



**Report of the in-depth review of the fifth national communication  
of Norway**

**Note by the secretariat**

The report of the in-depth review of the fifth national communication of Norway was published on 10 May 2011. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decision 4/CMP.4), the report is considered received by the secretariat on the same date. This report, FCCC/IDR.5/NOR, 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.





**Framework Convention on  
Climate Change**

Distr.: General  
10 May 2011

English only

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

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## I. Introduction and summary

### A. Introduction

1. For Norway, the Convention entered into force on 21 March 1994 and the Kyoto Protocol on 16 February 2005. Under the Kyoto Protocol, Norway committed itself to limiting the growth in its greenhouse gas (GHG) emissions to 1 per cent in relation to the base year<sup>1</sup> level during the first commitment period from 2008 to 2012.

2. This report covers the in-country in-depth review (IDR) of the fifth national communication (NC5) of Norway, coordinated by the UNFCCC secretariat, in accordance with the guidelines for review under Article 8 of the Kyoto Protocol (decision 22/CMP.1). The review took place from 10 to 15 May 2010 in Oslo, Norway, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: Mr. Max Åhman (Sweden), Ms. Maria Gutierrez (Mexico), Ms. Ashley King (United States of America) and Ms. Sirintornthep Towprayoon (Thailand). Ms. King and Ms. Towprayoon were the lead reviewers. The review was coordinated by Mr. Harald Diaz-Bone, Ms. Barbara Muik and Ms. Xuehong Wang (UNFCCC secretariat).

3. During the IDR, the expert review team (ERT) examined each section of the NC5. The ERT also evaluated the supplementary information provided by Norway as a part of the NC5 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 Norway in its revised 2010 annual submission under Article 7, paragraph 1, of the Kyoto Protocol.

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

### B. Summary

5. The ERT noted that Norway's NC5 complies in general with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications" (hereinafter referred to as the UNFCCC reporting guidelines). As required by decision 15/CMP.1, supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol<sup>2</sup> is provided in the NC5. Norway considered some of the recommendations provided in the report on the in-depth review of the fourth national communication of Norway.<sup>3</sup>

6. The supplementary information on the minimization of adverse impacts referred to in paragraph 3 above was found to be complete and transparent. During the review, Norway provided further relevant information.

#### 1. Timeliness

7. The NC5 was submitted on 22 January 2010, three weeks after the deadline of 1 January 2010 mandated by decision 10/CP.13. In response to potential problems

<sup>1</sup> "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The base year emissions include emissions from sectors/source categories listed in Annex A to the Kyoto Protocol.

<sup>2</sup> Decision 15/CMP.1, annex, chapter II.

<sup>3</sup> FCCC/IDR.4/NOR. Available at <<http://unfccc.int/resource/docs/2006/idr/nor04.pdf>>.

identified by the ERT during the review with regard to completeness and transparency, on 25 June 2010, within six weeks after the in-country visit, the Party submitted a revised NC5, including a new subsection on technology transfer and a revised table on the estimated effects of selected implemented or adopted policies and measures (PaMs), as well as a revised national inventory report (NIR) as part of its 2010 annual submission, with a revised chapter on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The ERT recommends that Norway ensure the timely submission of its next national communication.

## **2. Completeness**

8. In reviewing the NC5 of Norway, the ERT found that the information that Norway provided in its NC5 was not complete, as information on transfer of technology, as required by the UNFCCC reporting guidelines, was not provided. The ERT identified this lack of completeness as a potential problem. In response to this identified problem, Norway provided a revised NC5 that covers all the sections required by the UNFCCC reporting guidelines and all supplementary information under Article 7, paragraph 2, of the Kyoto Protocol. During the review, Norway provided the ERT with further information, presentations and additional background material on a number of its climate change related activities that were only partially or not at all reflected in the NC5. The ERT commended Norway for its comprehensive approach to addressing the challenges of climate change and encourages the Party to provide a complete picture of its broad range of activities, including success stories and lessons learned, in its next national communication.

## **3. Transparency**

9. In reviewing the NC5 of Norway, the ERT found that the information that Norway provided in its NC5 was not fully transparent, as it remained unclear how Norway is striving, under Article 3, paragraph 14, of the Kyoto Protocol, to implement its commitments mentioned in 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 identified this lack of transparency as a potential problem. In response to this identified problem, Norway provided a revised NC5 and a revised NIR. The ERT acknowledged that Norway's revised NC5, including supplementary information provided under Article 7, paragraph 2, of the Kyoto Protocol, is comprehensive and transparent. The revised NC5 provides clear information on all aspects of implementation of the Convention and its Kyoto Protocol. It is structured following the outline contained in the annex to the UNFCCC reporting guidelines and supplementary information submitted under Article 7, paragraph 2, of the Kyoto Protocol is easily identifiable. In the course of the review, the ERT formulated a number of recommendations that could help Norway to further increase the transparency of its reporting (see the relevant sections in this report below). Furthermore, the ERT encourages Norway to consider the possibility of including, in its next national communication, information on its response to recommendations made in previous review reports and on major improvements made in comparison with previous national communications.

## **II. Technical assessment of the reviewed elements**

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

10. In its NC5, Norway has provided a concise description of its national circumstances and elaborated on the framework legislations and key policy documents on climate change. The NC5 also refers to the description of the Party's national system provided in the NIR of the 2010 annual submission. Further technical assessment of the institutional and legislative arrangements for coordination and implementation of PaMs is provided in section II.B.1 below.

#### **1. National circumstances**

11. In its NC5, Norway has provided a description of its national circumstances, and information on how these national circumstances affect GHG emissions and removals in Norway and how changes in national circumstances affect GHG emissions and removals over time. Information was provided on the government structure, population and urban profile, geographic profile and land use, economic profile and industry, and relevant economic sectors. Norway's energy and industrial profile is quite different from that of other developed countries: half of all energy used is from renewable energy sources (RES), and nearly all electricity is produced from hydropower, which generates virtually no GHG emissions. The ERT noted that the main drivers of emission trends in Norway include: economic growth (expressed in terms of gross domestic product (GDP)); developments in activity and technology in the domestic oil and gas sector; high and increasing per capita income and decentralized settlement patterns, both of which give rise to a relatively high demand for passenger transport; and increasing demand for raw materials and other goods exported from Norway, resulting in increased freight transport.

12. The ERT welcomed the coverage of all major sectors in more specific detail in the NC5 compared with the previous national communication. However, with regard to the transport sector, some information, such as freight transport by mode of transport, has not been provided. The ERT encourages Norway: to enhance further its reporting on the drivers behind its emission trends; to more clearly distinguish between its off- and onshore activities; to provide a more transparent description of its relationship with the European Union (EU), and a detailed description of its mitigation and adaptation activities in the Norwegian Arctic, which is key scientific information for the assessment of the impact of climate change. Table 1 illustrates the national circumstances of the country by providing some indicators relevant to GHG emissions and removals.

13. Norway is a constitutional monarchy with a democratic parliamentary system of governance. Since 1994, Norway has been part of the EU internal market through the Agreement on the European Economic Area. Through this agreement, Norway has, to a large degree, the same obligation to implement EU environmental legislation as the EU member States. The Storting (Norwegian Parliament) determines Norway's overall climate policy and the Government implements and administers the most important PaMs, such as economic instruments and direct regulations. The Ministry of the Environment (MoE) has responsibility for coordination and implementation of Norwegian climate policy across all sectors of the economy, while the other ministries are responsible for implementation in their respective sectors.

14. Effectiveness and cost-effectiveness are two key criteria in environmental policymaking, as in other policy areas. The polluter-pays principle is an important element

of Norway’s environmental policy. To attain its ambitious goals in relation to sustainable development, Norway has integrated sustainability into its most important political and economic steering document – the annual national budget. Further legislative arrangements and administrative procedures, including those for the national system and the national registry, are presented in sections II.A.2 and II.A.3 and II.B below.

Table 1  
**Indicators relevant to greenhouse gas emissions and removals for Norway**

	1990	2007	2008	Change 1990–2008 (%)	Average growth rate 1990–2008 (%)	Change 2007–2008 (%)
Population (million)	4.2	4.7	4.8	12.5	0.7	1.3
GDP (2000 USD billion using PPP)	112.8	190.3	193.7	71.8	3.1	1.8
TPES (Mtoe)	21.0	27.5	29.7	41.2	1.9	8.0
GDP per capita (2000 USD thousand using PPP)	26.6	40.4	40.6	52.7	2.4	0.5
TPES per capita (toe)	5.0	5.8	6.2	25.7	1.3	6.7
GHG emissions without LULUCF (Tg CO <sub>2</sub> eq)	49.8	55.1	53.7	8.0	0.4	-2.6
GHG emissions with LULUCF (Tg CO <sub>2</sub> eq)	-11.3	-27.7	-28.6	153.2	5.3	3.1
CO <sub>2</sub> emissions per capita (Mg)	8.2	9.6	9.3	12.8	0.7	-3.2
CO <sub>2</sub> emissions per GDP unit (kg per 2000 USD using PPP)	0.3	0.2	0.2	-25.8	-1.7	-4.2
GHG emissions per capita (Mg CO <sub>2</sub> eq)	11.7	11.7	11.3	-4.0	-0.2	-3.8
GHG emissions per GDP unit (kg CO <sub>2</sub> eq per 2000 USD using PPP)	0.4	0.3	0.3	-36.4	-2.6	-3.5

*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.

*Data sources:* (1) GHG emissions data: Norway’s 2010 greenhouse gas 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.

15. Norway has provided a summary of information on GHG emission trends for the period 1990–2007. This information is consistent with the 2009 national GHG inventory submission. Summary tables, including trend tables for emissions in carbon dioxide equivalent (CO<sub>2</sub> eq) (given in the common reporting format), are provided for the years 1990, 2000 and 2007 in an annex to the NC5. However, the ERT noted that Norway did not provide the GHG emission trend tables for the period 1990–2007 as required by the UNFCCC reporting guidelines. The ERT recommends that the Party follow the UNFCCC reporting guidelines more closely and include such tables in its next national communication. During the review, the ERT assessed Norway’s most recent 2010 GHG inventory submission and reflected its findings in this report and the following trend analysis.



16. Total GHG emissions excluding emissions and removals from land use, land-use change and forestry (LULUCF) increased by 8.0 per cent between the base year (1990) and 2008, whereas total GHG emissions including net emissions or removals from LULUCF decreased by 34.6 per cent. The increase in total GHG emissions excluding LULUCF was mainly attributed to carbon dioxide (CO<sub>2</sub>) emissions, which increased by 26.9 per cent over this period. This increase was partly offset by a decrease in emissions of methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) by 7.3 per cent and 20.2 per cent, respectively.

17. A major part of these increases in CO<sub>2</sub> and decreases in non-CO<sub>2</sub> emissions was experienced after the entry into force of the Convention in 1995 (trends for 1995–2008: CO<sub>2</sub> +16.8 per cent, CH<sub>4</sub> –11.3 per cent, N<sub>2</sub>O –14.2 per cent and total GHGs +8.1 per cent). Emissions of fluorinated gases (F-gases) accounted for about 11.2 per cent of total GHG emissions in 1990 and 2.7 per cent in 2008. Trends of total GHG emissions were mostly underpinned by GHG emission trends in the energy and LULUCF sectors, driven by increases in emissions from the oil and gas, and transport sectors, and an increase in removals from forest land. An analysis of the drivers of GHG emission trends in each sector is provided in section II.B below. Table 2 provides an overview of GHG emissions by sector from the base year to 2008.

Table 2  
Greenhouse gas emissions by sector in Norway, 1990–2008

Sector	GHG emissions (Tg CO <sub>2</sub> eq)						Change (%)	Shares <sup>a</sup> by sector (%)		
	1990	1995	2000	2005	2007	2008		1990–2008	2007–2008	1990
1. Energy	29.56	32.28	35.58	37.72	40.24	39.03	32.0	–3.0	59.4	72.7
A1. Energy industries	6.74	8.55	10.21	12.59	12.91	13.09	94.4	1.4	13.5	24.4
A2. Manufacturing industries and construction	3.67	3.97	3.93	3.59	3.58	3.61	–1.8	0.9	7.4	6.7
A3. Transport	11.31	12.35	13.34	14.36	15.78	15.30	35.2	–3.0	22.7	28.5
A4.–A5. Other	4.80	4.14	3.65	3.82	3.50	3.25	–32.4	–7.3	9.7	6.0
B. Fugitive emissions	3.04	3.25	4.46	3.36	4.47	3.78	24.4	–15.4	6.1	7.0
2. Industrial processes	13.68	10.94	11.55	10.05	9.16	8.92	–34.8	–2.6	27.5	16.6
3. Solvent and other product use	0.19	0.19	0.18	0.19	0.19	0.19	–0.8	–1.1	0.4	0.4
4. Agriculture	4.49	4.56	4.49	4.34	4.29	4.36	–3.0	1.6	9.0	8.1
5. LULUCF	–11.28	–10.66	–12.55	–26.05	–27.70	–28.56	–153.1	–3.1	–22.7	–53.2
6. Waste	1.82	1.73	1.49	1.27	1.26	1.22	–33.2	–3.9	3.7	2.3
7. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<b>GHG total with LULUCF</b>	<b>38.46</b>	<b>39.04</b>	<b>40.75</b>	<b>27.51</b>	<b>27.45</b>	<b>25.15</b>	<b>–34.6</b>	<b>–8.4</b>	<b>77.3</b>	<b>46.8</b>
<b>GHG total without LULUCF</b>	<b>49.75</b>	<b>49.70</b>	<b>53.30</b>	<b>53.56</b>	<b>55.14</b>	<b>53.71</b>	<b>8.0</b>	<b>–2.6</b>	<b>100.0</b>	<b>100.0</b>

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

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

<sup>a</sup> 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.

18. The NC5 provides an ex-post analysis of the effect of PaMs on historic emission trends in Norway (see chapter 5.3 of the NC5). The ERT noted that, during the period 2003–2007, reductions in emissions of non-CO<sub>2</sub> gases were achieved mainly through improvements in technology and the application of economic instruments, while CO<sub>2</sub> emissions increased as a result of greater activity in the oil and gas industry and road transportation. The most recent decline in GHG emissions from almost all sectors during the period 2007–2008 might be attributed, to some extent, to the effects of the global financial and economic crisis. The ERT encourages Norway to further develop its ex-post analysis of the historic emission trends in order to improve its understanding of the mitigation effects of implemented domestic PaMs and policy instruments.

19. The ERT acknowledged a significant reduction in emissions of fluorinated gases (F-gases) (perfluorocarbons (PFCs) and sulphur hexafluoride (SF<sub>6</sub>)), resulting from improvements in technology and fiscal incentives, and encourages Norway to continue to investigate options for the substitution of F-gases (including hydrofluorocarbons (HFCs)) in the near future.

20. The ERT noted that the NC5 provided only limited information on emission trends from international aviation and marine bunker fuels and on emissions and removals from LULUCF in chapters 3 and 5, respectively. The ERT recommends that Norway improve the transparency and completeness of its reporting by providing more detailed information on these sectors in its next national communication.

## **2. National system**

21. In accordance with decision 15/CMP.1, Norway has provided in its NC5 a description of how its national system is performing the general and specific functions defined in the guidelines for national systems under Article 5, paragraph 1 (decision 19/CMP.1). The Party also provided a reference to the 2009 annual submission, which contains a more detailed description of the national system. The description includes all the elements as required by decision 15/CMP.1.

22. Norway provided a description of national legislative arrangements and administrative procedures that seek to ensure that the implementation of activities under Article 3, paragraph 3, and 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. Norway intends to give priority to climate-motivated measures that have positive or acceptable effects on the conservation of biodiversity and other important environmental assets. These and other priorities will be included in a sustainable forest management strategy, aimed at maintaining or increasing forest carbon stocks in the long term, while producing an annual sustained yield of timber, fibre or energy from the forest.

23. During the review, Norway provided additional information on the national system, elaborating on the capacity of the national system, institutional and legislative arrangements and administrative procedures for GHG inventory planning, preparation and management, and quality control/quality assurance (QA/QC).

24. The ERT reiterates the conclusion of the report of the individual review of the 2009 annual submission of Norway<sup>4</sup> that the national system continues to perform its required functions as set out in decision 19/CMP.1.

## **3. National registry**

25. In its NC5, Norway has provided information on the national registry, including a description of how its national registry performs the functions defined in the annex to

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<sup>4</sup> FCCC/ARR/2009/NOR.

decision 13/CMP.1 and the annex to decision 5/CMP.1, and how it complies with the requirements of the technical standards for data exchange between registry systems.

26. During the review, Norway provided additional information on the measures put in place to safeguard, maintain and recover registry data, the security measures employed in the registry to prevent unauthorized manipulations, the measures put in place to protect the registry against security compromises, the test procedures related to performance of the current version of the national registry, and on the recording of the changes in and discrepancies of the national registry. In response to questions raised by the ERT, Norway provided documents demonstrating how it records the changes related to the national registry and how it maintains these records. The ERT noted that updates of databases and applications, implemented security measures and changes to the national registry software are documented on a regular basis by nominated responsible staff. The ERT was informed about changes in the national registry in 2009, including the deployment of two Greta software versions (versions 4.0 and 4.1) and an improved list of publicly available information on the registry's website.

27. The ERT took note of the conclusion of the standard independent assessment report that Norway continues to maintain sufficient capacity to ensure the accurate accounting of Kyoto units and that it continues to conform to the technical standards for data exchange between registry systems.

28. The ERT concluded that Norway's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1.

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

29. As required by the UNFCCC reporting guidelines, Norway has provided in its NC5 comprehensive information on its package of PaMs implemented, adopted and planned in order to fulfil its commitments under the Convention and its Kyoto Protocol. Each sector has its own textual description of the principal PaMs, supplemented in some cases by summary tables on PaMs by sector. Norway has also provided information on how it believes selected PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals, consistent with the objective of the Convention. The NC5 contains, with some exceptions, a similar set of PaMs to those in the NC4.

30. The ERT noted that, overall, Norway has a comprehensive set of PaMs designed to mitigate GHG emissions. The NC5 provides an ex-post assessment of the mitigation effects for a subset of domestic PaMs (chapter 5.3 of the NC5); however, the ERT noted that the transparency of the reporting on PaMs and their estimated effects could be improved, for example by following more closely the structure, terms and definition set out in the UNFCCC reporting guidelines. The ERT further encourages Norway to provide more detailed information on the cost-effectiveness of its PaMs, given that this is one of the two main criteria for the development of environmental policy in Norway. Table 3 provides a summary of the reported information on the PaMs of Norway.

Table 3  
**Summary of information on policies and measures**

<i>Major policies and measures</i>	<i>Examples/comments</i>
<i>Framework policies and cross-sectoral measures</i>	
White Paper No. 34, 2007	Outlines Norway's overall climate policy targets
Carbon tax schemes	Internalizes the full environmental costs of economic activities
European Union emissions trading scheme (EU ETS)	Allocation of 15.2 million allowances during the 2008–2012 trading period, which is approximately 20 per cent lower than the projected level of emissions for installations covered by the scheme
<i>Policies and measures by sector</i>	
<i>Energy</i>	
EU ETS	The offshore petroleum sector and several industries are regulated as part of the EU ETS; the offshore sector must purchase all of its allowances
Taxes	A carbon tax has been applied to the offshore petroleum sector since 1991. Since the implementation of the EU ETS in 2008, tax rates on the petroleum sector have been reduced in order to account for the European Union allowance (EUA) price and maintain a constant overall financial burden on the sector
Carbon capture and storage (CCS)	Two CCS systems are operational at natural gas processing plants (Sleipner and SnØhvit); Norway requires new power plants to be equipped with CCS systems
New renewable energy sources and energy efficiency	National targets to promote the development of new renewable energy sources and energy efficiency
<i>Transport</i>	
Fuel taxes	Carbon and other taxes on petrol, diesel and other fuels
Registration tax	In 2007, Norway revised the vehicle registration tax on new vehicles, changing to a system including carbon intensity (0.4 Mt)
Transnova	Subsidies for the deployment of low-carbon technologies in the transport sector, including infrastructure for electric cars
Land use/parking policies	Sophisticated system of road pricing, parking policies and other measures to reduce road transport
Biofuels mandate	Mandate of 2.5 per cent by volume of biofuels for road transport in 2009 was achieved and raised to 3.5 per cent in 2010 (0.3 Mt)
International shipping	Support for an international emissions trading system for international shipping in the context of the International Maritime Organization (IMO); voluntary agreement on energy-efficiency design schemes and practices
<i>Industrial processes</i>	
EU ETS	Process emissions of carbon dioxide from several industries, including offshore oil and natural gas production, petrochemicals, fertilizer production, oil refineries, steel, cement, and pulp and paper, are covered

<i>Major policies and measures</i>	<i>Examples/comments</i>
	by the EU ETS; nitrous oxide from nitric acid production is also covered
Voluntary agreements	In 2009, a voluntary agreement was negotiated for industries that are not covered under the second phase of the EU ETS; the agreement sets a cap on emissions of 6.2 Mt/year from 2008 to 2012, over which level facilities must buy allowances
Tax/refund schemes on fluorinated gases	Fiscal incentives for limiting the use and promoting the recycling of fluorinated gases
<i>Agriculture</i>	
Bioenergy from manure	Goal of diverting 30 per cent of manure into biogas production by 2020
Information on enhanced agricultural practices	Promotes enhanced practices of soil cultivation and management of crop residues, manure and fertilizers
<i>Forestry</i>	
Use of bioenergy	Goal of obtaining 14 TWh from new bioenergy sources by 2020
Forest management	Increase of carbon sequestration in soils
<i>Waste</i>	
Pollution Control Act	Collection of methane from landfills (0.4 Mt)
Ban on organic waste	In 2009, all organic material was banned from landfills
Tax	Until 2009 – tax on final disposal of waste, either in landfills or by incineration. From 2010, the incineration tax was abolished

*Note:* The greenhouse gas reduction estimates, given for some measures (in parentheses), are reductions in CO<sub>2</sub> or CO<sub>2</sub> eq for the year 2020.

31. The ERT noted that Norway did not provide summary tables on PaMs by sector, as required by the UNFCCC reporting guidelines; and while the NC5 does provide estimates of the effects of selected PaMs in chapter 5 (on projections and the total effect of PaMs), the transparency of the reporting on how these estimates were calculated could be improved. In addition, only a few of the recommendations made in the previous review report were taken into consideration to improve reporting in the NC5. The ERT recommends that Norway provide, for all sectors, summary tables that include estimates of the effects of the domestic PaMs, as well as information on costs where available, in order to improve the transparency of the reporting in its next national communication.

## 1. Policy framework and cross-sectoral measures

32. The Ministry of the Environment has cross-sectoral responsibility for the coordination and implementation of Norwegian climate policy. The Ministry of Finance is responsible for the collection of direct and indirect taxes. The other ministries are responsible for implementation in their respective sectors. Also, municipalities and local governments are responsible for the implementation of PaMs and climate action plans at the local level.

33. Norway's climate policy is founded on the objective of the United Nations Framework Convention on Climate Change and the Kyoto Protocol and the scientific understanding of the greenhouse effect set out in the reports from the Intergovernmental Panel on Climate Change (IPCC). Climate change and GHG emissions have been a concern

of Norwegian policy since the late 1980s. Previously relying to a large extent on voluntary agreements and actions, most sources of GHG emissions are nowadays addressed through economic and fiscal instruments (taxes, emissions trading) that put a price on emissions. The ERT noted that the combination of the comprehensive coverage of sectors and the considerable level of taxation in Norway is unique in the world. Norway has advocated cost-effectiveness across emission sources, sinks, sectors and GHGs both domestically and internationally. The high political attention given to climate change together with the comprehensive policymaking process put in place in Norway gives the Party a leading role in combating climate change.

34. **Policy targets.** Norway has an ambitious set of emission reduction targets, based on the goals of the Convention and its Kyoto Protocol. During the first commitment period of the Kyoto Protocol, Norway is committed to limiting the increase in its annual average emission level to no more than 1 per cent above the 1990 level, including credits for the Kyoto Protocol mechanisms. In addition, a 2007 White Paper to the Storting (No. 34) announced Norway's intention to surpass its Kyoto commitment by 10 percentage points, equivalent to 9 per cent below the 1990 level. This document also outlines Norway's commitments to reducing global emissions to 30 per cent below the 1990 level by 2020, with approximately two thirds of that reduction (15–17 Mt CO<sub>2</sub> eq, including CO<sub>2</sub> uptake by forests, from LULUCF, estimated at 3 Mt CO<sub>2</sub> eq) coming from domestic reductions, and to achieving carbon neutrality by 2030 as part of a global and ambitious agreement whereby large industrial countries have pledged commitments. The ERT commends Norway for these strong and necessary targets.

35. **The Klimakur process.** In order to assess whether additional PaMs would be necessary to achieve its medium- and long-term targets, in 2008 Norway began the Klimakur process. In February 2010, a report was issued that assessed the mitigation effects and related costs of various bundles of sector-specific PaMs by 2020. This report was open for public comment until the end of May 2010. MoE is leading an inter-ministerial process with the relevant ministries to translate the Klimakur analysis into a set of recommendations on implementation. These recommendations will be presented as a white paper to the Storting in autumn 2011.

36. **Carbon taxes.** Beginning in 1991, Norway implemented a comprehensive system of carbon taxes on fuels and industrial processes. In combination with other environmental taxes (e.g. on sulphur content), these taxes represent the main policy instrument used to control the growth in the Party's GHG emissions and currently cover sectors accounting for approximately 59 per cent of Norway's total emissions. The ERT noted that Norway responded to the recommendation made in the previous review report and provided information in chapter 5 of its NC5 on the estimated effect of these tax schemes. The mitigation effect of taxes on the on- and offshore economic sectors in 2000 is estimated at nearly 3 Mt CO<sub>2</sub> eq and this is expected to grow to nearly 8 Mt CO<sub>2</sub> eq in 2020. Given the unique nature of this policy approach in terms of coverage and level of taxes, the ERT encourages Norway to continue making every effort to estimate and communicate the mitigation effect of its tax system.

37. **The EU emissions trading scheme (EU ETS).** Norway participates in the EU ETS, but, as a non-EU member State, negotiates modifications separately with the European Commission on the requirements in each trading period. Norway is also in the process of negotiating the implementation of several other relevant EU directives relevant to climate change, such as the directive on the reduction of F-gases, and its participation in the 2013–2020 trading period. In the 2008–2012 trading period, Norway's national allocation plan is for 15.2 million allowances, which is approximately 20 per cent lower than the projected level of emissions for the covered sectors. Unlike in some other countries in the EU, Norwegian installations in the offshore oil and gas sector must purchase all of their

allowances. In this trading period, the EU ETS covers approximately 40 per cent of Norway's emissions, including N<sub>2</sub>O from nitric acid production. Norway is currently negotiating with the European Commission its participation in the third trading period.

38. **Carbon capture and storage.** There are currently two CCS projects, associated with process emissions from natural gas extraction, in operation in Norway, which, combined, avoid 1.7 Mt CO<sub>2</sub> eq annually. The Mongstad gas-fired power plant in Norway has a CCS system under development. The Norwegian Government has announced that the decision to invest in the commercial-scale portion of the Mongstad project will be delayed. It has been decided that the investment decision will be taken no later than in 2016. The NC5 also reports that the Karsto project is on hold indefinitely. During the review, the ERT was informed that, in order to keep the emissions from the power sector minimal, all new gas-fired power plants are required to be built with CCS systems. However, given the uncertainty surrounding the current projects, the ERT noted a potential risk that Norway's level of emissions in the power sector in 2020 could be higher than projected in the NC5. The ERT also noted that the aforementioned delay may also have significant implications for other countries' plans to use CCS in the near future.

## 2. Policies and measures in the energy sector

39. The energy sector is the largest source of GHG emissions in Norway, representing almost 73 per cent of the Party's total emissions in 2008. Between 1990 and 2008, GHG emissions from energy industries increased by 32 per cent, mainly driven by a 94 per cent increase in emissions from energy supply and a 35 per cent increase in emissions from the transport sector. Emissions associated with the residential sector decreased by 32 per cent over this period.

40. **Energy supply.** In Norway, 99 per cent of electricity is generated by hydropower; therefore, the substantial growth in GHG emissions from energy industries is largely due to the increase in emissions associated with the extraction of oil and natural gas. Norway's oil and natural gas industry accounts for 24 per cent of GDP and 31 per cent of its total GHG emissions. The emissions intensity in this sector was broadly stable throughout the 1990s, but has been increasing steadily since 2000 owing primarily to increased production and the increasing maturity of the fields. The Party informed the ERT that power generation in Norway will continue to be based largely on hydropower in the foreseeable future.<sup>5</sup>

41. Until 2007, a carbon tax was applied to the offshore petroleum sector at a rate of 340 Norwegian kroner (NOK)/t CO<sub>2</sub>. Since the sector's incorporation into the EU ETS in 2008, this tax level was adjusted downwards to account for the expected price of allowances. The overall financial burden on the sector has remained roughly at the 2007 level, with some fluctuations since then owing to fluctuations in the EU ETS prices. The overall tax rate on the sector is 78 per cent. Norway credits the CO<sub>2</sub> tax schemes as the impetus for the development of the two operational CCS systems at the Sleipner and Snøhvit fields. In addition, Norway has supplementary measures in place, such as a requirement to re-inject associated CH<sub>4</sub> back into oil fields and a permit system for flaring. Norway estimates the total mitigation effect in 2020 of these sectoral PaMs at 7.0 Mt CO<sub>2</sub> eq.

42. Fugitive emissions from oil and natural gas extraction are also significant, accounting for 3.7 Mt CO<sub>2</sub> eq (from fuel combustion and fugitive emissions) or 7 per cent of Norway's total GHG emissions in 2008. CO<sub>2</sub> emissions are included under the EU ETS

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<sup>5</sup> The export of electricity from hydropower to neighbouring countries is seen as a business opportunity for Norwegian producers, and will be supported by new infrastructure (e.g. electricity cables through the North Sea).

and the carbon tax schemes, while methane and non-methane volatile organic compounds are covered by direct regulations.

43. The ERT noted that the offshore petroleum sector is regulated differently from the rest of the Norwegian economy, and encourages Norway, in its next national communication, to improve the transparency of the reporting on how various PaMs apply to off- and onshore facilities. The ERT further encourages Norway to provide, in its next national communication, better context for emission trends and more transparent reporting on PaMs for this sector.

44. **Renewable energy sources (RES) and energy efficiency.** Norway has an integrated strategy for increased production of renewable energy and energy efficiency. Enova SF is the state enterprise charged with implementing Norway's RES development and energy-efficiency programmes. Enova SF's main tasks are to contribute to environmentally sound and rational use and production of energy, relying on financial instruments and incentives to stimulate market actors and mechanisms to achieve national energy policy goals. Norway had set a goal of developing 3 TWh/year new wind power and 4 TWh/year renewable heat production by 2010. During the review, the ERT was informed that the wind power related goal had been abandoned after the development of about half of the desired capacity, owing to high opportunity costs in comparison with other RES and energy-efficiency investments. The goal for renewable heat production has been met. During 2008, Enova completed contracts for projects which could yield 11.6 TWh of renewable energy; however, the amount of RES power that has come online is unknown. District heating is covered by the EU ETS.

45. **Transport sector.** Domestic transport accounted for 28 per cent of Norway's GHG emissions in 2008. This represents a 35 per cent increase from 1990 to 2008, attributed mainly to the decentralized pattern of settlement, increasing economic growth and associated increase in living standards. The modal split for passenger travel stayed relatively constant between 1990 and 2005; however, freight transport on roads increased by 5 per cent.

46. The primary mechanism for mitigating emissions in this sector is a combination of different tax schemes, including taxes on fuel and CO<sub>2</sub>, which together account for approximately 50 per cent of the retail fuel price. While the structure of the fuel taxation scheme has not changed significantly since the preparation of the Party's NC4, in 2007 Norway did restructure the tax on the purchase and registration of new vehicles to also include GHG emissions as one of the three main criteria of the tax. As a result, the carbon intensity of new vehicles dropped by 12 per cent between 2006 and 2009, and it is estimated that the new measure will deliver approximately 0.4 Mt CO<sub>2</sub> eq in emission reductions in 2020.

47. Founded in 2009, Transnova is the state entity that delivers subsidies to encourage the diffusion of low-carbon transport technologies in Norway, such as electric and hydrogen-powered cars. Transnova's 2010 budget is an estimated NOK 52 million. Norway also appears to have an innovative system of road pricing and parking policies in place, but little information on this was reported in the NC5. The ERT encourages Norway to include an overview of these policies in its next national communication.

48. Norway had a mandate for the road transport fuel market of 2.5 per cent by volume of biofuels in 2009, which was met and raised to 3.5 per cent in 2010. Since policy targets for biofuels state that the fuels should be sustainable, Norway is planning to develop a certification system for biofuels, taking into account the results of international efforts. Norway has also phased out half of the fuel tax exemption for biodiesel in 2010.

49. Norway has a comprehensive strategy for addressing emissions associated with international shipping and aviation. The Party is aggressively supporting international



emission trading schemes through the International Maritime Organization (IMO) and the European Civil Aviation Conference to mitigate emissions from the shipping and aviation sectors, respectively. In addition, Norway has worked through IMO to facilitate the development of energy-efficiency design schemes and operational indicators for the shipping industry, and is working with its fleet to increase the voluntary usage of these tools. The ERT commends Norway for its efforts in these sectors.

50. The ERT noted that domestic PaMs have helped to restrain to some extent the growth in emissions in the energy and transport sectors; however, the ERT could not assess whether the PaMs currently in place are sufficient to curb enough future growth in emissions in order to meet Norway's ambitious reduction targets (see para. 34 above). The ERT noted that the assumed flattening of energy demand in these two sectors as presented in the NC5 section on projections does not correspond with the scale of new PaMs expected to be implemented before 2020. Given the importance of the energy and transport sectors to Norway's overall level of GHG emissions, the ERT encourages Norway to improve the transparency of its reporting on these sectors and include better estimates of the effects of specific PaMs.

### 3. Policies and measures in other sectors

51. Between 1990 and 2008, GHG emissions from industrial processes (including solvent and other product use), agriculture and waste decreased by 27 per cent, mainly driven by significant decreases in emissions from industrial processes (–34 per cent) and the waste sector (–33 per cent). The level of emissions from the agriculture sector was relatively constant between 1990 and 2008.

52. **Industrial processes.** Emissions from industrial processes amounted to 13.9 Mt CO<sub>2</sub> eq in 2008, which represents 17 per cent of Norway's total GHG emissions. Between 1990 and 2008, these emissions declined by almost 35 per cent. The main drivers for this trend were decreases in emissions in the aluminium sector, owing to a combination of sectoral restructuring, technological improvements and voluntary agreements, and decreases in emissions from the magnesium industry, as a result of the closure of cast magnesium plants in Norway.

53. The PaMs in Norway focusing on reducing emissions from industry are a combination of taxes, the EU ETS and voluntary agreements, and they vary greatly by industry and over time. For example, in the fertilizer production industry, N<sub>2</sub>O from nitric acid production has been opted into the EU ETS, but CO<sub>2</sub> from ammonia production is covered by a voluntary agreement. All industries pay fuel taxes on mineral oil and other fuels. In the second trading period, the EU ETS covers CO<sub>2</sub> emissions from petrochemicals, fertilizer production, oil refineries, steel, cement, and pulp and paper, among others, as well as N<sub>2</sub>O from nitric acid production. In total, about 13 per cent of Norway's total GHG emissions consist of land-based industrial emissions (both combustion- and process-related) that are covered by the EU ETS.

54. In its NC4, Norway reported on two voluntary agreements, one with the aluminium industry and another that covered several processing industries, which are no longer in force. The emissions covered by these agreements are now covered either by the EU ETS or by a new voluntary agreement that was negotiated in 2009 with industries outside the EU ETS. These industries include aluminium, magnesium, ferrous metals, carbonide, nickel and ammonia production. The agreement sets a cap of 6.2 Mt CO<sub>2</sub> eq/year from 2008 to 2012 on the overall level of emissions, and companies have agreed to buy allowances if emission levels exceed the cap. These sectors are expected to be incorporated into the third phase of the EU ETS during the period 2013–2020.

55. In order to combat the increase in emissions of HFCs (owing to their use as replacements for ozone-depleting substances) and PFCs, in 2003 Norway implemented a tax on these chemicals, which is currently set at NOK 205/t CO<sub>2</sub> eq. Refrigeration and air conditioning are the largest sources of HFCs in Norway, accounting for 0.62 Mt CO<sub>2</sub> eq in 2008. Since the implementation of this tax, the growth rate of HFC emissions has changed from exponential to linear, and associated PFC emissions have fallen to negligible levels. The tax on HFCs is expected to deliver reductions of 0.5 Mt CO<sub>2</sub> eq in 2020.

56. The ERT noted that the transparency of the reported impact of PaMs on emissions from industry could be improved. Some estimated mitigation effects were reported in chapter 5 of the NC5; however, little explanation was provided as to how these effects were related to industrial restructuring or changes in production. In addition, given the variability and complexity of the PaMs addressing emissions from industry, the ERT encourages Norway to improve the transparency of its reporting on how the various policy instruments overlap in the most important or dynamic industrial sectors.

57. **Agriculture.** Between 1990 and 2008, the level of emissions from the agriculture sector stayed mostly flat at 4.4 Mt CO<sub>2</sub> eq, and these emissions accounted for approximately 8 per cent of Norway's total GHG emissions in 2008. Few new PaMs have been implemented in the sector since the preparation of the Party's NC4. As part of the Klimakur process, the Norwegian Government has identified potential ways of reducing emissions, including through the generation of biogas from approximately 30 per cent of the nationally produced manure. Given the small size of Norwegian herds and the cold climate, the ERT noted that the PaMs currently in place in the sector may not be sufficient to reach this goal. As was the case with the NC4, the NC5 did not contain any information on the estimated mitigation effects associated with the PaMs in this sector.

58. **Forestry.** Net CO<sub>2</sub> removals by forests currently amount to approximately 25–31 Mt CO<sub>2</sub> eq/year, approximately half of Norway's total GHG emissions. The emissions trend appears to have had two distinct phases: a relatively constant level of removals during the period 1990–2000, followed by an almost doubling of the net removals during the period 2000–2008. During the review, host-country representatives explained to the ERT that this trend was due primarily to interpolation and a change in the sampling methodology. In general, the growth in net removals appears to be the result of tree-planting policies during the post-war era. However, specific details on these policies and the status of their implementation were not provided in the NC5. Norway has a goal of increasing the use of bioenergy up to 14 TWh by 2020. Given the large size of the Party's forest sink in comparison with its total GHG emissions, the ERT recommends that Norway provide more details on the most important PaMs in this sector in its next national communication.

59. **Waste management.** In 2008, emissions from waste management in Norway amounted to 1.2 Mt CO<sub>2</sub> eq, which represented around 2 per cent of its total GHG emissions and a decrease of 33 per cent since 1990. Final disposal of waste has been subject to taxation since 1999, but, in 2009, Norway banned the disposal of any biodegradable waste in landfills. As a result, the Government has proposed lowering the landfill tax to reflect the lower environmental cost of landfilled waste. In 2010, the incineration tax for waste was abolished. Overall, PaMs in the waste sector are expected to deliver reductions of 0.9 Mt CO<sub>2</sub> eq in 2020.

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

60. In its NC5, Norway has not 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, effects on international trade, and social, environmental and economic impacts, on other Parties, especially developing country

Parties. However, during the review, the Party provided the ERT with information on how Norway 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 the developing country Parties, as reported in the revised 2010 annual submission (see section II.I below). Norway emphasizes the need to devise cost-effective policies, and thus minimize such effects. The final effects are, however, assessed to be highly uncertain. Norway further draws on its cooperation activities in the field of carbon capture and sequestration. Furthermore, the Norwegian Oil for Development (OfD) initiative aims at assisting developing countries, upon their request, in their efforts to manage petroleum resources in a way that generates economic growth and promotes the welfare of the whole population in an environmentally sustainable way.

61. The ERT recommends that the Party follow the “Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol” (hereinafter referred to as the Article 7 guidelines), as contained in the annex to decision 15/CMP.1, more closely and provide information on the minimization of adverse effects in its next national communication.

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

### 1. Projections overview, methodology and key assumptions

62. The GHG emission projections provided by Norway in the NC5 include a ‘with measures’ scenario until 2010 and 2020, presented relative to actual inventory data for 1995. A projection ‘without measures’ was not provided, but the ERT noted that one could be partially constructed from the information given in the NC5 (in table 5.5 on effects of selected PAMs). 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 six GHGs: CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, PFCs, HFCs and SF<sub>6</sub> (treating PFCs and HFCs collectively in each case). Projections are also provided in an aggregated format for each sector as well as for a national total, using global warming potential values. Emission projections related to fuel sold to ships and aircraft engaged in international transport were reported separately and not included in the totals. During the review, the Party did not provide the ERT with an updated set of projections.

63. **Scenario definitions.** The ‘with measures’ scenario is called the ‘baseline scenario’ and was first presented in the White Paper on Long-term Perspectives for Norwegian Economy published in January 2009. It is based on a macroeconomic model which calculates annual GHG emissions. The projections are updated every second year, and presented either in the national budget or in the White Paper on Long-term Perspectives (which is issued every fourth year). The modelled scenario is based on current PaMs as adopted before autumn 2008.

64. **Methodology.** The GHG emission projections contained in the NC5 were based on various sources and methodologies. For energy-related emissions, the projections were based largely on macroeconomic simulations, using Statistics Norway’s Multi-Sector Growth model, supplemented by available supporting studies. The projections for CO<sub>2</sub> emissions from the petroleum sector were based on information collected by the Norwegian Petroleum Directorate. Projections of emissions of non-CO<sub>2</sub> gases were based mainly on sector- and plant-specific information collected by the Norwegian Pollution Control Authority from the industries concerned. The ERT noted that the methodology used was well described in annex C to the NC5.

65. **Key assumptions.** For the ‘with measures’ scenario, the key assumptions included GDP (separately for off- and onshore economic sectors) growth of 2.2 per cent in 2010 and of 2.1 per cent/year up to 2020. The ERT noted that the effect of the global financial and economic crisis in 2008–2009 was not included in the scenario. Petroleum-related activities were expected to reach a peak in 2010 and production was expected to decline thereafter by 0.9 per cent/year by 2020, while crude oil prices were expected to decline from NOK 617 in 2008 to an average of NOK 400 during 2010–2020, stabilizing thereafter. Domestic demand for electricity was expected to roughly stabilize during 2010–2020, while demand for petrol and autodiesel was expected to grow by 5 per cent. The ERT noted that these assumptions seemed plausible for the baseline scenario, and encourages Norway to better explain key assumptions and how these were developed and incorporated into the macroeconomic model calculating the scenario, in its next national communication.

66. **Sensitivity analysis.** A sensitivity analysis was performed, including many of the key factors (e.g. oil prices) that can be expected to influence the results of the projections. The ERT noted with appreciation that this analysis had been improved since the preparation of the Party’s NC4. However, during the review, it became clear that the sensitivity analysis for oil price did not include offshore activities. The ERT noted that these activities may have a considerable influence, and encourages Norway to include both the on- and offshore economies in the sensitivity analysis in its next national communication.

## 2. Results of projections

67. In the ‘with measures’ scenario, total GHG emissions are projected to increase by 15 per cent from 1990 to 2010, and to decrease thereafter by 1 per cent from 2010 to 2020. Projected emissions in 2010 and 2020 amount to 57.3 and 56.5 CO<sub>2</sub> eq, respectively. Table 4 and the figure below provide a summary of the GHG emission projections for Norway.

Table 4

### Summary of greenhouse gas emission projections for Norway

	<i>Greenhouse gas emissions (Tg CO<sub>2</sub> eq per year)</i>	<i>Changes in relation to base year level (%)</i>
Inventory data 1990 <sup>a</sup>	49.7	NA
Inventory data 2007	55.1	+10.9
Kyoto Protocol base year <sup>b</sup>	50.1	0.0
Kyoto Protocol target <sup>b</sup>	50.6	+1.0
Norway’s domestic target	45.1	–9.0
‘With measures’ projections for 2010 <sup>c</sup>	57.3	+14.3

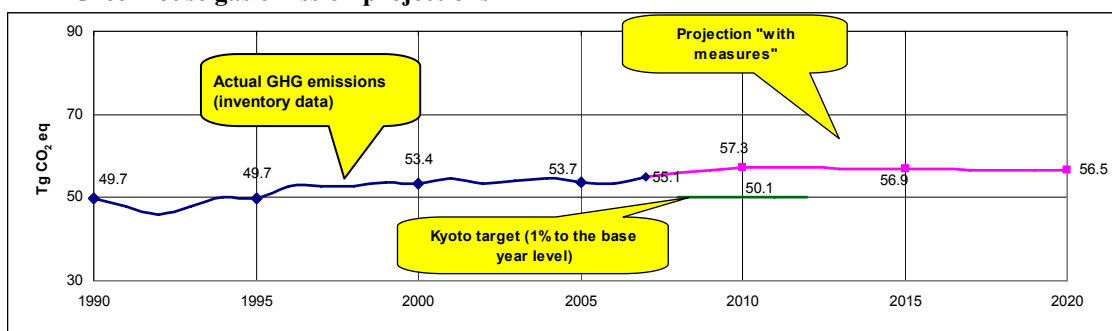
*Abbreviation:* NA = not applicable.

<sup>a</sup> *Data source:* Norway’s 2010 greenhouse gas (GHG) inventory submission; the emissions are without land use, land-use change and forestry (LULUCF).

<sup>b</sup> Based on the initial review report contained in document FCCC/IRR/2007/NOR.

<sup>c</sup> *Data source:* Norway’s fifth national communication; the projections are for GHG emissions without LULUCF.

### Greenhouse gas emission projections



*Data sources:* (1) Data for the years 1990–2007: Norway’s 2009 greenhouse gas inventory submission; the emissions are without land use, land-use change and forestry (LULUCF). (2) Data for the years 2009–2020: Norway’s fifth national communication; the emissions are without LULUCF.

68. Removals from forest land in 2007 have been estimated at 28.1 Mt CO<sub>2</sub>. By 2020, these removals are expected to decrease to 22.5 Mt CO<sub>2</sub>/year, owing to the age structure of the Norwegian forest. Emissions of CH<sub>4</sub>, N<sub>2</sub>O and F-gases are projected to decline by 4.3, 17.0 and 75.0 per cent, respectively, during the period 1990–2010.

69. **Norway’s target under the Kyoto Protocol.** The NC5 projections indicate that Norway does not expect to meet its Kyoto Protocol target (which is to limit the growth in its GHG emissions to 1 per cent in relation to the 1990 level during the Kyoto Protocol first commitment period from 2008 to 2012) through domestic action only. According to the NC5, it will be necessary for the Party to realize another 7.2 Mt CO<sub>2</sub> eq annually through additional domestic PaMs and/or net acquisitions of Kyoto Protocol units without the use of 1.5 Mt CO<sub>2</sub> eq of credits from LULUCF, as planned by Norway. The ERT calculated the gap between the target level (of 50.6 Mt CO<sub>2</sub> eq) and the projected level (of 57.3 Mt CO<sub>2</sub> eq) as 6.7 Mt CO<sub>2</sub> eq. During the review, the ERT was informed that the level of emissions in 2008 was substantially lower than expected in the projections and that Norway thus expects to need less Kyoto Protocol units for this purpose. The net acquisition of Kyoto Protocol units will also be crucial in achieving Norway’s target of reducing emissions by 10 percentage points below its Kyoto commitment (to 45.1 Mt CO<sub>2</sub> eq) as well as for meeting Norway’s commitment to reducing its emissions to 30 per cent below the 1990 level by 2020.

70. In order to improve transparency in relation to the total effect of its PaMs, the ERT encourages Norway to include in its next national communication a ‘without measures’ scenario and, if relevant, a ‘with additional measures’ scenario. The ERT also encourages Norway to include, in its next national communication, more detailed information on sector-specific models, such as the road model, and on technical assumptions made in important sectors (i.e. energy industries and transport) and how and to what extent these assumptions are used for calculating the projections. The ERT further encourages Norway to improve transparency as to whether the numbers given in the projections and tables include or exclude on- and offshore activities.

### 3. Total effect of policies and measures

71. In the NC5, Norway has presented an estimate of the total effect of implemented and adopted PaMs. Information is presented in terms of GHG emissions avoided or sequestered, by gas (on a CO<sub>2</sub> eq basis), in 1995, 2000, 2010 and 2020.

72. The ERT noted that the total effect of PaMs estimated in the NC5 was incomplete, as it only covered the estimated and expected aggregated effects of a selected number of

implemented and adopted PaMs. However, during the review, Norway provided the ERT with further information on the effects of the missing PaMs, which were either small or methodologically difficult to assess. The ERT acknowledged the assessment of a selected number of PaMs as a conservative assessment of the total effect of the Party’s PaMs. Norway stated that Statistics Norway had issued a paper with suggestions on how to develop a methodology which could allow for better assessment of the effects of adopted PaMs, and that this work will be followed up in the near future. Furthermore, the ERT noted, during the review, that the estimated aggregated effect of selected PaMs, as provided in the NC5, contained some minor miscalculations. In response to a question raised by the ERT, Norway provided a revised estimate of the total effect of its PaMs (see table 5).

Table 5  
**Projected effects of implemented and adopted policies and measures in 2005, 2010 and 2020**

	<i>Effect of implemented and adopted measures (Tg CO<sub>2</sub> eq)</i>	<i>Relative value (% of base year emissions)</i>
Implemented policies and measures in 2005	6.7–9.0	12–17
Implemented policies and measures in 2010	10.8–14.2	20–27
Implemented policies and measures in 2020	13.3–16.7	25–31

*Data source:* Norway’s fifth national communication (NC5), supplemented with revised numbers as provided by the Party during the review.

*Note:* The total effect of implemented and adopted policies and measures (PaMs) is defined, as in the NC5, as the effects of selected PaMs that were implemented or adopted by 2008.

73. Since 1990, Norway has implemented several PaMs and the greatest effect of these PaMs resulted from the CO<sub>2</sub> tax offshore (5.2 Mt CO<sub>2</sub> eq.). The agreements with the aluminium industry and chemical industry (on nitric acid production) resulted in estimated reduction effects of 1.5–4.2 Mt CO<sub>2</sub> eq and 1.2–1.6 Mt CO<sub>2</sub> eq, respectively. The sum of the individual effect of implemented PaMs in 2010 was calculated to be 10.8–14.2 Mt CO<sub>2</sub> eq or 20–27 per cent of the base year emissions. However, the total effect of implemented PaMs is likely to be higher, given that the mitigation effects of a number of the Party’s PaMs have not been estimated, notably with regard to the PaMs for increasing energy efficiency, and those for encouraging the use of new RES, as well as some policies in the transport and agriculture sectors. The ERT noted that, according to the description of the policymaking process in the NC5, cost-effectiveness is a crucial principle in Norway’s overall climate policy. Therefore, the ERT encourages the Party to increase its capacity to analyse the cost and mitigation effects of different PaMs, as cost-effectiveness is expected to become an even more important factor in the period after 2011.

74. The ERT recommends that Norway provide, in its next national communication, the estimated and expected total effect of the complete set of its implemented and adopted domestic PaMs. The ERT noted that corresponding comments regarding the provision of incomplete information on the total effect of the Party’s PaMs were made in the previous review report.

75. The ERT did not detect any obvious risks of Norway having double-counted the aggregated effect of the ‘selected policies’; however, this issue was not specifically addressed in the NC5. The ERT encourages Norway to address this issue in its next national communication, which will become more relevant when Norway includes an

assessment of the total effect of its PaMs. The risk of double-counting is also more apparent with greater integration in the EU ETS and when accounting for energy efficiency related PaMs, which, so far, have not been fully evaluated by Norway in its assessment.

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

76. Norway, in its NC5, has provided information on how its use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action. During the review, Norway pointed to the fact that it has reduced domestic emissions by approximately 10 Mt CO<sub>2</sub> eq/year and that it plans to use approximately 7 million Kyoto Protocol units annually to achieve its Kyoto Protocol target (see also paras. 69 and 73 above). During the review, the ERT was informed that the level of emissions in 2008 was substantially lower than expected in the projections and that Norway thus expects to need less Kyoto Protocol units for this purpose.

77. Norway adopted a domestic emissions reduction target of reducing emissions by 10 percentage points below its Kyoto commitment (see paras. 34 and 69 above), which it plans to meet by purchasing certified emission reductions (CERs) and emission reduction units, in addition to those units that will be purchased to meet its target under the Kyoto Protocol (see para. 69 above). In the NC5 and during the review, Norway presented projections and information on how it plans to purchase the necessary credits.

78. The ERT noted that Norway's surpassing of its emission limitation commitment under the Kyoto Protocol (see para. 34 above) could result in it holding a surplus of either assigned amount units or CERs. During the review, host-country representatives informed the ERT that Norway intends to cancel or retire the Norwegian surplus of Kyoto Protocol units that are above its domestic reduction target; however, no binding decisions have been taken yet. As the global effect of achieving this domestic emissions reduction target depends on whether these units will be cancelled, retired or carried over to the next commitment period, the ERT encourages Norway to clarify its plans to cancel, retire or carry over its surplus of Kyoto Protocol units resulting from the difference between its domestic target and its commitment under the Kyoto Protocol.

#### D. **Vulnerability assessment, climate change impacts and adaptation measures**

79. In its NC5, Norway has provided information on the expected impacts of climate change in the country and on adaptation options under consideration or implementation. Although the relevant chapter is overall rather general, the ERT welcomed the inclusion of more detailed information on the Norwegian Arctic. The ERT also acknowledged that Norway has just commenced a concerted effort to develop a national strategy for adaptation. Table 6 summarizes the information on vulnerability and adaptation to climate change presented in the NC5, which was expanded during the in-country review.

Table 6

##### **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><b>Vulnerability:</b> While an increase in the area and time available for biological production may have positive effects, changes in precipitation patterns are expected to increase the risks of run-off of nutrients and erosion. The incidence of new plant and animal diseases and new pests is also expected to augment.</p> <p><b>Adaptation:</b> Preparedness for new pests and animal diseases, and targeted research on adaptation are identified in Norway's fifth national communication (NC5) as priority areas (no concrete measures are reported).</p>

<i>Vulnerable area</i>	<i>Examples/comments/adaptation measures reported</i>
Biodiversity and natural ecosystems	<p><b>Vulnerability:</b> Ocean acidification is expected to reach levels not recorded in millions of years, with marked impacts on biodiversity (e.g. 70 per cent of deep ocean corals will be subject to slow dissolution by 2099).</p> <p><b>Adaptation:</b> Specific plans include the establishment of a multidisciplinary research centre on climate and the environment focused on the High North in Tromsø (no other concrete measures reported).</p>
Coastal zones	<p><b>Vulnerability:</b> It is estimated that, by 2100, the sea level will have increased by 70 cm in the south, 60 cm in the north and 40 cm in interior parts of the Oslo- and Trondheimsfjord (<math>\pm 20</math>–35 cm), affecting coastal zone activities and infrastructure.</p> <p><b>Adaptation:</b> The Norwegian Coastal Administration maintains a strong focus on impacts on piers, beacons, seamarks, etc., and stricter flood-safe height requirements on coastal constructions are under consideration. The Norwegian Public Roads Administration's Climate and Transport project is assessing the condition of a selected number of underwater tunnels and embankments exposed to wave erosion.</p>
Fisheries	<p><b>Vulnerability:</b> The habitats of fish species are expected to increase northwards and fishing operations may be extended to new areas. The risk of disease in farmed fish is expected to increase and more farmed fish may escape from nets as a result of extreme weather conditions, affecting the genetic interaction between farmed fish and wild stocks.</p> <p><b>Adaptation:</b> Fish farms may need to be relocated (no concrete measures are reported).</p>
Forests	<p><b>Vulnerability:</b> While rising CO<sub>2</sub> concentrations and a longer growing season are likely to increase forest productivity, changes in pathogens and insect or fungi attacks, along with increased stress owing to climatic extremes, may damage forests and result in reduced carbon stocks. The growth conditions of spruce, the most important timber species for the Norwegian forest industry, are already deteriorating and expected to worsen as a result of summer drought.</p> <p><b>Adaptation:</b> The Norwegian Forest and Landscape Institute is conducting more research on forests and the effect of drought stress (no concrete measures are reported).</p>
Human health	<p><b>Vulnerability:</b> Insect-borne diseases are expected to increase; the risk of infection from new species of bat, for example, is also likely to augment.</p> <p><b>Adaptation:</b> Extensive monitoring and vaccination programmes are mentioned in the NC5 as possible adaptation measures.</p>
Infrastructure and economy	<p><b>Vulnerability:</b> Higher levels of precipitation could increase hydropower production, while more frequent extreme weather events, including flooding and landslides, pose risks to electricity grids, power plants and dams, the transport system, and petroleum installations. These events also present challenges for the Civil Defence and rescue services.</p> <p><b>Adaptation:</b> The technical division of the Norwegian Public Roads Administration is conducting a four-year research and development project evaluating the effect of climate change on the road network. This includes conducting pilot projects on drainage, control of erosion of bridges and settling basins (no other concrete measures are reported).</p>
Water resources	<p><b>Vulnerability:</b> Extreme weather and changes in precipitation patterns will augment the strain on drainage systems and increase the risk of pollution and outbreaks of infectious diseases.</p> <p><b>Adaptation:</b> Work is under way in the Norwegian Water Resources and Energy Directorate to assess the impacts on the hydrology and physical conditions of watercourses.</p>

80. To address the impacts of climate change, in December 2008 the Norwegian Government appointed a Commission on Vulnerability and Adaptation, which is to prepare a comprehensive report on challenges and opportunities by November 2010. The Government has also set up the Norwegian Climate Adaptation Programme under MoE,



with a national secretariat under the Norwegian Directorate of Civil Protection and Emergency Planning in charge of practical coordination, and an online portal to promote the exchange of information and knowledge.<sup>6</sup> Notable concrete examples of action in the area of adaptation include the Cities for the Future initiative, a collaboration between the Government and the 13 largest cities in Norway, which addresses both adaptation and mitigation.<sup>7</sup>

81. Projections of climate change impacts in Norway indicate a warming trend in all areas of mainland Norway during all seasons. Precipitation is expected to increase by 18 per cent by 2100, with reductions in summer of up to 30 per cent and increases in autumn of up to 23 per cent. By the end of the century, the surface temperature of the sea may increase by 1.4 °C in the North Sea, and the sea level is expected to rise by up to 70 cm ( $\pm$  20–35 cm) in certain areas. While these changes may have some positive effects, such as longer growing seasons and milder winters, the rate of change and an expected increase in the incidence of extreme weather events will affect all sectors and aspects of the Norwegian economy, particularly fisheries, energy and infrastructure.

82. Land areas in the Arctic have experienced more warming in the last 20 to 30 years than any other region on Earth, and changes – for example in the rate of the thawing of permafrost and the loss of sea ice – are taking place faster than previously thought. As a follow-up to the Arctic Council's Arctic Climate Impact Assessment, Norway undertook the Norwegian Arctic Climate Impact Assessment (NorACIA) to consolidate and update knowledge on the Norwegian Arctic (i.e. northern Norway, Svalbard and the Barents Sea). Five scientific reports and one synthesis report detailing the results of the project were presented in May 2010.<sup>8</sup> Among other findings, the reports point to an expected rise in the average annual temperature of as much as 8 °C in the north-east of Svalbard compared with an increase of around 3 °C in mainland Norway by the end of the century, denoting large local variations. By the end of the century, changes in sea-water chemistry owing to acidification are expected to reach levels not seen in the past 20 million years. The Norwegian Arctic was also found to be greatly vulnerable to pollutants and ultraviolet radiation. Given the importance of the Arctic in the global climate system, the ERT welcomed the findings of NorACIA and encourages Norway to ensure their wide dissemination.

83. Although, as stated in its NC5, Norway is in the early stages of assessing impacts and adaptation options, the ERT found, during the in-country review, that more is being done than has been presented in the NC5. The ERT therefore encourages Norway to provide a more comprehensive picture of the initiatives undertaken in various sectors and to be more specific when reporting on expected impacts and adaptation measures being taken or contemplated. In this regard, the ERT encourages Norway to use, for its next national communication, the IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptations and the United Nations Environment Programme (UNEP) Handbook on Methods for Climate Change Impacts Assessment and Adaptation Strategies, as stated in the UNFCCC reporting guidelines.<sup>9</sup>

84. The ERT encourages Norway to further elaborate in its next national communication on its preparedness for the combined impacts of climate change and more intense economic activity in vulnerable areas in the Arctic, in particular with regard to oil extraction and increased maritime transportation.

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<sup>6</sup> See <<http://www.regjeringen.no/en/dep/md/kampanjer/engelsk-forside-for-klimatilpasning.html?id=539980>>.

<sup>7</sup> See <<http://www.citiesofthefuture.no>>.

<sup>8</sup> See <<http://npweb.npolar.no/english/articles/2010/norACIA-report>>.

<sup>9</sup> FCCC/CP/1999/7, paragraph 49.

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

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

85. The information provided in the NC5 covers most of the issues on which information is required under Article 4, paragraphs 3, 4 and 5, of the Convention and under Article 11 of the Kyoto Protocol with regard to financial resources. This information was updated and considerably extended during the review. In particular, Norway provided evidence of its substantial contribution to financial resources related to the implementation of the Convention through bilateral, regional and other multilateral channels, including the Global Environment Facility (GEF). Table 7 summarizes the information on financial resources.

Table 7

#### Summary of information on financial resources (million US dollars)

<i>Channel of financial resources</i>	<i>Years of disbursement</i>				
	<i>2005</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>	<i>2009</i>
Official development assistance (ODA), of which	2 793.6	2 934.9	3 722.6	4 005.8	4 085.8
Bilateral (incl. administration costs)	1 995.1	2 086.8	2 877.3	3 042.4	3 168.2
Multilateral	798.5	848.1	845.3	963.4	917.6
GNI-coefficient	0.94	0.89	0.95	0.88	1.06
Disbursements to climate-related aid in bilateral ODA	74.0	78.0	266.0	188.0	302.0
Climate-related support programmes	NA	NA	NA	NA	NA
Contributions to the GEF (USD million)	NA	NA	NA	NA	NA
Pledge for fourth GEF replenishment	6.8	6.9	7.5	7.7	7.0
UNFCCC funds (SCCF, LDCF and other voluntary)	1.1	2.2	5.8	12.1	9.7
JI and CDM under the Kyoto Protocol	NA	NA	NA	NA	NA
Other (bilateral/multilateral)	NA	NA	NA	NA	NA

*Abbreviations:* CDM = clean development mechanism, GEF = Global Environment Facility, GNI = gross national income, JI = joint implementation, LDCF = Least Developed Countries Fund, ODA = official development assistance, SCCF = Special Climate Change Fund, NA = not available.

86. Pursuant to Article 4, paragraph 3, of the Convention, Norway acknowledges that there is no internationally agreed definition of what constitutes “new” and “additional”. It is reported that Norway’s funding for climate change actions has been increased considerably over the last few years, and that by any definition these resources therefore can be classified as “new and additional”. The ERT commended Norway for ranking among the countries with the highest official development assistance/gross national income (ODA/GNI) ratio in the world (2009: 1.06 per cent) as well as for the steady increase in this ratio.

87. The Party’s total contribution to the GEF between 2004 and 2008, as well as to the third and fourth replenishments of the GEF, amounted to NOK 57 million/year (approximately USD 9.5 million/year). One third of this amount went to the climate change focal area. Seventy-seven per cent of the contributions to the GEF were reported as ODA.

Contributions by Norway to the UNFCCC funds have been among the highest on a per capita basis. Norway has also been the biggest contributor in absolute figures to the UNFCCC secretariat for activities not covered in the core budget and for the participation of developing countries in the process, with more than NOK 113 million provided between 2005 and 2009.

88. Norway has provided substantial contributions through multilateral institutions, in particular the World Bank and its various funds (Prototype Carbon Fund, Carbon Partnership Facility, Climate Investment Funds, Forest Carbon Partnership Facility and the World Bank Trust Fund for CCS). Bilateral contributions reported in the NC5 centre on China (for various projects, including the development of climate change plans for the provinces) and India (for institutional and technical cooperation). Bilateral aid has also been provided to support capacity for clean development mechanism (CDM) projects in Africa and Asia. The overall focus seems to revolve around support for private-sector engagement and the development of carbon finance.

89. The centrepiece of Norway's contribution to climate change mitigation and adaptation is the International Climate and Forest Initiative, which established Norway's leading role in international efforts to reduce deforestation and forest degradation in developing countries.<sup>10</sup> Launched in December 2007 at the thirteenth session of the Conference of the Parties in Bali and financed by ODA, the initiative will have an annual budget of around NOK 3 billion (approximately USD 500 million). Funds are mainly channelled through multilateral initiatives, in particular the United Nations programme for reducing emissions from deforestation and forest degradation in developing countries (approximately USD 52 million agreed between 2008 and 2009), the World Bank's Forest Carbon Partnership Facility and Forest Investment Programme and the African Development Bank's Congo Basin Forest Fund. However, the initiative also provides for bilateral cooperation. So far, agreements have been signed with Brazil (up to approximately USD 1 billion pledged by 2015 based on results), Indonesia (approximately USD 1 billion pledged over the next few years), Guyana (up to approximately USD 280 million by 2015 based on results) and the United Republic of Tanzania (approximately USD 83 million over five years).

90. In its NC5, Norway has also provided information 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 meet the costs of adaptation. These funds have been mainly targeted at Africa and channelled through multilateral development and finance institutions, such as the United Nations Development Programme, the World Bank and the African Development Bank.

91. Norway has also cooperated with developing country Parties in preparing for adaptation and has contributed substantially to adaptation funding, mainly through multilateral development and financing institutions such as the World Bank, the Consultative Group on International Agricultural Research, the Global Crop Diversity Trust, the African Development Bank and the African Climate Policy Centre. Support of up to NOK 165 million is planned in 2010 for conservation agriculture in eastern Africa through the Common Market for Eastern and Southern Africa. Significant support has also been provided and pledged to various disaster risk reduction initiatives, including, in 2009, NOK 12.5 million for the Global Fund for Disaster Risk Reduction.

92. Contributions by Norway to the UNFCCC funds have been among the highest on a per capita basis, with NOK 53 million going to the Least Developed Countries Fund (LDCF) between 2005 and 2009 and NOK 121 million to the Special Climate Change Fund

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<sup>10</sup> See <<http://www.regjeringen.no/en/dep/md/Selected-topics/climate/the-government-of-norways-international-/why-a-climate-and-forest-initiative.html?id=547202>>.

(SCCF) (for both adaptation and technology transfer). Norway also contributed NOK 1 million to the Adaptation Fund start-up phase in 2008.

93. A programme for 'climate proofing' all bilateral development assistance was introduced in 2009 by the Norwegian Agency for Development Cooperation.<sup>11</sup> This programme includes a review of Norwegian embassies' portfolios and the development of a practical guide to assist them in addressing and integrating climate change concerns into supported activities.

94. The ERT welcomed Norway's reporting to the Development Assistance Committee of the Organisation for Economic Co-operation and Development on the so-called Rio Markers on climate change mitigation, and recommends that, to ensure transparency in its next national communication, Norway follow the guidance presented in the UNFCCC reporting guidelines when providing information on financial resources, including the information presented in table 5 on bilateral and regional financial contributions related to the implementation of the Convention in 1997. The ERT also encourages Norway to include information on how it has taken into account the need for adequacy and predictability in the flow of resources, which was alluded to during the in-country review but information has not been included in the NC5.

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

95. Norway's NC5 as submitted on 22 January 2010 did not include a section on technology transfer. The ERT identified this lack of completeness as a potential problem in accordance with paragraph 137(b) of the "Guidelines for review under Article 8 of the Kyoto Protocol" (hereinafter referred to as the Article 8 review guidelines). During the in-country visit, host-country representatives explained to the ERT that, owing to an omission at the time of the compilation of Norway's NC5, the section on technology transfer was not included. In response to a request made by the ERT, the Party provided, within six weeks after the in-country visit, a revised NC5 that included a section on technology transfer. The ERT recommends that the Party include a final QC check in the processing of its next national communication, in order to ensure the complete and timely submission of all mandatory reporting elements.

96. In its revised NC5, Norway has provided details of measures related to the promotion, facilitation and financing of the transfer of, or access to, environmentally sound technologies. Furthermore, Norway has reported in textual format on steps taken by the government to promote, facilitate and finance transfer of technology, and to support the development and enhancement of the endogenous capacities and technologies of developing countries. However, the ERT noted that Norway did not provide the following reporting elements required by the UNFCCC reporting guidelines: a clear distinction between activities undertaken by the public sector and those undertaken by the private sector, and its activities for financing access by developing countries to 'hard' or 'soft' environmentally sound technologies. The ERT recommends that Norway include such information in its next national communication.

97. The budget allocated by Norway for clean energy related assistance has steadily increased since 2004, amounting in 2008 to more than NOK 600 million in bilateral and multilateral assistance, in addition to non-earmarked funding through multilateral organizations. Norfund, the development finance institution that serves as the commercial investment instrument of Norway's development policy, invested close to NOK 200 million in clean energy in 2008.

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<sup>11</sup> See <<http://www.norad.no/en/Thematic+areas/Climate+Change+and+the+Environment/Climate+proofing>>.

98. In 2007, Norway launched the Clean Energy for Development Initiative to coordinate and ensure the quality of an increased clean-energy portfolio within Norway's development cooperation. Examples of such cooperation include: improvements in the energy sector in the Lao People's Democratic Republic; increased access to electricity and support for the exploration of renewable energy in Mozambique; support for alternative energy and small hydro feasibility studies in Nepal; improvements in electricity supply in the United Republic of Tanzania; and investments in Uganda's national power infrastructure.

99. At the end of 2008, Norway was cooperating with more than 20 countries in the field of clean energy through bilateral and multilateral mechanisms. Activities centred on improvements in electricity grids, improved utilization of petroleum resources and energy efficiency, and support for the development of hydropower, as well as on solar energy and other renewable-energy technologies. Most of these initiatives were supplemented by capacity-building and institutional development, with a focus on legislation, mapping of resources and national planning. Norway also contributes to projects under the International Energy Agency and the Climate Technology Initiative.

100. CCS was identified by Norway as a priority area, and an action plan for the dissemination of information on CCS was endorsed by the Norwegian Parliament, with a focus on southern Africa, Indonesia, China and the Gulf States. Efforts in this area are complemented by other initiatives such as the Carbon Sequestration Leadership Forum. On the private-sector side, Statoil ASA, the Norwegian petroleum company operating the storage projects, has partnered with Algeria on a CCS project and with South Africa on the Technology Centre Mongstad (see para. 38 above).

101. Leveraging private investment in clean-energy projects in developing countries is reported as a particular concern of Norway and, in this regard, the country has undertaken a project analysis of critical bottlenecks which are currently hindering private investment in clean energy in developing countries. Norway also contributes to funds or projects seeking to raise risk capital in developed countries and economies in transition, such as the Global Energy Efficiency and Renewable Energy Fund or the Nordic Environment Finance Corporation.

102. Given the extent of Norway's experience in providing support for environmentally sound technologies and climate change mitigation and adaptation efforts more generally, the ERT encourages Norway to elaborate, in its next national communication, on success and failure stories relating to technology transfer, in accordance with the UNFCCC reporting guidelines. The ERT also recommends that Norway include a description of steps taken to support the development and enhancement of the endogenous capacities and technologies of developing countries. The ERT noted that both of these aspects had already been highlighted as lacking in the previous review report.

## **F. Research and systematic observation**

103. Norway has provided all of the required information on its actions relating to research and systematic observation, and addressed both domestic and international activities. As part of the Global Climate Observing System, the Norwegian Meteorological Institute operates 10 existing meteorological surface observing stations and one upper air station. The ERT noted that Norway is proactive in oceanographic and terrestrial observation with international cooperation through the Institute of Marine Research and the Global Terrestrial Observing System. The ERT acknowledged a number of large-scale and long-term projects, such as NORKLIMA, RENERGI and KLIMATEK, which form an integral part of Norway's climate change research.

104. The ERT noted that, according to the white paper on climate change, the Research Council of Norway plays an important role in supporting climate change research, both in terms of financial support and overall direction. The ERT was informed about Norway's financial contributions to climate change research and invited Norway to further elaborate on its financial contribution to climate- and non climate related research over time in its next national communication.

105. Norway's NC5 illustrates examples of successful research projects, including systematic observation in the Arctic and crucial findings with regard to climate change impacts based on scientific measurements. The ERT acknowledged the high standard of Norway's climate research in the context of the NorClim (Climate of Norway and the Arctic in the 21st Century) project and its contribution to the scientific community. The ERT noted that Norway placed emphasis on the research and development of CCS, which is supposed to become a crucial mitigation option for the country.

106. The ERT reiterated a recommendation made in the previous review report that Norway include, in its next national communication, information on action taken to support related capacity-building and research, as well as to establish and maintain observing systems, in developing countries.

107. The ERT invited Norway to identify constraints and barriers in the field of research and systematic observation, as well as actions to overcome these barriers. The ERT encourages Norway to establish an evaluation scheme and knowledge management platform in order to get the most benefit from these projects.

## **G. Education, training and public awareness**

108. In the NC5, Norway has provided information on its actions relating to education, training and public awareness at the domestic level. Training and educational programmes are administered, inter alia, by the MoE, the Ministry of Education and the Center for International Climate and Environmental Research (CICERO) in Oslo.

109. The ERT acknowledged that sustainable development is reported to be a fully integrated part of the Norwegian education system and that public awareness seems to be high. In addition, the ERT noted the Party's efforts to make climate-related information publicly available, including meteorological data.

110. The NC5 does not elaborate on the role of non-governmental organizations (NGOs) in domestic climate-policy-making, but the ERT had the opportunity to discuss Norwegian climate policy with both business and environmental NGOs during the review.

111. In 2008, a public information and awareness campaign called Klimaløftet was launched.<sup>12</sup> This was an extensive public information campaign targeting the general public but with a focus on young adults. The impact and media coverage were reported to be considerable but the results were not being monitored.

112. The ERT commends Norway for its work in relation to public information and awareness and encourages the Party to include more information on international activities and the role of NGOs in its next national communication.

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<sup>12</sup> See <<http://www.klimaloftet.no/Klimaloftet>>.

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

113. Norway has provided most of the supplementary information under Article 7, paragraph 2, of the Kyoto Protocol in its NC5. The supplementary information is placed in different sections of the NC5. Table 8 provides an overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol as well as references to the NC5 chapters in which this information is provided.

114. Norway has not reported the following elements of the supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol: information on what efforts Norway is making to implement PaMs in such a way as to minimize adverse effects, including the effects of climate change, effects on international trade, and social, environmental and economic impacts, on other Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention. However, in response to a request from the ERT, the Party provided a revised NC5 that did contain such information. The ERT recommends that Norway also include this reporting element in its next national communication. The technical assessment of the information reported by Norway under Article 7, paragraph 2, of the Kyoto Protocol is contained in the relevant sections of this report.

Table 8

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

<i>Supplementary information</i>	<i>Reference</i>
National registry	NC5, chapter 3.3
National system	NC5, chapter 3.2
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	NC5, chapter 5.4
Policies and measures in accordance with Article 2	NC5, chapter 4
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	NC5, chapter 4.2
Information under Article 10	Revised NC5, chapter 7
Financial resources	NC5, chapter 7.3

*Abbreviation:* NC5 = fifth national communication.

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

115. In line with the Article 7 guidelines, as contained in the annex to decision 15/CMP.1, Norway's 2010 NIR, submitted on 15 April 2010, contained a chapter with information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol (chapter 15). This chapter referred to the Party's previous reporting on this issue in 2009 and stated that there had been no changes to the approach reported. However, the ERT noted that neither Norway's NC5 nor its 2009 NIR contained any information on the approach taken by Norway on this matter. The ERT identified this

lack of transparency as a potential problem in accordance with paragraph 127(a) of the Article 8 review guidelines.

116. During the in-country visit, host-country representatives explained to the ERT that the reference “submitted in 2009” was an error in chapter 15 of Norway’s 2010 NIR and clarified that it intended to refer to its NC4, submitted in 2006. In response to a request made by the ERT, the Party provided, within six weeks after the in-country visit, a revised 2010 NIR that included a new chapter on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The ERT reviewed this new chapter 15 and noted that the revised information on this matter was transparent and complete. The ERT recommends that the Party include a final QC check in the processing of its next NIR, in order to ensure the complete and timely submission of all mandatory reporting elements.

117. The revised 2010 NIR and the additional information provided during the review presented several initiatives of Norway aiming to minimize adverse impacts, including cooperating in the development of CCS technologies (see para. 100 above) and assisting developing country Parties which are highly dependent on the export of fossil fuels in diversifying their economies. The Norwegian Oil for Development initiative aims to assist developing countries, upon their request, in their efforts to manage petroleum resources in a way that generates economic growth and promotes the welfare of the whole population in an environmentally sustainable way.<sup>13</sup> The ERT encourages Norway to further enhance the reporting on Article 3, paragraph 14, including by providing information on the prioritization of the action taken in implementing its commitments under Article 3.

### **III. Conclusions and recommendations**

118. The ERT concludes that the revised NC5 provides a good overview of the national climate policy of Norway. The information provided in the revised NC5 includes all mandatory information required by the UNFCCC reporting guidelines and all elements of the supplementary information under Article 7 of the Kyoto Protocol. During the review, Norway provided additional information on financial resources and technology transfer and on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. With this additional information, the ERT noted that two potential problems on completeness and transparency that it had raised in accordance with paragraph 127(a) and (b) of the Article 8 review guidelines have been resolved by the Party during the review.

119. Norway’s emissions for 2008 were estimated to be 8.0 per cent above its 1990 level excluding LULUCF and 34.6 per cent below its 1990 level including LULUCF. Emission increases were driven by: growth in GDP; activity in the domestic oil and gas sector; high and increasing per capita income and decentralized settlement patterns. The latter two drivers in particular gave rise to a relatively high demand for passenger transport; at the same time, increasing demand for raw materials and other goods exported from Norway resulted in increased freight transport. These factors outweighed improvements in the efficiency of energy use and technological developments in the domestic oil and gas sector.

120. In the NC5, Norway presents GHG projections for the period from 1990 to 2020. One baseline (‘without measures’) scenario was included. Total GHG emissions are projected to increase by 15 per cent from 1990 to 2010, and to decrease by 1 per cent from 2010 to 2020. Thus, the projections indicate that Norway does not expect to meet its Kyoto Protocol target (which is to limit the growth in its GHG emissions to 1 per cent in relation

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<sup>13</sup> A description of the Norwegian Oil for Development programme can be found at <[www.norad.no](http://www.norad.no)>.



to the 1990 level during the Kyoto Protocol first commitment period from 2008 to 2012) through domestic action only. Norway adopted a domestic emissions reduction target of 9 per cent below the 1990 level during the first commitment period. The 2007 White Paper to the Storting (No. 34) also outlines Norway's commitment to reducing its emissions to 30 per cent below the 1990 level by 2020, with approximately two thirds of that reduction coming from domestic reductions, and to achieving carbon neutrality by 2030.

121. The NC5 contains information on how the Party's use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action. Norway pointed to the fact that it has reduced domestic emissions by approximately 10 Mt CO<sub>2</sub> eq/year and that it plans to use approximately 7 million Kyoto Protocol units annually to achieve its Kyoto Protocol target. During the review, the ERT was informed that the level of emissions in 2008 was substantially lower than expected in the projections and that Norway thus expects to need less Kyoto Protocol units for this purpose.

122. In order to assess whether additional PaMs would be necessary to achieve its medium- and long-term targets, in 2008 Norway began the Klimakur process. In February 2010, a report was issued that assessed the mitigation effects and related costs of various bundles of sector-specific PaMs by 2020. The ERT noted that Norway's PaMs have helped to restrain the growth in its emissions; however, the ERT could not assess whether the PaMs currently in place are sufficient to curb enough future growth in emissions in order to meet Norway's ambitious emission reduction targets of achieving carbon neutrality by 2030.

123. Norway has provided substantial financial contributions through multilateral institutions. The ERT commended Norway for ranking among the countries with the highest ODA/GNI ratio in the world (2009: 1.06 per cent) as well as for the steady increase in this ratio. Bilateral contributions reported in the NC5 centre on China (for various projects, including the development of climate change plans for the provinces) and India (for institutional and technical cooperation). Bilateral aid has also been provided to support capacity for CDM projects in Africa and Asia. Contributions by Norway to the UNFCCC funds have been among the highest on a per capita basis, with NOK 53 million going to the LDCF between 2005 and 2009 and NOK 121 million to the SCCF (for both adaptation and technology transfer). Norway also contributed NOK 1 million to the Adaptation Fund start-up phase in 2008.

124. Projections indicate a warming trend in all areas of mainland Norway during all seasons. Land areas in the Arctic have experienced more warming in the last 20 to 30 years than any other region on Earth, and changes – for example in the rate of the thawing of permafrost and the loss of sea ice – are taking place faster than previously thought. Latest Norwegian research findings point to an expected rise in the average annual temperature of as much as 8 °C in the north-east of Svalbard compared with an increase of around 3 °C in mainland Norway by the end of the century, denoting large local variations. To address the impacts of climate change, the Norwegian Government appointed a Commission on Vulnerability and Adaptation, which is to prepare a comprehensive report on challenges and opportunities by November 2010.

125. The ERT acknowledged the high standard of Norway's climate research in the context of the NorClim (Climate of Norway and the Arctic in the 21st Century) project and its contribution to the scientific community. The ERT noted that Norway placed emphasis on the research and development of CCS, which is supposed to become a crucial mitigation option for the country.

126. The ERT concluded that Norway's national system continues to perform its required functions as set out in decision 19/CMP.1; and that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision

5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1. The ERT noted that updates of databases and applications, implemented security measures and changes to the national registry software are documented on a regular basis by nominated responsible persons.

127. Supplementary information under Article 7, paragraph 1, of the Kyoto Protocol on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol provided by the Party in its revised 2010 annual submission is complete and transparent. The ERT encourages Norway to further enhance the reporting on Article 3, paragraph 14, including by providing information on the prioritization of the action taken in implementing its commitments under Article 3.

128. In the course of the IDR, the ERT formulated several recommendations relating to the completeness and transparency of Norway's reporting under the Convention and its Kyoto Protocol. The key recommendations<sup>14</sup> are that Norway:

- (a) Improve the completeness of its reporting by including, in its next national communication:
  - (i) GHG emission trend tables from the latest available inventory;
  - (ii) Information on how Norway 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, effects on international trade, and social, environmental and economic impacts, on other Parties, especially developing country Parties;
  - (iii) The estimated and expected total effect of the complete set of implemented and adopted domestic PaMs;
  - (iv) Reporting on how Norway gives priority to the actions taken to implement its commitments under Article 3, paragraph 14, of the Kyoto Protocol;
  - (v) A final QC check in the processing of its next national communication and NIR, in order to ensure the complete and timely submission of all mandatory reporting elements;
  - (vi) Information on action taken to support related capacity-building and research, as well as to establish and maintain observing systems, in developing countries;
- (b) Improve the transparency of its reporting by:
  - (i) Providing more detailed descriptions of tax incentives and other domestic PaMs;
  - (ii) Providing more detailed information on addressing emissions from international aviation and marine bunker fuels and on emissions and removals from LULUCF;
  - (iii) Providing, for all sectors, summary tables that include estimates of the effects of the domestic PaMs, as well as information on costs, where available;
  - (iv) Providing a more comprehensive picture of the adaptation measures taken in various sectors, and being more specific when reporting on expected impacts and adaptation measures being taken or contemplated;
- (c) Providing more detailed information on research and development in the field of CCS.

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<sup>14</sup> The recommendations are given in full in the relevant sections of this report.

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

(a) Consider the possibility of including, in its next national communication, information on its response to recommendations made in previous review reports and on major improvements made in comparison with its previous national communications;

(b) Further elaborate its reporting on the drivers behind emission trends, more clearly distinguish between its off- and onshore activities, and provide a more transparent description of its relationship with the EU as well as a detailed description of its mitigation and adaptation activities in the Norwegian Arctic, which is key scientific information for the assessment of the impact of climate change;

(c) Increase its capacity to analyse the cost and mitigation effects of different PaMs, as cost-effectiveness is expected to become an even more important factor in the period after 2011;

(d) Explain in more detail the crucial assumptions used for projections and how these were developed and incorporated into the macroeconomic model when calculating the scenario;

(e) Include a 'without measures' scenario and, if relevant, a 'with additional measures' scenario.

#### **IV. Questions of implementation**

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

## Annex

### Documents and information used during the review

#### A. Reference documents

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

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

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

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

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

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

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

FCCC/SBI/2007/INF.7. Compilation and synthesis of supplementary information incorporated in fourth national communications submitted in accordance with Article 7, paragraph 2, of the Kyoto Protocol. Available at <<http://unfccc.int/resource/docs/2007/sbi/eng/inf07.pdf>>.

FCCC/ARR/2009/NOR. Report of the individual review of the greenhouse gas inventory of Norway submitted in 2009. Available at <<http://unfccc.int/resource/docs/2010/arr/nor.pdf>>.

FCCC/IRR/2007/NOR. Report of the review of the initial report of Norway. Available at <<http://unfccc.int/resource/docs/2007/irr/nor.pdf>>.

FCCC/IDR.4/NOR. Report on the in-depth review of the fourth national communication of Norway. Available at <<http://unfccc.int/resource/docs/2007/idr/nor04.pdf>>.

Fourth national communication of Norway. Available at <<http://unfccc.int/resource/docs/natc/nornc4.pdf>>.

Fifth national communication of Norway. Available at <[http://unfccc.int/resource/docs/natc/nor\\_nc5.pdf](http://unfccc.int/resource/docs/natc/nor_nc5.pdf)>.

2009 greenhouse gas inventory submission of Norway. Available at <[http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/4771.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/4771.php)>.

2010 greenhouse gas inventory submission of Norway. Available at <[http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/5270.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php)>.

**B. Additional information provided by the Party**

Responses to questions during the review were received from Mr. Gisle Haakonsen and Mr. Erik Lorentzen (Ministry of the Environment), including additional material on the estimated effects of policies and measures, the national registry, technology transfer, and the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The following documents<sup>1</sup> were also provided by Norway:

Norwegian Ministry of the Environment. 2006-2007. *Norwegian Climate Policy*. White Paper No 34,. Available at <[http://www.regjeringen.no/pages/2065909/PDFS/STM200620070034000EN\\_PDFS.pdf](http://www.regjeringen.no/pages/2065909/PDFS/STM200620070034000EN_PDFS.pdf)>.

Klimakur 2020. 2008. *Climate Cure 2020*. Available at <<http://www.klimakur2020.no>> and <<http://www.klif.no/publikasjoner/2590/ta2590.pdf>>.

Norwegian Public Roads Administration. 2010. *Transnova 2009* Available at <<http://www.transnova.no>>.

Norwegian Ministry of the Environment. 2010. *Norwegian Arctic Climate Impact Assessment (NorACIA)*. Available at <<http://www.noracia.npolar.no>>.

Norwegian Ministry of the Environment. 2010. *NorClim – Climate in Norway in 2100*. Available at <<http://www.norlim.no>>.

Norwegian Ministry of the Environment. 2007-2010. *International Climate and Forest Initiative 2010*. <<http://www.regjeringen.no/en/dep/md/Selected-topics/climate/the-government-of-norways-international-/why-a-climate-and-forest-initiative.html?id=547202>>.

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<sup>1</sup> Reproduced as received from the Party.