

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

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

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I. Introduction and summary

A. Introduction

1. For the Kingdom of Denmark, the Convention entered into force on 21 March 1994 and the Kyoto Protocol on 16 February 2005.¹ Under the Convention, the European Union (EU) made a commitment to reduce its greenhouse gas (GHG) emissions by 20 per cent by 2020. Denmark, as a member State of the EU, will contribute jointly together with all member States of the EU to achieving this target. Since the Faroe Islands and Greenland are not included in the EU, the EU target under the Convention does not apply to these territories.

2. The Kingdom of Denmark is Party to the Kyoto Protocol, including both Denmark and Greenland; for the Faroe Islands a territorial reservation was taken in accordance with the Vienna Convention on the Law of Treaties when the Kyoto Protocol was ratified by the Kingdom of Denmark in 2002. Within the burden-sharing agreement of the EU for meeting commitments under the Kyoto Protocol, Denmark committed itself to reducing its GHG emissions by 21 per cent compared with the base year² 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 per cent compared with the base year level.

3. For the second commitment period of the Kyoto Protocol, from 2013 to 2020, Denmark committed to contribute to the joint EU commitment to reduce GHG emissions by 20 per cent compared with the base year level. In its sixth national communication (NC6), Denmark reports that it is expected that a territorial reservation for Greenland will be taken in accordance with the Vienna Convention on the Law of Treaties, when the amendment to the Kyoto Protocol is ratified.

4. Denmark has set an ambitious domestic quantified economy-wide emission reduction target of 40 per cent reduction by 2020 compared to 1990 levels. For this domestic target, removal units on the basis of its activities under Article 3, paragraphs 3 and 4 of the Kyoto Protocol, as an annual average in the period 2013–2019, will be taken into account, and emissions in 2020 will be adjusted for electricity trading, when assessing whether the 40 per cent domestic target in 2020 has been met. Neither Greenland nor the Faroe Islands are included in Denmark's domestic target.

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

6. The review took place from 17 to 22 March 2014 in Copenhagen, Denmark, and was conducted by the following team of nominated experts from the UNFCCC roster of experts:

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.

Mr. Hoseok Kim (Republic of Korea), Ms. Kristina Saarinen (Finland), Ms. Dovilė Vaitkutė (Lithuania), and Mr. Vute Wangwacharakul (Thailand). Ms. Saarinen and Mr. Wangwacharakul were the lead reviewers. The review was coordinated by Mr. Bernd Hackmann and Mr. Javier Hanna Figueroa (secretariat).

7. During the review, the expert review team (ERT) reviewed each section of the NC6. The ERT also reviewed the supplementary information provided by Denmark as a part of the NC6 in accordance with Article 7, paragraph 2, of the Kyoto Protocol. In addition, the ERT reviewed the information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, which was provided by Denmark in its 2013 annual submission and previous submissions under Article 7, paragraph 1, of the Kyoto Protocol.

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

B. Summary

9. The ERT conducted a technical review of the information reported in the NC6 of Denmark in accordance with the “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications” (hereinafter referred to as the UNFCCC reporting guidelines on NCs). As required by decision 15/CMP.1, supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol³ is provided in the NC6 (see paras. 104–108 below). The supplementary information on the minimization of adverse impacts referred to in paragraph 7 above is complete and mostly transparent. The ERT identified gaps and issues in reported information that are summarized in table 1.

10. Denmark considered all recommendations provided in the report on the in-depth review of the NC5 of Denmark.⁴ The ERT commends Denmark for its complete and improved reporting. During the review, Denmark provided additional information on policies and measures (PaMs) (see paras. 37, 43 and 74 below); projections and trends (see para. 84 below); financial, technological and capacity-building support (see paras. 113 and 116 below); and the steps taken towards implementing Article 3, paragraph 14, of the Kyoto Protocol (see para. 153).

1. Completeness and transparency of reporting

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

2. Timeliness

12. The NC6 was submitted on 3 January 2014, after the deadline of 1 January 2014 mandated by decision 9/CP.16. The ERT noted the delay in the submission of the NC6.

3. Adherence to the reporting guidelines

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

³ Decision 15/CMP.1, annex, chapter II.

⁴ FCCC/IDR.5/DNK.

Table 1

Assessment of completeness and transparency issues of reported information in the sixth national communication of Denmark^a

<i>Sections of national communication</i>	<i>Completeness</i>	<i>Transparency</i>	<i>Reference to paragraphs</i>	<i>Supplementary information under the Kyoto Protocol</i>	<i>Completeness</i>	<i>Transparency</i>	<i>Reference to paragraphs</i>
Executive summary	Complete	Transparent		National systems	Complete	Transparent	
National circumstances	Complete	Transparent		National registries	Complete	Transparent	
Greenhouse gas inventory	Complete	Transparent		Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Complete	Transparent	
Policies and measures (PaMs)	Complete	Transparent		PaMs in accordance with Article 2	Complete	Transparent	
Projections and total effect of PaMs	Mostly complete	Mostly transparent	102 and 103	Domestic and regional programmes and/or arrangements and procedures	Complete	Transparent	
Vulnerability assessment, climate change impacts and adaptation measures	Complete	Transparent		Information under Article 10	Complete	Transparent	
Financial resources and transfer of technology	Complete	Transparent		Financial resources	Complete	Transparent	
Research and systematic observation	Complete	Transparent		Minimization of adverse impacts in accordance with Article 3, paragraph 14	Complete	Transparent	
Education, training and public awareness	Complete	Transparent					

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

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

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

1. Information on relevant national circumstances (including Greenland and Faroe Islands)

14. In its NC6, Denmark has provided a concise description of the national circumstances and elaborated on the framework legislation and key policy documents on climate change. Further information on the review of the institutional and legislative arrangements for the coordination and implementation of PaMs is provided in chapter II.B below. Table 2 illustrates the national circumstances of Denmark by providing some indicators relevant to GHG emissions and removals. Table 2 shows that Denmark has seen a growth in population (8.4 per cent) and gross domestic product (GDP) (38.8 per cent) between 1990 and 2011, whereas in the same time GHG emissions per capita and GHG emissions per GDP unit have been substantially reduced, by 24.0 per cent and 40.7 per cent, respectively.

Table 2

Indicators relevant to greenhouse gas emissions and removals for Denmark

	1990	2000	2005	2010	2011	Change 1990–2011 (%)	Change 2010–2011 (%)
Population (million)	5.14	5.34	5.42	5.55	5.57	8.4	0.4
GDP (2000 USD billion using PPP)	130.80	169.01	179.89	179.63	181.61	38.8	1.1
TPES (Mtoe)	17.36	18.63	18.89	19.31	18.00	3.7	-6.8
GHG emissions without LULUCF (kt CO ₂ eq)	70 087.68	69 649.08	65 395.96	62 778.63	57 748.33	-17.6	-8.0
GHG emissions with LULUCF (kt CO ₂ eq)	75 560.90	72 867.37	70 092.04	62 305.75	55 084.37	-27.1	-11.6
GDP per capita (2005 USD thousand using PPP)	25.45	31.65	33.19	32.37	32.61	28.1	0.7
TPES per capita (toe)	3.38	3.49	3.49	3.48	3.23	-4.4	-7.2
GHG emissions per capita (t CO ₂ eq)	13.64	13.04	12.07	11.31	10.37	-24.0	-8.3
GHG emissions per GDP unit (kg CO ₂ eq per 2005 USD using PPP)	0.54	0.41	0.36	0.35	0.32	-40.7	-8.6

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

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

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

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

15. Denmark has provided a summary of information on GHG emission trends for the period 1990–2011. This information is fully consistent with the 2013 national GHG inventory submission. Summary tables, including trend tables for emissions in carbon dioxide equivalent (CO₂ eq) (given in the common reporting format), are provided in an annex to the NC6. Table 3 below provides an overview of GHG emissions by sector from the base year to 2011 for Denmark, Greenland and the Faroe Islands.

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

Sector	GHG emissions (kt CO ₂ eq)				Change (%)		Share ^a by sector (%)	
	1990	2000	2010	2011	1990–2011	2010–2011	1990	2011
	1. Energy	53 413.16	54 216.52	50 195.48	44 972.27	–15.8	–10.4	76.2
A1. Energy industries	26 526.69	26 212.77	24 328.78	20 417.49	–23.0	–16.1	37.9	35.4
A2. Manufacturing industries and construction	5 534.93	6 143.44	4 504.20	4 500.44	–18.7	–0.1	7.9	7.8
A3. Transport	10 982.08	12 562.66	13 463.63	13 111.29	19.4	–2.6	15.7	22.7
A4.–A5. Other	10 000.40	8 489.74	7 429.10	6 576.05	–34.2	–11.5	14.3	9.4
B. Fugitive emissions	369.06	807.90	469.78	366.99	–0.6	–21.9	0.5	0.6
2. Industrial processes	2 239.52	3 389.98	1 703.66	1 872.74	–16.4	9.9	3.2	3.2
3. Solvent and other product use	116.38	153.79	187.68	167.18	43.7	–10.9	0.2	0.3
4. Agriculture	12 585.57	10 512.56	9 654.97	9 712.30	–22.8	0.6	18.0	16.8
5. LULUCF	5 473.22	3 218.29	–472.88	–2 663.97	–148.7	–463.4	NA	NA
6. Waste	1 733.05	1 376.23	1 036.84	1 023.85	–40.9	–1.3	2.5	1.8
GHG total with LULUCF	75 560.90	72 867.37	62 305.75	55 084.37	–27.1	–11.6	NA	NA
GHG total without LULUCF	70 087.68	69 649.08	62 778.63	57 748.33	–17.6	–8.0	100	100

Note: The changes in emissions and the share by sector are calculated using the exact (not rounded) values and may therefore differ from values calculated with the rounded numbers provided in the table. The numbers in the table correspond to the GHG emissions and removals of Denmark, Greenland and the Faroe Islands.

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.

16. Total GHG emissions⁵ excluding emissions and removals from land use, land-use change and forestry (LULUCF) decreased by 17.6 per cent between the base year and 2011, whereas total GHG emissions including net emissions or removals from LULUCF decreased by 27.1 per cent over the same period. The decrease is mainly the result of the

⁵ In this report, the term “total GHG emissions” refers to the aggregated national GHG emissions expressed in terms of CO₂ eq excluding LULUCF, unless otherwise specified.

decreases of CO₂ emissions by 16.3 per cent, methane (CH₄) emissions by 9.0 per cent, nitrous oxide (N₂O) emissions by 38.3 per cent from 1990 to 2011, whereas fluorinated gases (F-gases), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) increased by 164.6 per cent from 1995 to 2011. An analysis of the drivers of GHG emissions trends in each sector is provided in chapter II.B below.

17. The steadily decreasing trend in total GHG emissions is mainly driven by significant emission reductions in: the energy sector (15.8 per cent reduction), mainly attributed to changes in the fuel mix from coal to natural gas and renewable energy, the increasing use of combined heat and power (CHP) production and a general decrease in gross energy consumption due to energy efficiency gains; the agriculture sector (22.8 per cent reduction), mainly due to the improved utilization of nitrogen in manure; and the waste sector (40.9 per cent reduction) mainly due to the ban on landfilling combustible waste. The transport sector shows an increasing emission trend of 19.4 per cent over the same period, accounting for 22.7 per cent of total emissions from the energy sector in 2011.

18. The ERT noted significant inter-annual variations in Denmark's total GHG emissions, owing to its electricity trading with neighbouring countries. These inter-annual variations are influenced by the availability of hydropower, and to the variation in Denmark's 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 winter temperatures.

3. National system

19. Denmark provided in its NC6 a description of how its national system is performing the general and specific functions defined in the guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol (decision 19/CMP.1). The description includes all the elements mandated by decision 15/CMP.1. The NC6 also contains a reference to the description of a national system provided in the national inventory report (NIR) of the 2013 annual submission. In its 2013 submission, Denmark reported no changes to the national system since 2012.

20. The ERT took note of the recommendation made in the previous review report of the NC5 in relation to the national system to provide a description of the procedures for the official consideration and approval of its inventory. The ERT noted that, following this recommendation, Denmark included a subchapter introducing "procedures for the official consideration and approval of the inventory" into its NC6.

21. The ERT concluded that the Party's national system continues to perform its required functions as set out in decision 19/CMP.1 and commends Denmark for its improved reporting on its national system.

4. National registry

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

23. The ERT noted that Denmark maintains its national registry in a consolidated manner in the Consolidated System of European Union Registries (CSEUR) together with all other members of the EU. The EU Registry is hosted and facilitated by the European Commission. The administration of the Danish national registry has been moved from the Danish Energy Agency (DEA) under the Danish Ministry of Climate, Energy and Building to the Danish Business Authority under the Danish Ministry of Business and Growth.

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

24. Denmark has reported in its NC6 comprehensive and transparent information on domestic and regional programmes and/or legislative arrangements and procedures related to the Kyoto Protocol.

25. The overall responsibility for climate change policymaking lies within the Ministry of Climate, Energy and Building of Denmark, and a number of national institutions are involved in the implementation of this policy. In addition, other ministries have prepared sectoral action plans in which the environment, including climate change, is an integral part. The sectoral action plans contain specific environmental objectives and dates for achieving them. Institutional arrangements for the implementation of the Kyoto Protocol have been delegated to DEA under the Ministry of Climate, Energy and Building. In addition, DEA is also responsible for legislation and administration of the European Union Emissions Trading System (EU ETS). Since September 2011, DEA took over all the energy-related authority tasks in the building sector, which until then had been carried out by the National Agency for Enterprise and Construction. These new tasks include energy provisions in building regulations, rules on individual metering of electricity, gas, water and heating, as well as rules on the efficiency of district heating. Moreover, it was decided to close the Centre for Energy Savings, based on the 2012 Energy Agreement, and some of its activities have also been taken over by DEA.

26. Implementation of the Kyoto Protocol is underpinned by a number of policies based on sustainable development and climate change mitigation. In the first commitment period 2008–2012, Denmark's implementation of the Kyoto Protocol had been effected by the follow up on the National Climate Strategy, sector-policy strategies and other initiatives contributing to reduction of GHG emissions. Key policies in this regard are: the Danish Government Platform from October 2011, the energy plan 'Our Future Energy' from November 2011, the 'Energy Agreement' from March 2012 and the Danish Climate Policy Plan, 'Towards A Low Carbon Society', from August 2013.

27. In its NC6, Denmark reports that EU climate policy, including the EU burden-sharing agreement (European Union decision 2002/358/EC), EU ETS (directive 2003/87/EC) and the EU effort-sharing decision (ESD) regulating GHG emissions in non-ETS sectors (European Union decision 406/2009/EC), has been pivotal for Denmark to comply with its domestic and international emission reduction targets.

28. The entire set of the climate change-related regulations (in Danish) can be accessed via Retsinformation (an online legal information system).⁶ Additional information related to climate change and energy policies, and energy projects, can also be accessed through the DEA website.⁷ The Danish Government plans to put forward a climate change bill in 2014 in order to strengthen monitoring and evaluation of climate policy, and to contribute to ensuring that the public have access to information on climate change.

29. Denmark provided a description of its national legislative arrangements and administrative procedures that seek to ensure that the implementation of activities under Article 3, paragraph 3, and elected activities under Article 3, paragraph 4, of the Kyoto Protocol also contribute to the conservation of biodiversity and the sustainable use of natural resources. The Forest Act is one of the main policies to ensure the implementation of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol; the Danish Nature Agency under the Danish Ministry of the Environment is responsible for its implementation as well as for the other nature preservation acts.

⁶ <www.retsinformation.dk>.

⁷ <<http://www.ens.dk/en>>.

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

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

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

31. Denmark reported on its PaMs adopted, implemented and elaborated in achieving its commitments under the Convention. Denmark provided information on PaMs by sector and by gas and a description of the principal PaMs. Each sector has its own textual and tabular description of its principal PaMs. Denmark has also provided information on how it believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals, in accordance with the objective of the Convention. The NC6 contains a set of PaMs similar to those in the NC5.

32. As in its NC5, Denmark reports in its NC6 on all mandatory information relating to PaMs as required by the UNFCCC reporting guidelines on NCs. Compared with its NC5, Denmark further improved the transparency of its reporting on PaMs by following the encouragement from the previous review report to adhere more closely to the UNFCCC reporting guidelines on NCs by providing concise and focused sections on each sector, including detailed information on some key PaMs and quantitative estimates of their impacts, as well as on associated costs for some PaMs.

33. In addition to the ex-ante estimates of the effects of PaMs by sector and by gas for the period 2008–2012 resulting from Denmark's 2005 Effort Analysis, which covers the effects of PaMs implemented in the period 1990–2001, Denmark included in its NC6 the assessment of mitigation effects for 2008–2012 of nine additional selected measures in non-ETS sectors. The ERT commends the efforts made by Denmark to conduct the ex-post analysis on the effects of the selected climate change mitigation measures based on the recommendation of the National Audit Office in 2012.

34. However, the ERT noted that the NC6 still includes only limited information on the quantitative estimates of mitigation effects of individual PaMs or collections of PaM and reiterates the finding from the previous review report that the results from the 2005 Effort Analysis are somewhat outdated and do not cover the PaMs implemented in the last decade (see paras. 99–103 below). The ERT further noted that, based on the reported information, it is hard to assess how the Danish PaMs are modifying longer-term trends consistent with the objective of the Convention.

35. The ERT therefore strongly encourages Denmark to improve the transparency of its reporting on PaMs by providing additional data and updating existing data on the quantitative estimate of the impacts of individual PaMs and collective PaMs.

36. In the NC6, information is provided on the socioeconomic evaluation of planned PaMs, which are needed in order to reduce emissions of around 2,700 kt CO₂ eq to reach the 40 per cent domestic reduction target in 2020. These additional PaMs are listed and described in the 2013 'Catalogue of Danish Climate Change Mitigation Measures'. However, the PaMs listed are only considered as options and will not necessarily be adopted.

37. During the review, Denmark provided additional information, elaborating on the status of the planned PaMs and on the PaMs implementation and monitoring process. The ERT considered the additional information useful to better understand how planned PaMs could be implemented and their effects monitored. The ERT, therefore, encourages

Denmark to provide more detailed information on the planned PaMs, together with the status of their adoption and their effects.

2. Policy framework and cross-sectoral measures

38. The Danish Government in power since 2011 elevated climate change to one of its top political priorities as part of the 2011 Government Platform. In this context, Denmark has increased its mitigation ambition significantly and set a domestic goal of a 40 per cent reduction in Denmark's GHG emissions by 2020 compared with the 1990 level, in addition to its commitment to contribute to the EU-wide 20 per cent reduction target for 2020 under the Convention and the second commitment period of the Kyoto Protocol.

39. The 2012 Danish Energy Agreement for the period 2012–2020 focuses on the long-term goal to cover the entire energy supply with renewable energies by 2050 and to enhance energy efficiency. The main expected results in 2020 of the implementation of this agreement are: a 34 per cent reduction in GHGs compared to 1990; having more than 35 per cent of final energy consumption and approximately 70 per cent of electricity consumption coming from renewable energies; and an approximately 8 per cent reduction in gross energy consumption in relation to 2010.

40. In addition, Denmark published the Danish Climate Policy Plan in 2013, which aims at assessing the Party's current status in relation to its 40 per cent domestic GHG emission reduction target in 2020 compared with 1990, and presents the Government's strategy on how additional PaMs should be developed to achieve this target in the most efficient way possible. The Danish Government is planning to present its new Climate Change Act in 2015, which will serve as a framework for future climate policy.

41. The main changes in the policy framework compared with the NC5 were mostly initiated to reflect the expiration of the first commitment period of the Kyoto Protocol and to launch policies to attain the targets for 2020, both under the second commitment period of the Kyoto Protocol and under the Convention.

42. The ERT noted that the information reported on the policymaking process with regard to achieving broad agreement on, and the final adoption of, climate change-related policies is not fully transparent. In particular, the description of the participation of the business and environmental communities, and the civil society, as well as on how this participatory process contributes to broad agreement across societal and political actors provided in the 'Energy Agreement' adopted in 2012 and the Government's Climate Policy Plan 'Towards a Low Carbon Society' launched in 2013, could be improved.

43. During the review, Denmark provided additional information on its decision-making process when elaborating on frequent dialogues between the government, environmental non-governmental organizations (NGOs), the business community and other actors from social society on future climate change decisions, such as additional PaMs across all sectors. Furthermore, Denmark provided additional information on how to reach agreement on the adoption of a specific policy, set of policies or an action plan by the Danish Government. The ERT noted that Denmark could include such information in its next national communication (NC), in order to enhance the transparency of its reporting.

44. Some PaMs are implemented at the regional and local levels. However, the ERT noted that the information reported in the NC6 on the role of regional and local authorities in the implementation of PaMs is limited. During the review, Denmark provided additional information on the role of these authorities. Denmark outlined that the regional and local authorities contribute to the necessary planning for the installation of wind turbines and intermodal installations. Also, information was provided that these authorities are responsible for the administration and monitoring of activities in the agriculture sector (e.g. the ban on the burning of straw residues and the approval of new livestock production) and

in the waste sector (e.g. landfill management). The ERT took note of this information and encourages Denmark to provide such information in its next NC, to increase the transparency of its reporting.

45. Denmark's three cross-cutting policies and policy instruments are in the core of its policy portfolio and complement each other ensuring comprehensive coverage of emissions. These are the EU ETS, the energy and carbon taxes and incentives, and other instruments such as support provided for research and development.

46. The EU ETS plays a crucial role in the achievement of Denmark's emission reduction target under the first commitment period of the Kyoto Protocol, having replaced a domestic cap-and-trade scheme for power plants that was in place between 2001 and 2004. In 2012, a total of 375 stationary installations were covered under the EU ETS: 16 central power and heat plants, 111 installations in the manufacturing industry, 241 decentralized electricity and district heating plants, and 7 installations in offshore companies. Danish installations covered under the EU ETS accounted for nearly 50 per cent of Denmark's emissions.

47. The annual emission allowances have been cut from 33,500 kt CO₂ in the first period of the EU ETS (2005–2007) to 24,500 kt CO₂ in its second period (2008–2012). During the review, the allowances to the companies for the third period of the EU ETS (2013–2020) have still been calculated in accordance with the EU benchmarking decision (EU decision 2011/278/EU), and were not yet available.

48. For the second period of the EU ETS (2008–2012), the deficit between expected Danish emissions of CO₂ and the target that Denmark is committed to achieve was expected to be 13,000 kt CO₂ for the period 2008–2012 if no further initiatives were implemented. However, the final EU ETS accounting in Denmark for the period 2008–2012 shows that the annual average of the verified CO₂ emissions under the EU ETS were already 500 kt CO₂ lower than the annual average of allocated allowances.

49. Over the last 25 years Denmark has introduced a broad range of environmental and energy taxes, for example on coal, gas, mineral oil, electricity, motor vehicles and waste, which aim at more efficient energy consumption and a reduction in CO₂ emissions. In addition, Denmark implemented a specific CO₂ tax on energy products, a tax on CH₄ emissions (equal to the CO₂ tax in terms of CO₂ eq) from natural gas-fired power plants, and a tax on imports of F-gases (HFCs, PFCs and SF₆) in the industry sector. The different energy taxes are complemented by a change in the taxation structure for solar panels with the aim of providing additional incentives for the installation of solar panels.

50. Denmark provides large-scale and comprehensive support to research and development (R&D) activities relating to new and renewable energy technologies, energy savings and more efficient energy conversion. Since 2010 Denmark provided more than Danish krone (DKK) 1 billion per year through public programmes to related R&D. This concerted financial effort by Denmark has contributed to enable Danish companies to become international market leaders.

51. Denmark reported in its NC6 that agreement has been reached to create a new innovation foundation in 2014, with an expected annual budget of DKK 1.5 billion to invest in R&D activities relating to new and renewable energy technologies.

52. The ERT acknowledges that the Danish Government strives to be among the progressive countries that are driving the policy agenda on climate change, both at domestic level and within the EU by setting ambitious policy goals and implementing effective climate policy.

53. Denmark's example shows how proactive policies on renewable energy and energy efficiency, as well as targeted support, can contribute to the achievement of ambitious

energy policy objectives, such as energy security, environmental protection and economically viable energy production and consumption, together with sizeable GHG emission reductions. In Denmark's case these PaMs contributed to the decoupling of GDP growth from GHG emissions (see para. 14 above).

54. Table 4 provides a summary of the reported information on the PaMs of Denmark.

Table 4
Summary of information on mitigation actions reported by Denmark

<i>Sectors affected</i>	<i>List of key policies and measures</i>	<i>Estimate of mitigation impact for 2008–2012, (kt CO₂eq)</i>
<i>Policy framework and cross-sectoral measures</i>	EU CO ₂ allowances for electricity and district heat production and certain industrial processes (including business)	NE
<i>Energy</i>	Energy taxes	1 000
Energy supply	Mineral Oil Tax Act	1 200
	CO ₂ tax on energy products	410
	Tax on CH ₄ from natural gas-fired power plants – equivalent to the CO ₂ tax	20
Renewable energy	Biomass Agreement (agreement on the use of biomass in electricity production)	1 100
	Renewables for the industry (promotion of investment in energy efficient use of renewable energy)	1 000 in 2020
	Biogas plants	17–36 in 2008–2012 240 in 2020
Energy efficiency	Agreements on energy efficiency with energy-intensive enterprises	900
	Savings activities by electricity grid, gas, oil and district heating companies	60
Residential and commercial sectors	Energy labelling of small and large buildings (including public sector and business)	400
	Substitution of individual oil-based furnaces	20
<i>Transport</i>	Green Owner Tax – a fuel-efficiency-dependent annual tax on motor vehicles	600
	EU requirements regarding biofuels	290
<i>Industrial sectors</i>	Tax on HFCs, PFCs and SF ₆ – equivalent to the CO ₂ tax	400 in 2008–2012 20 in 2015
<i>Agriculture</i>	Action Plan for the Aquatic Environment I+II	2 200
	Action Plan for the Aquatic Environment III	200

<i>Sectors affected</i>	<i>List of key policies and measures</i>	<i>Estimate of mitigation impact for 2008–2012, (kt CO₂eq)</i>
	Reduced emissions of ammonia	30
	Agreement on Green Growth (reduced use of nitrogen)	800 in 2020
Forestry	Ban on burning croplands	1.8
	Subsidies scheme for private afforestation on agricultural land	120 in 2008–2012 280 in 2020
	Public afforestation (state, counties and municipalities)	68 in 2008–2012 123 in 2020
	Planting of windbreaks	140
Waste management	Obligation to send combustible waste to incineration	333

Note: The greenhouse gas reduction estimates given for some measures are reductions in carbon dioxide or carbon dioxide equivalent for the period 2008–2012 unless stated otherwise.

Abbreviations: EU = European Union, HFCs = hydrofluorocarbons, NE = not estimated, PFCs = perfluorocarbons, SF₆ = sulphur hexafluoride.

3. Policies and measures in the energy sector⁸

55. Between 1990 and 2011, GHG emissions from the energy sector decreased by 15.8 per cent (from 53,413.16 to 44,972.27 kt CO₂ eq), mainly driven by the shift in the primary energy consumption from oil and coal to natural gas and renewable energies. The trend in GHG emissions from fuel combustion by sector showed a notable increase in transport (19.4 per cent or 2,129.21 kt CO₂ eq) and a decrease in energy use in other sectors (34.2 per cent or 3,424.35 kt CO₂ eq).

56. **Energy supply.** The increased use of CHP and the expansion of the areas provided with district heating have been main elements of the Danish strategy to promote the efficient use of energy resources since the end of the 1970s. In addition, since the 1990s, the share of coal has steadily decreased in favour of natural gas, waste and biomass use in small-scale and industrial CHP and in favour of natural gas and renewable energy (mostly wind) in large-scale electricity production. There has also been increased use of natural gas for the heating of individual buildings. In the near future, wind energy is expected to continue to grow and deliver 50 per cent of Denmark's domestic electricity supply by 2020. This might lead to the reduced utilization of CHP plants, which will however continue to be an integral component of the overall electricity supply system.

57. Taxes on energy, coal, gas, mineral oil, electricity, motor vehicles and the waste industry sector, a specific CO₂ tax on energy products and a tax on CH₄ from natural gas-fired power plants, which have been used for a number of years to support various policy objectives, also led to a reduction of CO₂ emissions in the energy sector, partly with a view to achieving a general reduction and partly to promote the use of fuels with lower CO₂ emissions, mainly biomass. These taxes remain a prime tool for GHG mitigation along with the EU ETS (see also para. 45 above).

⁸ The totals in the chapter correspond to the GHG emissions and removals of Denmark, Greenland and the Faroe Islands.

58. In addition to the energy taxes, the processing enterprises not covered by the EU ETS pay a CO₂ tax on their fuel consumption. In 2014, the CO₂ tax was DKK 166.90/t (up from the DKK 150.00/t indexed in 2008). Non-ETS energy-intensive enterprises, with so-called ‘heavy’ processes, are compensated between approximately 80 per cent and almost 100 per cent of the CO₂ tax through a basic tax deduction. Heavy processes are defined as the processes included in the annex to Denmark’s CO₂ Tax Act.

59. **Renewable energy sources.** The 2012 Energy Agreement sets the long-term goal for the Danish energy policy that by 2050 the entire energy supply, including transport, will be covered by renewable energy (see para. 39 above). Renewable energy sources are promoted through economic instruments that change the price ratio in favour of renewable energy, including the use of energy taxes and CO₂ taxes on fossil fuels, and through the public service obligation (PSO) schemes,⁹ which add a supplement to the price of electricity paid by electricity consumers. In addition, a new natural gas PSO scheme has been introduced. The PSO collected through the gas bills will finance subsidies for renewable energy in the natural gas sector.

60. Since the NC5, Denmark has continued to expand upon the use of wind power and biomass for power generation. In this regard, a new offshore wind farm of 400 MW capacity went into operation in 2013. The 2012 Energy Agreement (see paras. 39 and 59) includes initiatives to expand renewable energy production from wind by 2,000 MW, aiming at covering approximately 50 per cent of Danish electricity consumption through wind power in 2020. The energy production from biomass also continues to increase and has more than doubled since 1990, mainly due to the 1993 Biomass Agreement (which requires power plants to use straw and wood, equivalent to almost 20 PJ per year), and due to the policy agreement from February 2008 on the increased use of straw and chips at the large co-generation plants (up to 700,000 tonnes in 2011). In 2012, biomass accounted for approximately 69 per cent of renewable-energy production, wind for 24 per cent and energy production from heat pumps, photovoltaic power, geothermal and hydro power made up for the remaining 7 per cent.

61. **Energy efficiency.** Since 2005, several political agreements have been reached that significantly strengthen energy-saving efforts in Denmark. The 2012 Energy Agreement further expands energy-saving efforts and aims at decreasing Denmark’s gross energy consumption by approximately 8 per cent in 2020 in relation to 2010. Initiatives covered under the agreement target the industry and building sectors. To that end, the agreement introduces a comprehensive strategy for the energy retrofitting of Danish buildings and increased quotas for energy companies to realize energy savings of 2.6 per cent of final energy consumption compared with 2010 levels. This figure is expected to rise from 2015 to 2020 to an annual 2.9 per cent annually compared with the 2010 level. These obligations have been implemented as voluntary agreements between the Ministry of Climate, Energy and Building and trade associations representing the companies responsible for the electricity grid, natural gas, district heating and oil.

62. **Residential and commercial sectors.** In 2011, GHG emissions from energy use in manufacturing industries and construction, commercial/institutional and agriculture, forestry and fisheries decreased by around 20 per cent from compared to 1990, primarily due to improvements in energy efficiency and energy savings but also due to increased use of renewable energy. In the 2012 Energy Agreement, the subsidies to provide support to businesses are aiming at: (i) replacement of fossil fuels with renewable energy – such as

⁹ The Danish Parliament introduced the PSO levy as an additional tariff on electricity bills in connection with an agreement on the liberalization of energy markets in 1998. PSO funds should cover the costs of new energy technologies that are not yet able to perform at market conditions (additional information is available at: <<http://en.1stmile.dk/funds/overview/>>).

wind, solar, biogas or biomass – in power generation; (ii) replacement of fossil fuel use by district heating; and (iii) investment in energy-efficiency measures. The estimated effect of this so called ‘Renewables for industry’ initiative under the agreement is a reduction of approximately 1,000 kt CO₂ eq per year from 2020 onwards.

63. The residential sector used 163.6 PJ of energy for space heating and hot water (climate-corrected) and 32.4 PJ of electricity for appliances in 2011. Energy consumption for heating remained broadly constant from 1990, in spite of an increase in the number of households and in the area heated. In contrast, the consumption of electricity for appliances is still increasing. Various PaMs to reduce GHG emissions in the residential sector have been adopted and/or implemented, such as energy and CO₂ taxes, energy labelling of buildings when built, sold or rented, regular energy labelling of large buildings and public buildings, minimum energy requirements and energy labelling of appliances, information initiatives towards private households and support for the substitution of individual oil-based furnaces. The 2012 Energy Agreement sets a goal to reduce energy consumption in new buildings by 75 per cent by 2020 relative to 2006.

64. **Transport sector.** Efforts to reverse the upward trend of GHG emissions in the transport sector have so far failed, mostly due to difficulties in reducing the CO₂ emissions in this sector in Denmark using domestic measures only. The measures in the transport sector comprise both the EU and national initiatives. Thus, Denmark strongly supports more ambitious EU policy in relation to CO₂ emissions from cars or vans.

65. In the 2012 Energy Agreement, DKK 70 million have been allocated to transport infrastructure projects related to electric, gas and hydrogen vehicles. Further, Denmark is planning to develop a strategy for the promotion of energy-efficient vehicles, based on analysis to be carried out in 2013–2015. The Danish Government has allocated funds to several larger projects, which are expected to result in emission reductions. The largest fund allocations are: DKK 1.2 billion to the electrification of parts of the rail infrastructure; DKK 328 million to the establishment of a metro line to the new Nordhavn area in Copenhagen; and DKK 1 billion to improve and promote Danish cycle transport facilities.

4. Policies and measures in other sectors

66. Between 1990 and 2011, GHG emissions from industrial processes (including solvent and other product use), agriculture and waste decreased by 23.4 per cent (from 16,674.52 to 12,776.07 kt CO₂ eq).

67. **Industrial processes.** Between 1990 and 2011, GHG emissions from the industrial processes (including solvent and other product use) sector decreased by 13.4 per cent (315.98 kt CO₂ eq), mainly owing to the global economic recession at the end of 2008, in particular emissions from the cement industry dropped due to a sharp decrease in the demand for cement, and the phasing out of nitric acid production and impact from the regulation of fluorinated gases.

68. In addition, installations in cement production with process emissions of CO₂ since 2005 have been covered by the EU ETS. Also, when the only nitric acid production facility in Denmark was phased out in 2004, N₂O emissions decreased by approximately 900 kt CO₂ eq. The regulation of emissions of F-gases (HFCs, PFCs and SF₆) comprises a tax and a statutory order that regulates the use of F-gases in new installations which entered into force in 2002. The tax is imposed only on the import of these gases, as they are not produced in Denmark. The statutory order includes a general ban on the use of F-gases in a wide range of new installations/products from 1 January 2006, including, for example, domestic refrigerators and freezers, foam, etc.

69. **Agriculture.** Between 1990 and 2011, GHG emissions from the agriculture sector decreased by 22.8 per cent (2,873.27 kt CO₂ eq), mainly owing to the decreased use of

synthetic fertilizers and nitrogen leaching as well as decreased volumes of enteric fermentation. Most of the implemented PaMs in the agriculture sector aim at the reduction of nitrogen. From 1990 to 2011 emissions of N₂O decreased by some 39 per cent due to several legislative measures to reduce nitrogen leaching, including the improved utilization of nitrogen bound in manure and a reduction in the application of mineral fertilizers. Major reductions in emissions of N₂O stem from the Danish Plans for the Aquatic Environment I (1987), II (1998) and III (2004), which set the framework for reductions of approximately 100,000 tonnes of nitrogen per year. The present Danish Government has not yet taken a position on new targets for nitrogen reduction.

70. According to the latest projection from the Danish Energy Agency an increase in biogas production is expected from 4 PJ in 2007 to 17 PJ in 2020, leading to a five- to six-fold increase in the volume of manure used for biogas generation by 2020.

71. **LULUCF.** The LULUCF sector in Denmark was a net sink in 1990 estimated at 5,473.22 kt CO₂ eq, but became a net source in 2011 (-2,663.97 kt CO₂ eq). The overall trend in the LULUCF sector without forestry is a decrease in emissions of 30 per cent since 1990. The trend was mainly driven by a decrease in total carbon stock in soil. Forests have been a net sink in Denmark for the last decade, but due to the age distribution of the forests – containing a majority of mature forests – a slight decrease of the carbon stock has been observed. Danish forestry policy such as that outlined in the National Forest Programme (2002) is 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 (by 450,000–500,000 ha) has been set. It is planned that for cropland, land-use measures such as a ban on burning straw on fields and support for the planting of windbreaks will continuously reduce CO₂ emissions and enhances CO₂ removal.

72. **Waste management.** Between 1990 and 2011, GHG emissions from the waste sector decreased by 40.9 per cent (709.2 kt CO₂ eq), mainly owing to: the obligation to incinerate combustible waste (in practice, a ban on landfilling); a tax on waste (based on weight and volume) and taxes on packaging; increased recycling of waste and plastic packaging; and implementation of the EU landfill directive. As a result of the Statutory Order on Waste from 1997 combustible waste that used to go to landfill sites is now either recycled or used as fuel in Denmark's incineration plants.

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

73. Denmark reported on its package of PaMs adopted, implemented and elaborated in achieving its commitment under the Kyoto Protocol. The NC6 includes all the required information with respect to commitments under the Kyoto Protocol. Denmark also provided comprehensive information on PaMs adopted both at the national level and in the context of the EU, as well as on the synergies and overlaps between them.

74. During the review, Denmark provided additional information, elaborating on the role of regional and local governments as well as the whole decision-making process and the adoption of the strategies and other strategic documents process. The ERT encourages Denmark, in order to improve the transparency of its reporting, to provide additional information on the policymaking and adoption process in order to enhance transparency (see para. 43 above).

75. The NC6 includes information on how Denmark promotes and implements the International Civil Aviation Organization (ICAO)/International Maritime Organization (IMO) decisions to limit emissions from aviation and marine bunker fuels. In its NC6, Denmark reports on its active role under ICAO and IMO, in particular within IMO where it

has proposed the creation of a market-based instrument in the context of an International GHG Fund to address GHG emissions from maritime transport.

76. In its NC6, Denmark 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 1, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, as reported in the 2013 annual submission, is presented in chapter III.B below.

77. According to the assessment by Denmark presented in its NC6, Denmark does not consider that its contributions to international climate efforts have adverse effects in other countries, as the reduction of GHG emissions in Danish commitments will contribute to limiting climate change in all countries.

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

78. Denmark provided comprehensive and well-organized information on its projections from 2011 to 2035.

79. The NC6 provides references to source documents that include more detailed information on projections. In 2012, the latest baseline ('with measures') scenario with a projection of Denmark's GHG emissions between 2011 and 2035 was published by the Danish Energy Agency, and a full documentation report in English, *Projections of Greenhouse Gases 2011–2035*, was published in March 2013 by the Danish Centre for Environment and Energy (DCE) at Aarhus University.

1. Projections overview, methodology and key assumptions

80. The GHG emission projections provided by Denmark in the NC6 include a 'with measures' scenario until 2035 (baseline scenario), presented relative to actual inventory data for 1990, 1995, 2000, 2005, 2010 and 2011 and a 'without measures' scenario for the period from 1990 to 2012. Projections are presented on a sectoral basis, using the same sectoral categories used in the PaMs section and on a gas-by-gas basis for all the following GHGs: CO₂, CH₄, N₂O, PFCs, HFCs and SF₆ (treating PFCs and HFCs collectively in each case). As for PaMs, the sector category 'Solvent and Other Product Use' is also reported in the section on projections together with 'Industrial Processes'. Denmark presented its projections in a tabular format by gas for each of the projected years in the section on PaMs of its NC6. Projections are also provided in an aggregated format for each sector as well as for a national total, using global warming potential (GWP) values. Emission projections related to fuels sold to ships and aircraft engaged in international transport were reported separately and not included in the totals.

81. The ERT encourages Denmark to increase the transparency of its reporting by presenting projections also in a tabular format by gas for each of the projected years in the section on projections.

82. The NC6 provides a description of the methodology used for the sectoral projections. 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. The projection of production by businesses is based on the ADAM projections in the 'Convergence Programme' by the Danish Ministry of Finance. The projection of emissions from road transport is carried out within the macroeconomic model EMMA. Projections of rail transport and domestic ferries and freighters are based on a report on the transport sector's energy consumption and emissions by the Danish Road Directorate in 2002, whereas domestic air transport is based on the study 'European energy and transport – trends to 2030' from 2003.

83. Denmark reported the changes to the methodology compared to the NC5. The changes to the methodology resulted in no clear difference in the projections. The impact of the changes was assessed in the NC6 where a comparison of the latest reported greenhouse gas inventory with the 'with measures' projections of the total GHG emissions reported in Denmark's NC1 to NC6 was provided.

84. During the review, Denmark provided additional information, elaborating on sectoral projections and the respective methodologies used. The report, *Projection of Greenhouse Gases 2011–2035*, contains the sectoral emission projections to 2035 using a scenario that includes the estimated effects of PaMs implemented by September 2012 on Denmark's GHG emissions. The report also provides a description of the models, background data and projections of CO₂, CH₄, N₂O, HFCs, PFCs and SF₆ emissions for Denmark.

85. The ERT welcomed the additional information received during the review and encourages Denmark, in order to increase the transparency of its reporting, to provide detailed information on the methodology used for the projections, in particular the type of the models or approaches employed, their strengths and weaknesses and the original purpose of the respective models or approaches.

86. In its NC6, Denmark provided a 'with measures' scenario, in order to assess how GHG emissions levels could change reflecting the evolution of the energy systems in the future under the assumption that no new policies will be introduced. There are also a number of assumptions of macroeconomic framework as reflected in variables such as industrial production, consumption and energy prices, technological change and the energy market. The 'with measures' scenario includes the effects of already adopted, but not necessarily implemented, measures. All elements of the Energy Agreement of March 2012 are included in this scenario, and, in addition, it includes previously agreed actions from the 2008 Energy Agreement, and the 2009 tax reform, for vehicles.

87. Whereas, the Danish Government's Climate Policy Plan (see para. 40 above) includes a strategy on how additional PaMs should be determined for the purpose of achieving the domestic 40 per cent reduction target in 2020 in the most efficient manner, Denmark did not provide a 'with additional measures' scenario in its NC6.

88. Denmark reported that as long as the Government has not decided on which of the additional measures should be considered for adoption, a 'with additional measures' projection scenario would be difficult to prepare. Denmark further reported that, depending on the progress of the dialogue with the business and civil communities, the update of the baseline scenario is planned for 2014. The ERT encourages Denmark to follow the UNFCCC reporting guidelines on NCs more closely and to present a 'with additional measures' projection scenario in its next NC (see also para. 95 below).

89. The basic assumption of the Danish projections is that future energy consumption is expected to remain broadly stable for the projection period, unless there is an external event such as economic recessions, major technology improvements or drastic climatic changes.

In these projections, the assumptions of the International Energy Agency (IEA) on fossil fuels prices (World Energy Outlook – New Policy scenario, 2011) have been applied. Biomass prices are based on an analysis conducted by an external consultant in 2011 and district heating prices are based on the production cost, while the electricity price has been calculated based on the marginal costs of generation. In the energy projection, about 1.0–2.4 per cent/year of economic growth and about EUR 21.6/t prices of CO₂ allowances in 2020 are assumed. To improve the consistency of the assumption on electricity prices in the regional electricity market, Denmark also reported its efforts to coordinate assumptions on the electricity market with the other Nordic countries, in particular the planned investment in production and transmission capacity as well as closing plants.

90. The NC6 reported that Denmark's energy demand and GHG emissions are sensitive to climatic changes, and identified it as one of the drivers that determines the long-term trend of GHG emissions. The ERT noted that Denmark could analyse the sensitivity of its energy demand and GHG emissions with respect to different temperature scenarios.

2. Results of projections

91. Denmark, in its NC6, presents the average annual GHG emissions for the period 2008–2012, based on GHG inventory data for 2008–2011 and projections for 2012.

92. On the basis of total emissions of 69,978.07 kt CO₂ eq in the base year, the initial review report in 2007 concluded that the total assigned amount for Denmark and Greenland for the period 2008–2012 is 276,838.96 kt CO₂ eq. While the Convention was ratified by the Kingdom of Denmark, comprising Denmark, Greenland and the Faroe Islands, the Kyoto Protocol was ratified with a territorial exclusion in respect of the Faroe Islands.

93. Denmark reports that its target under the first commitment period to the Kyoto Protocol will be met through a combination of domestic efforts, use of flexibility mechanisms and use of accounting for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. The projected gap between the projected emissions and the Kyoto Protocol target is estimated to be approximately 2,200 kt CO₂ eq on average per year for the period 2008–2012 and will be covered by Kyoto Protocol units from the State portfolio, including the national Joint Implementation (JI) and Clean Development Mechanism (CDM) programme (see para. 106 below).

94. With regard to the progress made towards the targets for 2020, both under the Convention and the second commitment period of the Kyoto Protocol, Denmark reports in its NC6 projected emissions that show significant reductions of 35.2 per cent by 2020 compared to the base year, including significant reductions for sectors covered under the EU ETS as well as non-ETS sectors that are covered under the ESD for this period. Emissions covered under the ESD are projected to exceed the non-ETS target by approximately 2,000 kt CO₂ eq per year on average.

95. The domestic target for 2020 is translated into emission levels in 2020 of approximately 42,200 kt CO₂ eq (including credits from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol). When comparing to the projected emission level for 2020 of 44,898 kt CO₂ eq under the 'with measures' scenario, this results in a gap of around 2,700 kt CO₂ eq that needs to be covered by additional measures. Such possible additional measures are provided in the 2013 'Catalogue of Danish Climate Change Mitigation Measures' (see para. 38 above). The ERT noted that a 'with additional measures' scenario would be useful to assess the possibility whether the domestic target could be achieved (see also para. 88 above).

96. The results from the GHG emissions projections show an overall decreasing trend in emissions in the projection period from 2011 to 2035, with decreasing trends from 2010 to 2025 and slightly increasing trends from 2025 to 2035. As a continuation of the past trend

and impacts from PaMs, emissions from energy industries are projected to decline and that is expected to more than off-set projected continuous growth in emissions from transport. This will lead to a further decrease in the share of emissions from energy industries, on account of the share of transport. The total emissions for 2035 compared to 1990 levels are projected to be 45,731 kt CO₂ eq, corresponding to a decrease of around 33.5 per cent over the same period.

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

Table 5
Summary of greenhouse gas emission projections for Denmark

	<i>Greenhouse gas emissions (kt CO₂eq per year)</i>	<i>Changes in relation to the base year level (%)^a</i>	<i>Changes in relation to the 1990 level (%)</i>
Kyoto Protocol base year ^b	69 978.07	NA	0.9
Kyoto Protocol target for the first commitment period (2008–2012)	55 367.79	–21.0	–20.2
Kyoto Protocol target for the second commitment period (2013–2020) ^c	Not available yet	NA	NA
Quantified economy-wide emission reduction target under the Convention ^d	Not available yet	NA	NA
Denmark's domestic emission reduction target (2020)	40 300	–40.0	–40.0
Inventory data 1990 ^e	69 379.48	–0.9	NA
Inventory data 2011 ^e	57 011.07	–18.5	–17.8
Average annual emissions for 2008–2011 ^e	61 225.29	–12.5	–11.8
'With measures' projections for 2020 ^f	44 898.00	–35.8	–35.3
'With measures' projections for 2030 ^f	44 822.00	–35.9	–35.4

Abbreviation: NA = not applicable.

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

^b The Kyoto Protocol base year level of emissions is provided in the initial review report contained in document FCCC/IRR/2007/DNK.

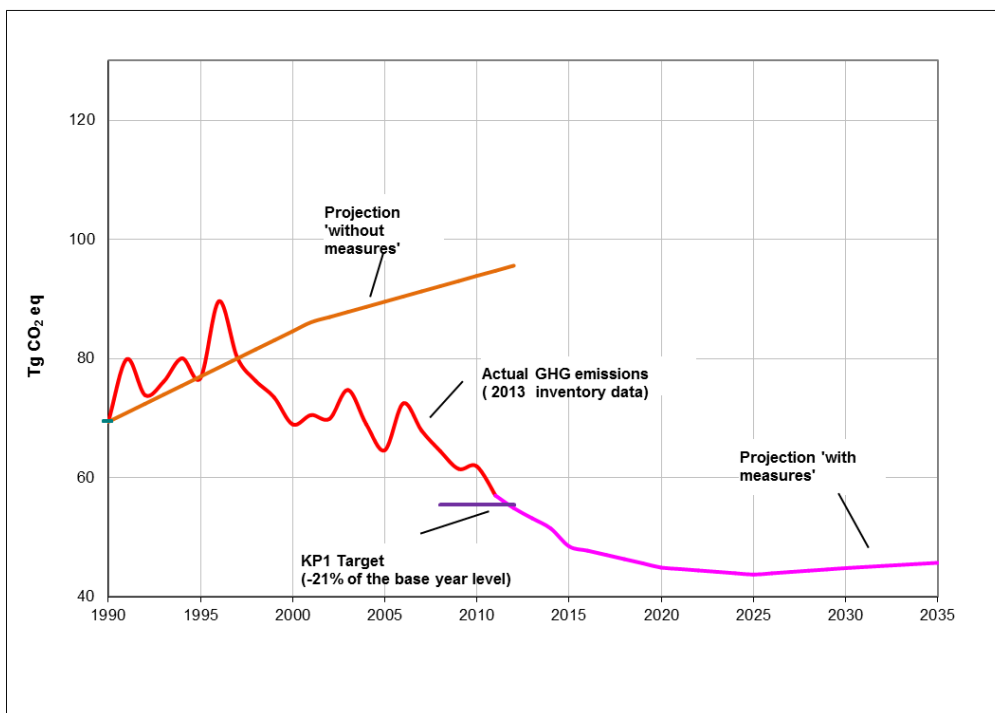
^c The Kyoto Protocol target for the second commitment period (2013–2020) is a joint target for the European Union and its 28 member States and Iceland. The target is to reduce emissions by 20 per cent by 2020 compared with the base year (1990) level. The target for sectors not covered by the European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

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

^e Denmark's 2013 greenhouse gas inventory submission; the emissions are without land use, land-use change and forestry (LULUCF).

^f Denmark's sixth national communication and/or first biennial report.

Greenhouse gas emission projections



Sources: (1) Data for the years 1990–2011: Denmark’s 2013 greenhouse gas inventory submission; the emissions are without land use, land-use change and forestry; (2) Data for the years 2011–2035: Denmark’s sixth national communication and/or first biennial report; the emissions are without land use, land-use change and forestry.

Abbreviations: GHG = greenhouse gas; KP1 = Kyoto Protocol first commitment period; Tg CO₂ eq = teragrams of carbon dioxide equivalent.

3. Total effect of policies and measures

98. In the NC6, Denmark presents the estimated and expected total effect of implemented and adopted PaMs and an estimate of the total effect of its PaMs, in accordance with the ‘with measures’ definition, compared with a situation without such PaMs for the period from 2008–2012. The information is presented in terms of actual GHG emission reductions (on a CO₂ eq basis) in 2001 and as an average for the period 2008–2012.

99. In annex B to its NC6, Denmark reported the estimated and expected total effect of implemented PaMs for the period 2008–2012, as contained in its 2005 Effort Analysis. This study provides an assessment of the effect on GHG emissions of the most important environment and energy 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.

100. Denmark reported that, according to its 2005 Effort Analysis study, the total estimated effect of adopted and implemented PaMs during the period 2008–2012 is approximately 15,600 kt CO₂ eq per year. According to the information reported in the NC6, PaMs implemented in the energy sector will deliver the largest emission reductions, followed by the effect of PaMs implemented in the agriculture and transport sectors. The most effective PaMs and drivers behind GHG emission reductions are described in chapter

II.B above. Table 6 provides an overview of the total effect of PaMs as reported by Denmark.

101. The ERT considered the reported information on the results of the effort analysis useful in understanding the scale of, and relative contribution of the different sectors to, the emission reduction by means of PaMs implemented between 1990 and 2001. However, the ERT noted that the information provided does not cover the effect of PaMs implemented after 2001 and that the reported information has not been updated with an ex-post assessment of actual data after 2005. Moreover, the ERT noted that Denmark does not report the total effect of its PaMs compared with a situation without such measures for 1995, 2000, 2005, 2010, 2015, 2020 and beyond.

102. The ERT therefore recommends that Denmark improve the transparency of its reporting by presenting the estimated and expected total effect of currently implemented and adopted PaMs in accordance with the ‘with measures’ definition, compared to a situation without such PaMs.

103. The ERT also recommends that Denmark provide an estimate of the total effect of its implemented and adopted PaMs for historic years, and further encourages Denmark to report the total effect of its PaMs compared with a situation without such measures also for 2015, 2020 and beyond, in the projections sections of its next NC.

Table 6

Projected effects of implemented and adopted policies and measures for the period 2008–2012

<i>Sector</i>	<i>Effect of implemented and adopted measures (kt CO₂eq)</i>	<i>Relative value (% of 1990 emissions)</i>
Energy (without transport)	11 000	20.6
Transport	1 700	15.5
Industrial processes	400	17.9
Agriculture	1 900	15.1
Land-use change and forestry	NA	NA
Waste management	500	28.9
Total	15 500	22.1

Source: Denmark’s sixth national communication and first biennial report.

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

Abbreviations: NA = not applicable.

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

104. Denmark in its NC6 provided information on how its use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action. Denmark explained that in defining supplementarity it took into account 50 per cent of the difference between the projected emissions and the Kyoto Protocol target (average annual emissions for the period 2008–2012), as required by the European Commission.

105. Denmark reported that its target under the first commitment period of the Kyoto Protocol will be met through a combination of domestic efforts, the accounting of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol and the use of flexibility mechanisms. The ERT noted that Denmark plans to use the market-based mechanisms to meet its Kyoto Protocol target.

106. The ERT noted that the total effect of implemented and adopted PaMs for the period 2008–2012 is estimated to be 15,600 kt CO₂ eq on average per year and units from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol are estimated to be 1,800 kt CO₂ eq on average per year for the same period. The estimated gap between the projected emissions and the Kyoto Protocol target of approximately 2,200 kt CO₂ eq on average per year for the period 2008–2012 is planned to be covered by Kyoto Protocol units from the State portfolio, including the national JI and CDM programme.

107. Therefore, the ERT noted that the use of market-based mechanisms under the Kyoto Protocol is supplemental to the domestic actions of Denmark in meeting its Kyoto Protocol target.

108. In its NC6, Denmark reports that the use of Kyoto Protocol mechanisms have been important elements in supplementing domestic reduction measures towards fulfilling the emission reduction target under the Kyoto Protocol for the period 2008–2012. Although, the purchasing of CO₂ credits is primarily a task for private businesses under the regulations of the EU allowance directive, the Danish Government has contributed to the launch of the carbon market mostly through participation in emission reductions projects. Credits acquisition has also contributed to fulfilment of Denmark's commitment under the Kyoto Protocol. In this context, approximately DKK 1.4 billion has been committed for the development of JI and CDM projects, and the purchase of relevant credits.

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

1. Finance, including 'new and additional' resources and resources under Article 11 of the Kyoto Protocol

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

110. In its NC6, Denmark provided details on measures taken to give effect to its commitments under Article 4, paragraphs 3–5, of the Convention as required by the UNFCCC reporting guidelines on NCs and under Article 11 of the Kyoto Protocol, as required by the "Guidelines for the preparation of information required under Article 7 of the Kyoto Protocol". Denmark has indicated what 'new and additional' financial resources it has provided pursuant to Article 4, paragraph 3, of the Convention and clarified how it has determined such resources as being 'new and additional'.

111. The NC6 has distinguished between activities undertaken by the public and private sectors when reporting details of measures that are more specifically related to the promotion, facilitation and financing of the transfer of, or access to, environmentally sound technologies. The ERT noted inconsistencies between the total figures in table 7.1 of the NC and the summation of disaggregated values in corresponding tables 7.2(a) to 7.2(d).

112. The ERT encourages Denmark to ensure consistencies of related values across tables in the next NC to further improve transparency.

113. During the review, Denmark provided additional information, elaborating on the development of official development assistance (ODA) policies and plans, including the efforts to address the issue of 'new and additional resources' as required by the UNFCCC reporting guidelines on NCs. In 2011, development policy priorities guiding Denmark's development cooperation efforts followed the Freedom from Poverty – Freedom to Change component of the 2010 Strategy for Denmark's Development Cooperation.

114. A new strategy for development cooperation was adopted in 2012 as reflected in the Right to Better Life strategy that outlines the vision of the current government. Four strategic priority areas were identified: human rights and democracy; green growth; social progress; and stability and protection. In the context of this strategy the ERT noted the difficulties Denmark had with separating the technology transfer and capacity-building elements within the development projects that Denmark supports, as both elements are integral parts of the projects.

115. In its NC6, Denmark reported that it made use of the Rio markers, which were established by the Development Assistance Committee (DAC) of the Organisation for Economic Co-operation and Development in close collaboration with the secretariat to track the assistance provided to support the implementation of the Convention. Using the Rio markers, all Denmark-funded aid activities were screened and marketed as either targeting the Convention as a 'principal objective', a 'significant objective' or as not targeting it at all.

116. Denmark also provided additional information related to measures and mechanisms to track the financial and technological support to developing countries, such as: inter-agency consultation to assess the progress made towards and needs of assistance; maintaining a monitoring and evaluation system for the support provided; and engaging in intergovernmental dialogue among donor countries and recipient countries to effectively allocate and utilize the financial resources. The ERT encourages Denmark to provide such information in a transparent manner in its next NC.

117. In the previous review report of NC5, the ERT recommended Denmark to improve the definition of 'new and additional' financial resources. Pursuant to this recommendation, in its NC6, Denmark has indicated that, in the absence of an internationally agreed definition, the 'new and additional' financial resources refer to the Danish development assistance related to the UNFCCC which is not diverted away from other priorities, such as poverty alleviation and education, and is contained in the Danish ODA that goes beyond the United Nations target of 0.7 per cent of gross national income (GNI). The ERT noted this information.

118. The NC6 provided information about financial support and its distribution through multilateral, bilateral and private sector channels. In 2011, Denmark provided development assistance amounting to approximately DKK 15.7 billion, corresponding to 0.85 per cent of GNI; in 2012 Denmark provided 0.84 per cent of its GNI in ODA. In the NC6, Denmark also stated that it would continue to provide development assistance at a high level, amounting to at least 0.8 per cent of GNI in the years to come.

119. Under the 'green economy' heading, Denmark is working to contribute towards sustainable global development closely linked to the protection of the environment, the climate and nature as well as economic growth, poverty reduction and social development. Denmark has identified the following priority areas of development assistance that also make contributions to climate change issues:

- (a) Supporting developing countries in fighting poverty and creating sustainable development through green growth, increased earnings and more jobs, especially for the youth;
- (b) Supporting green growth based on sustainable management and use of natural resources;
- (c) Contributing to strengthening international and national framework conditions for green growth and enhancing coherence with environmental protection;
- (d) Promoting innovative technological and financial solutions in the areas of agriculture, forestry, environment, energy, water and climate;

(e) Promoting resource-efficient food production capable of feeding a growing population sustainably and effectively;

(f) Contributing to increasing developing countries' access to sustainable energy and increasing efforts made towards achieving a more sustainable and resource-efficient management and use of energy and water;

(g) Promoting the participation of economically disadvantaged people and improving access to water, land, knowledge and finance.

120. As indicated in the NC6, support in combating climate change is expected to remain a significant and integral part of Danish development cooperation through multilateral and bilateral cooperation. Such cooperation contributed to green growth and job creation, and promotes the introduction of climate-adapted agricultural methods, especially in the poorest and most vulnerable countries. Denmark also highlights the need for increasing international climate finance to be directed towards the mitigation of GHG emissions in the fastest-growing economies among developing countries.

121. Denmark has provided information on its financial contributions related to the implementation of the Convention provided through bilateral, regional and multilateral channels. The Danish bilateral and regional financial contributions during 2009–2012 with a principal objective related to the Convention are summarized and presented by country/region and sector. For instance, in 2012, Denmark provided bilateral and regional financial contributions with a principal objective of the implementation of the Convention of approximately DKK 887 million for mitigation and adaptation activities. Mitigation support was provided to the energy and forestry sectors, as well as for capacity-building. For adaptation, support was provided for: coastal zone management; land-use planning; rural development; water management, supply and sanitation; capacity-building; and other forms of adaptation. Support in 2012 was provided to Bhutan, Bangladesh, Chile, Ethiopia, Indonesia, Kenya, Somalia, South Africa, Uganda and Viet Nam, as well as at an interregional level.

122. In its NC6, Denmark has included information on financial resources contributed to various projects that support the development and transfer of climate-friendly technologies and capacity-building focusing on countries in Africa with a great development need such as Somalia, Sudan and Zimbabwe.

123. Denmark has also provided information in its NC6 on the assistance it has made available to developing country Parties that are particularly vulnerable to the adverse effects of climate change to help them to meet the costs of adaptation. The NC6 also indicates that there is no internationally agreed definition of 'particularly vulnerable'; Denmark has therefore treated all developing countries receiving UNFCCC-related support from Denmark as being particularly vulnerable.

124. Denmark provided information on its contributions related to the implementation of the Convention provided through multilateral channels, including the Global Environmental Facility (GEF), the World Bank, the United Nations Development Programme (UNDP), the African Development Bank and the United Nations Environment Programme (UNEP). For instance, in 2012, Denmark provided support to GEF and multilateral financial institutes amounting to DKK 100 million and 1,527 million respectively.

125. Also Denmark has provided information on its financial contribution to the Adaptation Fund, established in accordance with decision 10/CP.7. With regard to the most recent financial contributions, the fast-start finance launched at COP 15 in Copenhagen, to enhance the implementation of the Convention by developing countries, Denmark has allocated DKK 1.2 billion (DKK 300 million in 2010, 400 million in 2011 and 500 million in 2012). In 2013, Denmark allocated additional DKK 500 million with the aim of assisting

developing countries with the transition to low carbon economies and to enter into a new global climate agreement. Table 7 summarizes information on financial resources.

126. In the context of climate finance, Denmark continues to support the integration of climate adaptation measures into national development strategies. It also works to strengthen the capacity of economically disadvantaged and vulnerable groups to adapt, handle risk, and withstand the impact of climate-related natural disaster. Denmark is also increasing its efforts to enhance developing countries' access to climate-friendly energy technologies, including building up local knowledge and capacity, providing access to clean water and protecting water sources, providing a sustainable energy supply, and sustainable energy management and production with a view to preventing soil exhaustion and desertification

Table 7

Summary of information on financial resources for 2009–2012

(Danish krone million)

<i>Allocation channel of public financial support</i>	<i>Years of disbursement</i>			
	<i>2009</i>	<i>2010</i>	<i>2011</i>	<i>2012</i>
Total bilateral development assistance	10 379	9 421	11 100	10 833
Contributions through multilateral channels and programmes relevant for the implementation of the Convention, including:	1 288	1 585	1 532	1 527
Contributions to the Global Environment Facility	62	100	100	100
Contributions through international environmental organizations and other NGOs relevant to the implementation of the Convention	52	53	48	62
Contributions through bilateral and regional channels cooperation with the principal objective related to the Convention	273	465	584	887
Fast start finance		300	400	500

Abbreviation: NGOs = non-governmental organizations.

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

127. Denmark has provided in its NC6 information on activities related to the transfer of technology and highlighted activities by the public and private sectors. A detailed review of reported information is provided in chapter II.D.3 of the report of the technical review of the first biennial report.

128. In its reporting on activities related to technology transfer, Denmark outlined concrete examples of its activities for financing access by developing countries to 'hard' or 'soft' environmentally sound technologies and relevant success stories. Furthermore, Denmark has reported in textual format information on the steps taken by governments to promote, facilitate and finance the transfer of technology, and to support the development and enhancement of endogenous capacities and technologies of developing countries.

129. The ERT reiterates the encouragement made in the previous review report to Denmark to further improve the quality of its reporting by providing information on failure stories in promotion, facilitation and financing transfer of and access to climate-friendly technology for Parties not included in Annex I to the Convention (non-Annex I Parties).

130. Among Denmark's most important activities in the area of technology transfer is the support Denmark provides to the energy sectors in a number of developing countries, such

as support for energy planning, the establishment of wind farms, the promotion of energy efficiency and the sustainable use of biomass. Capacity-building components are an integral part of these projects.

131. The NC6 provides three selected projects/programmes that promote practical steps to facilitate/and or finance the transfer of, or the provision of access to, environmentally sound technologies in Burkina Faso, Indonesia and Nepal. In Burkina Faso, the Sector Programme for Energy (2000–2010) was implemented. In Indonesia, support has been provided to the environmental programme (2005–2017) covering forestry, energy and climate. In Nepal, support is provided to the programme for sustainable energy in rural areas for the period 1999–2017. The two-phase sustainable energy utilization programme is expected to reach 1.4 million people in rural Nepal.

132. Denmark also indicated during the review that its Investment Fund for Developing Countries has co-invested with Danish companies in 812 projects in 88 developing countries. The investment generally produced positive results for all parties involved. Such investments have helped to create about 350,000 jobs, in addition to the transfer of knowledge and technology. The bilateral development cooperation also includes technical assistance for capacity-building. Denmark provided multilateral support programmes through the UNEP Risoe Centre on Energy, Climate and Sustainable Development on promoting the transfer of technology, especially through the Climate Technology Centre and Network, in 2013.

133. In the NC6, Denmark also reported cooperation with and support for the private sector as one of its strategic objectives for climate change cooperation, implemented through various instruments, such as Danida Business Finance, Danida Business Partnership and the Investment Fund for Developing Countries, to provide assistance in technology development and transfer to developing countries. Through these project activities, transfer of both ‘hard’ and ‘soft’ technologies went hand-in-hand, and differentiating between ‘soft’ and ‘hard’ technologies in the NC6 reporting on related activities has been challenging. The Investment Fund for Developing Countries has realized 812 investments in 88 different developing countries through concrete project activities. To enhance the transparency of its reporting, the ERT encourages Denmark to further elaborate on its activities for financing access by developing countries to ‘hard’ or ‘soft’ technologies and explore approaches for distinguishing between ‘hard’ and ‘soft’ technologies.

134. In its NC6, Denmark has provided information on fulfilment of its commitments under Article 10 of the Kyoto Protocol. The steps taken by Denmark to promote, facilitate and finance the transfer of technology to developing countries and to build their capacity include financial and technical support through bilateral and multilateral processes. Information on support to the private sector, using the commercial instrument, has also been provided.

E. Vulnerability assessment, climate change impacts and adaptation measures

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

136. The ERT noted during the review that the quantity and quality of information regarding the vulnerability assessments, climate change impacts and adaptation measures provided in the NC6 differ between Denmark, Greenland and the Faroe Islands. The ERT encourages Denmark to further improve upon the transparency of the information by providing a similar level of detail in reporting on the vulnerability assessments, climate

change impacts and adaptation measures for all three parts of the Kingdom of Denmark in its next NC, in particular since Greenland and the Faroe Islands are highly vulnerable to climate change.

137. The NC6 focuses on both vulnerability and adaptation. The impacts of possible changes in climate for Denmark have been evaluated since 1988; the most recent evaluation is presented in the 2012 report by the Task Force on Climate Change Adaptation entitled ‘Mapping Climate Change – Barriers and Opportunities for Action’. The results from this most recent evaluation are broadly consistent with the earlier analyses, but they provide a greater level of detail. This applies to the main conclusion from the previous analysis that possible changes in climate are estimated to have both positive and negative impacts in Denmark, depending on the area (see table 8).

138. Overall, vulnerability to climate change has been assessed as low for Denmark as the possible impacts from climate change are not regarded as extreme and the capacity to act as well as the preparedness of the country is high in terms of legislation, technology and security.

139. The increased attention of policymakers to adaptation is demonstrated in the action plan for a climate-proof Denmark (referred to as Action Plan for Adaptation in table 8), which deals with the framework, knowledge base and green transition as well as on responsibilities and collaboration regarding climate change adaptation. In addition, a handbook for municipalities on climate change adaptation in coastal areas has been prepared that contains a guide on how to prepare adaptation plans and a screening tool for coastal erosion. Recent changes in legislation make it possible for municipalities and wastewater companies to act according to relevant needs with respect to the climate.

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

<i>Vulnerable area</i>	<i>Examples/comments/adaptation measures reported</i>
Agriculture and food security	<p><i>Vulnerability:</i> impacts on agriculture and food security may be positive (increase in growing season, strengthening of certain species) and rising temperature can enable alternative farming methods and farming of other species. Negative impacts include more nutrient run-off due to increased fertilization, flooding of certain areas, or, increased need for irrigation, as well as plant and animal diseases. Strong winds and precipitation may impact marine aquaculture and periodically obstruct shellfish harvests in coastal areas due to the consequences of untreated wastewater discharges for food safety</p> <p><i>Adaptation:</i> information on abatement of, for example, nutrient run-off are included in the Action Plan on Adaptation and in the guidelines to municipalities</p>
Biodiversity and natural ecosystems	<p><i>Vulnerability:</i> increased temperatures may enhance biomass production through increased carbon dioxide and substance conversion in the aquatic environment, increased biological activity/conversion and invasion of non-native species due to a warmer climate. A drop in the salt concentration of seawater may lead to changes in the geographical and temporal distribution of fisheries resources and a drop in pH as a result of increasing carbon concentration can affect the production of fish and shellfish due to reduced calcium formation</p> <p><i>Adaptation:</i> possible adaptation measures in general reported in the Action Plan on Adaptation and guidelines to municipalities</p>
Coastal zones	<p><i>Vulnerability:</i> increased precipitation and run-off can lead to a drop in the salt concentration of the Danish Belts and the Baltic Sea and an increase in the flooding of low-lying land areas and their habitats. Rising sea level and powerful storms could cause coastal erosion and recession and reduce or affect coastal habitats</p> <p><i>Adaptation:</i> possible adaptation measures in general reported in the Action Plan on Adaptation and guidelines to municipalities</p>

<i>Vulnerable area</i>	<i>Examples/comments/adaptation measures reported</i>
Fisheries	<p><i>Vulnerability:</i> temperature increase may impact fish stocks depending on the temperature preference of the species, oxygen depletion and increase nutrient run-off</p> <p><i>Adaptation:</i> information on abatement on, for example, nutrient run-off is included in the Action Plan on Adaptation and guidelines to municipalities</p>
Forests	<p><i>Vulnerability:</i> positive impacts include a longer growing season and higher biomass production, and negative impacts such as increased storm intensity, drought stress, diseases, pests, forest fires and change in species composition</p> <p><i>Adaptation:</i> possible adaptation measures in general reported in the Action Plan on Adaptation and guidelines to municipalities</p>
Human health	<p><i>Vulnerability:</i> positive impacts include increased outdoor physical activity, increased creation of vitamin D from exposure to the sun, fewer cold-related diseases and injuries from ice and snow and less outdoor air pollution (due to decreased heating). Negative impacts include skin cancer, melanoma, heat stroke and dehydration during heat waves for sensitive groups, allergies due to pollen, infections due to temperature increase and pollen, increase of damp and mould induced symptoms and injuries due to extreme weather events</p> <p><i>Adaptation:</i> adaptation measures in general reported in the Action Plan on Adaptation and guidelines to municipalities. For this issue, awareness raising and education is taken as a measure</p>
Infrastructure and economy	<p><i>Vulnerability:</i> positive impacts include enhanced productivity in the industry, lower heating demand and reduced wear and tear of buildings due to milder winters. Negative impacts include extreme rainfall leading to more flooding (basements and sewerage). Milder winters with higher humidity may reduce the life span of building components, and increase exposure to dust mites and risk of mould. More powerful storms or changes in snowfall may cause damage to buildings. A gradually rising sea level or more frequent storm-surge events in combination with heavy precipitation may put low-lying and coastal urban areas at risk</p> <p><i>Adaptation:</i> Action Plan on Adaptation and guidelines to municipalities include information on for example spatial planning and issues to be taken into account in the construction and building sector</p>

140. In addition to the action plan, the Danish Task Force on Climate Change Adaptation has published a background report ‘Mapping Climate Change – Barriers and Opportunities for Action’, as well as guidelines for the municipalities on assessing the local risk and preparing action plan for flooding.

141. According to the NC6 Denmark integrates adaptation, risk management and withstanding the impact of climate-related natural disasters in Danish development cooperation with developing countries and non-Annex I Parties.

F. Research and systematic observation

142. Denmark has provided complete and transparent information on its actions relating to research and systematic observation, and addressed both domestic and international activities, including the World Meteorological Organization, the World Weather Watch Programme, the Global Climate Observing System (GCOS), the Intergovernmental Panel on Climate Change (IPCC), the Network for the Detection of Atmospheric Composition Change (NDACC), the Group on Earth Observations (GEO) and the EU. Denmark contributes to international activities, such as research and observation programmes for instance in the Nordic region, the European Union and the Republic of Korea, where Denmark supports several research collaboration projects.

143. Denmark has carried out systematic observations on climate parameters for over 125 years, and carries out stratospheric measurements and monitors sea level changes. In addition, Denmark runs several terrestrial monitoring programmes such as developments in snow cover, sea ice and surface radiation. Climate monitoring, modelling and research include monitoring the effect of climate change on nature and the environment in Denmark and Greenland.

144. Denmark participates in global observation networks, such as Global Atmosphere Watch, the Global Observing System, the Global Ocean Observing System, NDACC, GEO, the World Climate Research Programme, and Global Earth System modelling. Also, Denmark has provided a summary of information on GCOS activities.

145. The Danish Meteorological Institute, DCE, the Geological Survey of Denmark and Greenland, the Greenland Institute of Natural Resources and several national universities are involved in various national and international research activities related to all aspects of climate change. Denmark carries out research, for instance, in the following areas: the reduction of GHG emissions, development of energy production and consumption, and the economic consequences of different ways to mitigate GHG emissions. Energy efficiency and wind power are examples of areas specific to the Danish research. Denmark also has special research fields regarding historical climate change, paleo climate data and core ice in Greenland.

146. The ERT noted Denmark's ongoing activities to support development assistance for the establishment and maintenance of observation and monitoring systems as well as on meteorological networks and climatic forecasts in developing countries, such as projects in the Gambia, Ghana, Niger and Zambia.

G. Education, training and public awareness

147. In its NC6, Denmark has provided information on its actions relating to education, training and public awareness at both the domestic and international level. Compared to NC5, the Party provided additional information regarding new activities as well as information on activities in Greenland.

148. The NC6 provides comprehensive information on a number of education and training programmes organized by Danish universities and research institutes on the topic of climate. Some of the universities collaborate with UNEP and the EU in sharing information on clean, climate-friendly and energy-efficient technologies, and adaptation in developing countries. For instance, information was shared regarding: the establishment of meteorological stations networks in Ghana, forecasts to improve cultivation strategies in West Africa, and developing modelling systems and weather products in Zambia.

149. Denmark has a long tradition of involving the public in environmental issues and there is plenty of information on climate change and domestic policies on government, university and other institutions' websites. Information on climate change and sustainable development is provided at all levels of education starting from primary education. Climate change-related outreach is carried out in connection to national events, lectures and through the media. NGOs are fully involved in climate work from the beginning and also participate in providing material for the NCs. Stakeholders provide information through websites and information phone lines, in printed matter and through the media.

150. The ERT commends Denmark for its comprehensive reporting on education, training and public awareness.

III. Summary of reviewed supplementary information under the Kyoto Protocol

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

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

Table 9

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

<i>Supplementary information</i>	<i>Reference to the sixth national communication</i>
National registry	Chapter 3.4
National system	Chapter 3.3
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Chapter 5.3
Policies and measures in accordance with Article 2	Chapter 4.3
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	Chapter 4.2
Information under Article 10	Chapter 3.3 (Article 10, para. (a)) Chapters 4 and 6 (Article 10, para. (b)) Chapter 7 (Article 10, para. (c)) Chapter 8 (Article 10, para. (d)) Chapter 9 (Article 10, para. (e))
Financial resources	Chapter 7

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

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

153. Denmark reported the information requested in section H, “Minimization of adverse impacts in accordance with Article 3, paragraph 14”, of the annex to decision 15/CMP.1 as a part of its 2013 annual submission. During the review, Denmark provided the ERT with the additional information on how it strives to implement its commitments under Article 3, paragraph 1, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention. The ERT considers the reported information to be complete and mostly transparent.

154. According to the assessment by Denmark presented in its 2013 NIR and the NC6, Denmark does not consider that its contributions to international climate efforts have adverse effects in other countries. Rather on the contrary, the reduction of GHG emissions resulting from its efforts is considered to help limit dangerous climate change in all countries.

155. The NC6 also includes information on how Denmark gives priority to the actions taken in implementing its commitments under Article 3, paragraph 14, of the Kyoto Protocol. In particular it includes information on Denmark's initiatives aiming to minimize adverse impacts in developing country Parties, which are particularly vulnerable to climate change, by providing assistance on mitigation and adaptation, capacity-building, technology transfer, forest management and coastal erosion and flooding. According to the NC, Denmark strives to integrate activities to minimize adverse impacts on climate change, climate variability and related costs into its projects in development cooperation.

156. Regarding social, environmental and economic impacts, Denmark, as a member of the EU, provided additional information during the review on how EU policies consider and give priority in implementing its commitments under Article 3, paragraph 14, of the Kyoto Protocol referring, inter alia to the forthcoming European Commission communication on biomass sustainability, including an impact assessment of EU policies (directive 2009/28/EC) and EU policy to promote second generation biomass technologies.

157. In order to increase the transparency of its reporting on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol the ERT notes that Denmark could further enhance the information in the NIR on how it gives priority to the actions taken in implementing its commitments under Article 3, paragraph 14, of the Kyoto Protocol.

IV. Conclusions and recommendations

158. The ERT conducted a technical review of the information reported in the NC6 of Denmark according to the UNFCCC reporting guidelines on NCs. The ERT concludes that the NC6 is complete and provides a good overview of the national climate policy of Denmark. The information provided in the NC6 includes all elements of the supplementary information under Article 7 of the Kyoto Protocol. During the review, Denmark provided additional information on PaMs (see paras. 37, 43 and 74 above); projections and trends (see para. 84 above); financial, technological and capacity-building support (see paras. 113 and 116 above); and the steps in taken towards implementing Article 3, paragraph 14, of the Kyoto Protocol (see paras. 153 above).

159. Denmark's emissions for 2011 were estimated to be 17.6 per cent below its 1990 level excluding LULUCF and 27.1 per below including LULUCF. The overall decreasing trend in total GHG emissions is mainly driven by decreasing CO₂ emissions since 1997 due to significant changes in the use of fuels in power generation from coal to natural gas and renewable energies, as well as by the increasing use of CHP and improvements in energy efficiency.

160. In the NC6, Denmark presents GHG projections for the period from 2012 to 2035. Two scenarios are included: a baseline ('with measures') scenario and a 'without measures' scenario for the period from 1990 to 2012.

161. In line with its GHG trends and projected emissions for the period from 2008 to 2012, Denmark reports that its target under the first commitment period of the Kyoto Protocol will be met through a combination of domestic efforts, the use of flexibility mechanisms and the accounting of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. The projected gap between the projected emissions and the Kyoto Protocol target is estimated to be approximately 2,200 kt CO₂ eq on average per year for the period 2008–2012 and is planned to be covered by Kyoto Protocol units from the State portfolio, including the national JI and CDM programme.

162. The NC6 contains information on how Denmark's use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action. Denmark is planning to make use of the Kyoto Protocol mechanisms to meet its Kyoto Protocol target. The ERT noted that the use of market mechanisms under the Kyoto Protocol is supplemental to the domestic actions of Denmark in meeting its Kyoto Protocol target.

163. In its projections, Denmark estimates significant emission reductions (35.2 per cent in 2020 and 34.0 per cent in 2035 compared with 1990 levels). On the basis of these projections Denmark is expected to continue contributing within the EU towards achieving the joint EU targets under the Convention and under the second commitment period of the Kyoto Protocol.

164. Denmark set an ambitious domestic target for 2020 of reducing GHG emissions by 40 per cent compared with 1990 levels, in addition to its commitments under the Convention and the Kyoto Protocol. This domestic target is translated into emission levels in 2020 of approximately 42,200 kt CO₂ eq (including credits from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol). When comparing this with the projected emissions of 44,898 kt CO₂ eq for 2020 in the 'with measures' scenario, this results in a gap of around 2,700 kt CO₂ eq that needs to be covered by additional measures. A broad range of possible additional measures to close the expected emission gap in 2020 is provided in the 2013 'Catalogue of Danish Climate Change Mitigation Measures'.

165. Denmark has a long-standing track record of developing environmental and climate change-related policies. The 2011 Government Platform elevated climate change to a high priority and regards it as an incubator for innovating, creating jobs, increasing exports of green technologies, upgrading the skills of the workforce and covering the energy supply entirely by renewable energy by 2050 and thus achieving fossil fuel independence over the long term.

166. In Denmark, recent climate change policies were adopted on the basis of broad political agreement among parliamentary parties and after a consultation process with stakeholders, including the public. Denmark's climate change policy portfolio has evolved over the years, shifting from relying primarily on taxes to utilizing more flexible emissions trading approaches in accordance with the EU legislative requirements as well as enhancing support for research and development in new technologies. Central to the policy portfolio is the EU ETS that covers approximately half of Denmark's total GHG emissions and, as of 2008, became the most important measure in Denmark to fulfil its obligations under the Kyoto Protocol.

167. Regarding the provision of financial resources, in 2012 Denmark contributed DKK 1.53 billion through multilateral channels and DKK 795 million through bilateral channels to climate change-related financial support. Denmark is treating climate change-related financial support to developing countries as an integral element of Danish development cooperation, contributing to green growth, job creation and the introduction of climate-adapted agricultural methods in developing countries. Danish development assistance related to climate change is not diverted away from other priorities and is contained in the Danish ODA which goes beyond the United Nations' target of 0.7 per cent of GNI. In this context, Denmark reported that the country would continue to provide such assistance amounting at least to 0.8 per cent of GNI in the years to come.

168. In promoting, facilitating and financing the transfer of and access to climate-friendly technology for developing countries, Denmark is focusing mainly on the energy sectors in partner countries. Denmark is working to increase the access of developing countries to sustainable energy, the implementation of energy-efficient measures and the spread of climate-friendly energy technologies. One major strategic objective in this context is the cooperation with and support provided to the private sector, both in Denmark and in its

partner countries. The ERT notes that the reporting on technology transfer could further benefit from providing information on success but also on failure stories in promoting, facilitating and financing the transfer of and access to climate-friendly technologies for non-Annex I Parties.

169. Regarding vulnerability and adaptation, Denmark evaluated the impacts of possible changes in climate since 1988 and concluded that possible changes in climate are estimated to have both positive and negative impacts in Denmark depending on the specific area, but are not considered to be extreme.

170. Denmark has made substantial contributions to research and observation networks related to climate change, both at the national and the international level, moreover Denmark fully participates in GCOS activities.

171. Denmark has a long tradition for involving the public in environmental issues and climate change-related policy making. Hence, the public awareness in relation to climate change issues is generally high and the Government's environment-related policies are accepted by the general public. Information on climate change and sustainable development is provided at all levels of education in Denmark, ranging from primary education to universities.

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

173. In the course of the review, the ERT formulated several recommendations relating to the completeness and transparency of Denmark's reporting under the Convention and its Kyoto Protocol. The key recommendations¹⁰ are that Denmark:

(a) Improve the completeness of reporting by including in the next NC an estimate of the total effect of its implemented and adopted PaMs for historic years (see para. 103 above);

(b) Improve the transparency of reporting by including in the next the estimated and expected total effect of currently implemented and adopted PaMs in accordance with the 'with measures' definition, compared to a situation without such PaMs (see para. 102 above).

174. The ERT encourages Denmark to improve the transparency of its reporting; the most important of these is that Denmark provide additional data and update existing data on the quantitative estimate of the impacts of individual PaMs and collective PaMs (see para. 35 above).

V. Questions of implementation

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

¹⁰ The recommendations are given in full in the relevant sections of this report.

Annex

Documents and information used during the review

A. Reference documents

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

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

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

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

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

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

FCCC/SBI/2011/INF.1/Add.1. Compilation and synthesis of fifth national communications. Note by the secretariat. Addendum. Policies, measures, and past and projected future greenhouse gas emission trends of Parties included in Annex I to the Convention. Available at <<http://unfccc.int/resource/docs/2011/sbi/eng/inf01a01.pdf>>.

FCCC/SBI/2011/INF.1/Add.2. Compilation and synthesis of fifth national communications. Note by the secretariat. Addendum. 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/2011/sbi/eng/inf01a02.pdf>>.

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

FCCC/ARR/2012/DNK. Report of the individual review of the annual submission of Denmark submitted in 2012. Available at <<http://unfccc.int/resource/docs/2013/arr/dnk.pdf>>.

FCCC/ARR/2013/DNK. Report of the individual review of the annual submission of Denmark submitted in 2013. Available at <<http://unfccc.int/resource/docs/2013/arr/dnk.pdf>>.

FCCC/IDR.5/DNK. Report of the in-depth review of the fifth national communication of Denmark. Available at <<http://unfccc.int/resource/docs/2010/idr/dnk05.pdf>>.

Sixth national communication of Denmark. Available at
 <http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/nc6andbr1-dnk-2jan2013%5B1%5D.pdf>.

First biennial report of Denmark. Available at
 <http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/nc6andbr1-dnk-2jan2013%5B1%5D.pdf>.

2013 GHG inventory submission of Denmark. Available at
 <http://unfccc.int/documentation/documents/advanced_search/items/6911.php?priref=600006046#beg>.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Erik Rasmussen (Danish Energy Agency), including additional material on updated policies and measures, greenhouse gas projections, the national registry and recent climate policy developments in Denmark. The following documents¹ were also provided by Denmark:

Danish Energy Agency. 2010. *The Danish JI and CDM Program – Seven Years Experience with Climate Projects around the World*.

Inter-ministerial working group. August 2013. *Catalogue of Danish Climate Change Mitigation Measures: Reduction Potentials and Costs of Climate Change Mitigation Measures*.

Task Force on Climate Change Adaptation. May 2012. *Mapping Climate Change – Barriers and Opportunities for Action, Working Document*.

The Danish Government. August 2013. *The Danish Climate Policy Plan – Towards a Low Carbon Society*. 2012/2013/8. Copenhagen: The Ministry of Climate, Energy and Building. Available at <www.kebmin.dk>.

The Government. December 2012. *How to Manage Cloudburst and Rain Water – Action Plan for a Climate-proof Denmark*. Task Force for Climate Change Adaptation, Danish Nature Agency. Available at <www.nst.dk> and <www.klimatilpasning.dk>.

The Ministry of Climate, Energy and Building. *All about China – Information about the Joint Sino–Danish Cooperation on Renewable Energy*.

Tvaerministeriel arbejdsgruppe. August 2013. *Virkemiddelkatalog, potentialer og omkostninger for klimatiltag*. Copenhagen: The Ministry of Climate, Energy and Building. Available at <www.kebmin.dk> (in Danish).

¹ Reproduced as received from the Party.