COMPLIANCE COMMITTEE

CC/ERT/IRR/2007/10
16 October 2007

Report of the review of the initial report of the Kingdom of Norway

Note by the secretariat

The report of the review of the initial report of the Kingdom of Norway was published on 15 October 2007. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2), the report is considered received by the secretariat on the same date. This report, FCCC/IRR/2007/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.

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Report of the review of the initial report of the Kingdom of Norway

According to decision 13/CMP.1, each Annex I Party with a commitment inscribed in Annex B to the Kyoto Protocol shall submit to the secretariat, prior to 1 January 2007 or one year after the entry into force of the Kyoto Protocol for that Party, whichever is later, a report (the 'initial report') to facilitate the calculation of the Party's assigned amount pursuant to Article 3, paragraphs 7 and 8, of the Kyoto Protocol, and to demonstrate its capacity to account for emissions and the assigned amount. This report reflects the results of the review of the initial report of Norway conducted by an expert review team in accordance with Article 8 of the Kyoto Protocol.

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I. Introduction and summary

A. Introduction

1. This report covers the in-country review of the initial report of the Kingdom of Norway, coordinated by the United Nations Framework Convention on Climate Change (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 23 to 28 April 2007 in Oslo, Norway, and was conducted by the following team of nominated experts from the roster of experts: generalist – Mr. Bernd Gugele (European Community); energy – Mr. Dario Gomez (Argentina); industrial processes – Mr. Jos Olivier (the Netherlands); agriculture – Mr. Ayite-Lo Ajavon (Togo); land use, land-use change and forestry (LULUCF) – Mr. Risto Sievanen (Finland); waste – Mr. Sabin Guendehou (Benin). Mr. Bernd Gugele and Mr. Sabin Guendehou were the lead reviewers. In addition the expert review team (ERT) reviewed the national system, the national registry, and the calculations of the Party's assigned amount and commitment period reserve (CPR), and took note of the LULUCF parameters and the elected Article 3, paragraph 4 activities. The review was coordinated by Ms. Ruta Bubniene and Ms. Astrid Olsson (UNFCCC secretariat).

2. In accordance with the guidelines for review under Article 8 of the Kyoto Protocol (decision 22/CMP.1), a draft version of this report was communicated to the Government of Norway.

B. Summary

1. Timeliness

3. Decision 13/CMP.1 requests Parties to submit their initial report prior to 1 January 2007 or one year after the entry into force of the Kyoto Protocol for that Party, whichever is later. The initial report of Norway was submitted on 22 December, which is in compliance with decision 13/CMP.1. In its initial report Norway refers to its 2006 greenhouse gas (GHG) inventory submission of 27 May 2006 and the common reporting format (CRF) resubmitted on 8 December 2006.

2. Completeness

4. Table 1 below provides information on the mandatory elements included in the initial report and reflects any revised estimates provided by the Party as a result of the review process. These revised calculations are based on revisions of the estimates of emissions of nitrous oxide (N_2O) and methane (CH_4) from ferroalloys production (see para. 66), carbon dioxide (CO_2) from the use of lubricants and paraffin waxes (see para. 67), CH_4 from solid waste disposal on land (see para. 94), CH_4 from wastewater handling (see para. 95) and N_2O from wastewater handling (see para. 97) which resulted in revision of the base year emissions – from 49,792,386 tonnes CO_2 equivalent as reported originally by the Party to 49,619,168 tonnes CO_2 equivalent (see para. 104).

Table 1. Summary of the reporting on mandatory elements in the initial report

Item	Provided	Value/year/comment
Complete GHG inventory from the base year (1990) to the most recent year available (2004)	Yes	1990–2004
Base year for HFCs, PFCs and SF_6	Yes	1990
Agreement under Article 4		Not applicable
LULUCF parameters	Yes	Minimum tree crown cover: 10% Minimum land area: 0.5 ha Minimum tree height: 5 m
Election of and accounting period for Article 3, paragraphs 3 and 4, activities	Yes	Forest management elected Commitment period accounting
Calculation of the assigned amount in accordance with Article 3, paragraphs 7 and 8	Yes	251,451,551 tonnes CO_2 eq.
Calculation of the assigned amount in accordance with Article 3, paragraphs 7 and 8 values	Yes	250,576,797 tonnes CO_2 eq.
Calculation of the commitment period reserve	Yes	226,306,396 tonnes CO_2 eq.
Calculation of the commitment period reserve values	Yes	225,519,117 tonnes CO_2 eq.
Description of national system in accordance with the guidelines for national systems under Article 5, paragraph 1	Yes	
Description of national registry in accordance with the requirements contained in the annex to decision 13/CMP.1, the annex to decision 5/CMP.1 and the technical standards for data exchange between registry systems adopted by the CMP	Yes	However, the information is limited: see paragraphs 108–115.

5. The information in the initial report covers all the elements required by decision 13/CMP.1, section I of decision 15/CMP.1, and relevant decisions of the Conference of the Parties serving as the Meeting of the Parties (CMP). The ERT noted that the information on the national registry was limited. The ERT welcomes Norway's providing the additional information requested within the time frame set out in decision 22/CMP.1.

3. Transparency

6. The initial report is generally transparent. The only information found to be not transparent is that on the national registry, which is not exhaustive. During the review the ERT identified the following areas where transparency needs to be further enhanced: (a) consistency in the use of the notation keys (e.g. in industrial processes and LULUCF); (b) consistency in the use of the documentation boxes (e.g. in LULUCF); (c) consistency of quality of the sectoral chapters of the national inventory report (NIR) (e.g. in industrial processes); (d) consistency as between the information in the NIR and the underlying documentation reports (e.g. in industrial processes); and (e) consistency as between the NIR and the CRF (in industrial processes and LULUCF).

4. Emission profile in the base year, trends and emission reduction target

7. In the base year (1990 for all gases), the most important GHG in Norway was CO_2, contributing 70.1 per cent to total[1] national GHG emissions expressed in CO_2 equivalent,[2] followed by N_2O, 9.4 per cent, and CH_4, 9.3 per cent (see figure 1). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) taken together contributed 11.2 per cent of overall GHG emissions in the base

[1] In this report, the term total emissions refers to the aggregated national GHG emissions expressed in terms of CO_2 equivalent excluding LULUCF, unless otherwise specified.

[2] In this report, the values for total and sectoral emissions for the complete time series, and in particular for the base year and 2004, reflect the revised estimates submitted by Norway in the course of the review. These estimates differ from Norway's GHG inventory submitted in 2006.

year. The large share of the fluorinated gases (F-gases) is due to a high share of PFCs (6.8 per cent) and SF_6 (4.4 per cent). The energy sector accounted for 59.4 per cent of total GHG emissions in the base year, followed by industrial processes (27.5 per cent), agriculture (9.0 per cent) and waste (3.7 per cent) (see figure 2). Total GHG emissions (excluding LULUCF) amounted to 49,619.17 Gg CO_2 equivalent in the base year, and increased by 10.5 per cent from the base year to 2004.

Figure 1. Shares of gases in total GHG emissions, base year

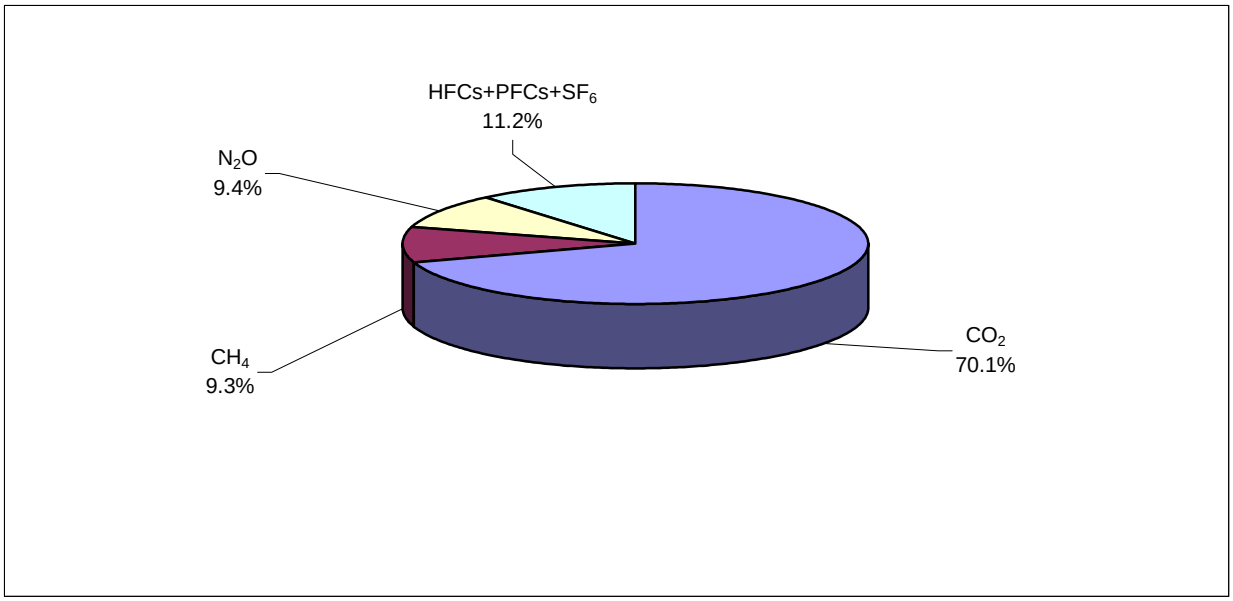
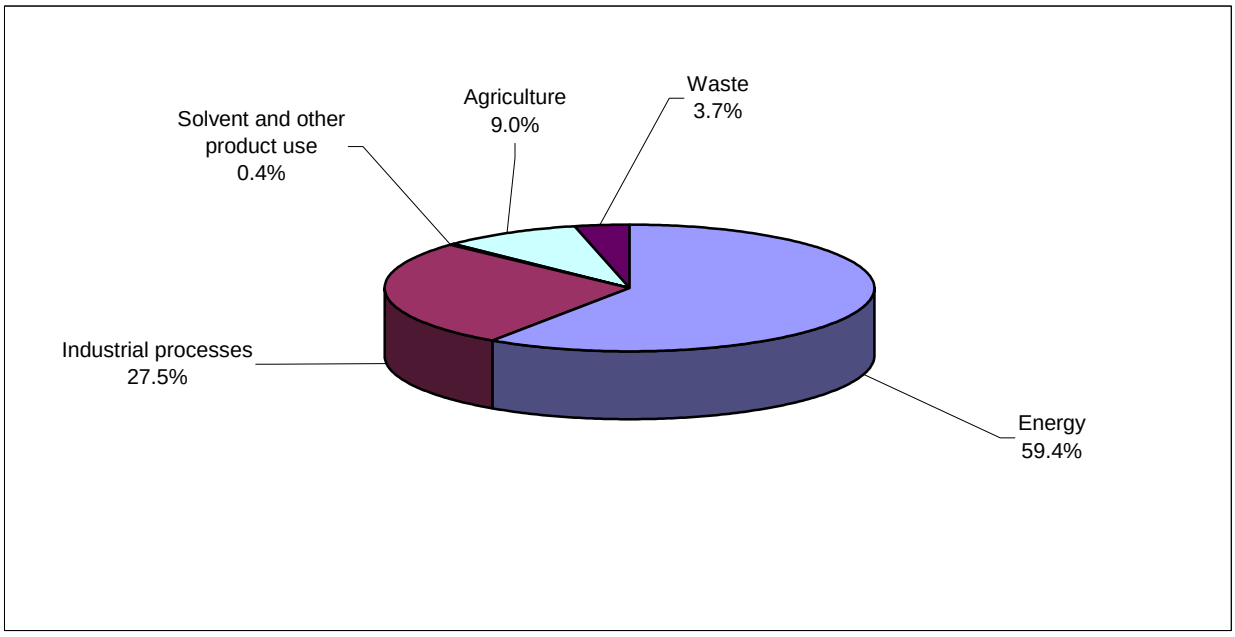


Figure 2. Shares of sectors in total GHG emissions, base year



8. Tables 2 and 3 show the greenhouse gas emissions by gas and by sector, respectively.

9. Norway's quantified emission limitation is 101 per cent as included in Annex B to the Kyoto Protocol.

Table 2. Greenhouse gas emissions by gas, 1990–2004

GHG emissions (without LULUCF)	Gg CO_2 equivalent								Change BY–2004 (%)
	Base year [a,]	1990	1995	2000	2001	2002	2003	2004[a]	
CO_2	34 766.97	34 766.97	37 774.14	41 530.52	42 917.32	42 036.14	43 549.93	44 015.45	26.6
CH_4	4 621.18	4 621.18	5 083.55	4 953.32	4 958.67	4 792.01	4 822.55	4 730.51	2.4
N_2O	4 660.82	4 660.82	4 396.65	4 523.76	4 428.16	4 609.19	4 436.42	4 532.81	–2.7
HFCs	0.03	0.00	25.43	239.20	305.41	355.55	378.36	400.41	1 429 942.9
PFCs	3 370.40	3 370.40	2 007.72	1 318.56	1 329.29	1 438.26	909.77	880.60	–73.9
SF_6	2 199.78	2 199.78	607.79	934.42	791.20	238.30	234.86	275.68	–87.5

Note: BY = Base year, LULUCF = Land use, land use change and forestry, NA = Not applicable.
Norway submitted revised estimates for the base year and 2004 in the course of the initial review on 8 July 2007. These estimates differ from Party's GHG inventory submitted in 2006.

Table 3. Greenhouse gas emissions by sector, 1990–2004

Sectors	Gg CO_2 equivalent								Change BY–2004 (%)
	Base year [a,b]	1990	1995	2000	2001	2002	2003	2004[a]	
Energy	29 496.27	29 496.27	32 184.97	35 523.07	37 439.26	37 052.67	38 505.24	38 425.06	30.3
Industrial processes	13 661.24	13 661.24	11 044.31	11 525.72	11 069.63	10 332.74	9 674.88	10 355.61	–24.2
Solvent and other product use	180.02	180.02	174.16	166.86	166.86	166.92	167.51	168.00	–6.7
Agriculture	4 444.57	4 444.57	4 534.74	4 489.32	4 364.87	4 292.20	4 358.69	4 311.11	–3.0
LULUCF	NA	–14 568.15	–13 824.10	–25 257.36	–27 114.70	–26 245.23	–25 984.85	–26 307.50	NA
Waste	1 837.06	1 837.06	1 957.09	1 794.81	1 689.44	1 624.91	1 625.56	1 575.68	–14.2
Other	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total (with LULUCF)	NA	35 051.02	36 071.17	28 242.42	27 615.36	27 224.21	28 347.03	28 527.96	NA
Total (without LULUCF)	49 619.17	49 619.17	49 895.28	53 499.78	54 730.06	53 469.45	54 331.88	54 835.46	10.5

Note: BY = Base year, LULUCF = Land use, land use change and forestry, NA = Not applicable.
Norway submitted revised estimates for the base year and 2004 in the course of the initial review on 8 July 2007. These estimates differ from Party's GHG inventory submitted in 2006.

II. Technical assessment of the elements reviewed

A. National system for the estimation of anthropogenic GHG emissions by sources and sinks

10. Norway's national system is prepared in accordance with the guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol (decision 19/CMP.1) and can perform the general and specific functions required by the guidelines for national systems.

11. Table 4 shows which of the specific functions of the national system are included and described in the initial report.

Table 4. Summary of reporting on the specific functions of the national system

Reporting element	Provided	Comments
Inventory planning		
Designated single national entity*	Yes	See section II.A.1
Defined/allocated specific responsibilities for inventory development process*	Yes	See section II.A.1
Established process for approving the inventory*	Yes	See section II.A.1
Quality assurance/quality control plan*	Yes	See section II.A.2
Ways to improve inventory quality	Partly	See section II.B.3
Inventory preparation		
Key category analysis*	Yes	See section II.B.1
Estimates prepared in line with the IPCC guidelines and IPCC good practice guidance*	Yes	See section II.B.2
Sufficient activity data and emission factor collected to support methodology*	Yes	See section II.B
Quantitative uncertainty analysis*	Yes	See section II.B.2
Recalculations*	Yes	See section II.B.2
General QC (tier 1) procedures implemented*	Yes	See section II.A.2
Source/sink category-specific QC (tier 2) procedures implemented	Yes	See section II.A.2
Basic review by experts not involved in inventory	Partly	See section II.A.2
Extensive review for key categories	No	See section II.A.2
Periodic internal review of inventory preparation	No	See section II.A.2
Inventory management		
Archive inventory information*	Yes	See section II.A.3
Archive at single location	No	See section II.A.3
Provide ERT with access to archived information*	Yes	See section II.A.3
Respond to requests for clarifying inventory information during review process*	Yes	See section II.A.1

* Mandatory elements of the national system.

1. Institutional, legal and procedural arrangements

12. In the initial report and during the in-country visit, Norway explained the institutional arrangements, as part of the national system, for preparation of the inventory. The Norwegian Pollution Control Authority (SFT) is the designated single national entity. Statistics Norway (the SSB) and the Norwegian Forest and Landscape Institute are the other core institutions involved. All three institutions have well-defined and allocated specific responsibilities for the inventory development process. The SFT has the following main responsibilities: (a) submitting the inventory to the UNFCCC secretariat; (b) completing the national inventory report; (c) implementing and coordinating the quality assurance/quality control (QA/QC) plan; (d) coordinating work between the core institutions; (e) approving the inventory before the official submission to the UNFCCC secretariat; (f) collecting point source data, and (g) ensuring that the different underlying emission models are based on sound and

updated scientific knowledge. The SSB has the following main responsibilities: (a) compiling the CRF tables; (b) maintaining the underlying emission models; (c) collecting the relevant basic data; and (d) QA/QC of activities and archiving relevant data. The Norwegian Forest and Landscape Institute has the following responsibilities: (a) compiling the emission/removal estimates for LULUCF; (b) collecting the relevant basic data; and (c) QA/QC of activities and archiving the relevant data.

13. In Norway there is an established process for the official consideration and approval of the inventory, including recalculations, prior to its submission and for responding to any issues raised by the inventory review. The responsible organization is the SFT. The national system was working during the review; the Party responded to all requests for further information in a very cooperative, comprehensive and timely manner. However, for the preparation of the CRF and the NIR the core institutions have agreed on an inventory development plan which is not yet fully implemented. This is currently making it difficult to meet the deadlines. The ERT therefore encourages Norway to improve the working procedures internally in every institution in order to make it possible to meet the agreed deadlines.

14. Norway has a formal national system established for the reporting of forest activities under Article 3, paragraph 3 and for the estimation of forest management activities under Article 3, paragraph 4, of the Kyoto Protocol. The Norwegian Forest and Landscape Institute is responsible for collecting LULUCF data and preparing the GHG estimates. It is formally responsible for QA/QC and archiving procedures, and providing documentation and delivering data and information in a timely manner.

2. Quality assurance/quality control

15. Norway has elaborated and implemented a QA/QC plan in accordance with the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance). This includes general QC procedures (tier 1) as well as source/sink category-specific procedures (tier 2) for key categories and for those individual categories in which significant methodological and/or data revisions have occurred. QA/QC procedures are in place and QC reports are prepared at all three institutions involved in the inventory compilation (the SSB, the SFT and the Norwegian Forest and Landscape Institute). Some strengthening of these procedures and further elaboration of the QC reports are needed. The ERT recommends that Norway further strengthen the QA/QC procedures at the three relevant institutions and elaborate the QC reports further, for example, by including summary results of the checks performed and by including links to the underlying checklists.

16. The ERT noted that some review procedures are carried out by staff who have not been involved with the inventory preparation process (e.g. cross-checks between the institutions), which is in line with the IPCC good practice guidance. In 2007, an invitation for public review of the GHG inventory was placed on the web. However, no further procedures for peer reviews are in place and no improvement plan is available yet, although this is planned for autumn 2007. The ERT recommends Norway to prepare an inventory improvement plan, to further compare its own GHG inventory with those of other countries and to be more proactive in setting-up independent peer reviews. It also encourages Norway to evaluate after every reporting cycle whether the quality objectives have been met and to use the conclusions from this evaluation when setting the priorities in the inventory improvement plan. In addition, the ERT encourages Norway to ask industrial associations and relevant research institutions to review the NIR.

3. Inventory management

17. Norway does not have a centralized archiving system. The SFT, the SSB and the Norwegian Forest and Landscape Institute are responsible for archiving disaggregated emission factors (EFs), activity data (AD), and documentation on how these factors and data have been generated and aggregated for the preparation of the inventory. The information archived also includes internal documentation on

QA/QC procedures and documentation on annual key categories and key category identification. The SFT will build up a library with the most important methodology reports. During the review the ERT noted that Norway was able to provide most of the archived documents requested by the ERT, including confidential data. In addition, during the review the ERT had access to the electronic archives of the SSB and SFT containing the relevant input and output files. However, not all staff seem to be aware of the archiving structure and procedures. In addition, the archiving of email correspondence with links to the relevant documents (in order to make it easier to trace the information flow) may need improvement. The ERT recommends that all staff involved in the preparation of the GHG inventory should be familiar with the structure of the archives and that the documentation of links between email correspondence and the relevant documents should be improved.

B. Greenhouse gas inventory

18. In conjunction with its initial report, Norway has submitted a complete set of CRF tables for the years 1990–2004 and a NIR.

19. During the review Norway provided the ERT with additional information sources, which are in many cases referenced in the NIR. The full list of materials used during the review is provided in the annex to this report.

1. Key categories

20. Norway has reported a key category tier 2 analysis, on both level and trend assessment, and has also applied a qualitative approach in determining its key categories as part of its initial report submission. It also reports a tier 1 analysis identifying nine key categories of which two are considered as key categories under the qualitative approach – cement production (CO_2) and ammonia production (CO_2). Norway has also included the LULUCF sector in its key category analysis. However, no overview table listing all key categories identified in the key category analysis including LULUCF is provided in the NIR; only the LULUCF key categories are reported in the table.

21. The key category analyses performed by the Party and the secretariat[3] produced some different results. The differences are due partly to the use of different levels of aggregation and partly to different approaches (the secretariat used tier 1, while Norway used tier 2). The ERT found a small inconsistency between the key category analysis and the CRF for gaseous fuels in manufacturing industries and construction (1.A.2): in the key category analyses coke oven gas and refinery gas were allocated to gaseous fuels whereas in the CRF these gases are allocated to solid and liquid fuels. For the sake of transparency, the ERT recommends Norway to provide complete overview tables for both key category analyses (excluding and including LULUCF) and to use consistent fuel definitions in the key category analysis and in the CRF.

22. The results of the key category analysis are a driving factor for the preparation of the inventory, particularly in the prioritization of resources and the level of methodology (tier) to be applied. Most of the key categories are estimated using higher-tier methods. This is in line with the IPCC good practice guidance. The tier 2 approach enables to include relatively uncertain categories and consequently excludes more significant and more certain categories. Therefore, some categories identified as key using tier 1 approach are not identified as key by the tier 2 approach. For example, SF_6 used in

[3] The secretariat identified, for each Party, those source categories that are key categories in terms of their absolute level of emissions, applying the tier 1 level assessment as described in the IPCC *Good Practice Guidance for Land Use, Land-use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF) for the base year or base year period as well as the latest inventory year. Key categories according to the tier 1 trend assessment were also identified. Where the Party performed a key category analysis, the key categories presented in this report follow the Party's analysis. However, they are presented at the level of aggregation corresponding to a tier 1 key category assessment conducted by the secretariat.

magnesium foundries is correctly identified as a key category in the tier 1 analysis due to contribution in level but is not identified as key in the tier 2 analysis due to low uncertainty. Norway may wish to consider using the qualitative approach to identify further important categories, additional to those identified by the tier 2 approach, in its future inventory submissions.

2. Cross-cutting issues

23. The inventory is in line with the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines), the IPCC good practice guidance and the IPCC *Good Practice Guidance for Land Use, Land-use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF).

24. The inventory has been compiled in accordance with Article 7, paragraph 1, and decision 15/CMP.1.

Completeness

25. The inventory is complete in terms of coverage of years, sectors, and gases. Some minor categories are missing in the original 2006 submission, e.g. in industrial processes (CO_2 from the use of lubricants and waxes), in LULUCF (land converted to forest land, carbon stock change in living biomass; land converted to forest land, carbon stock change in dead organic matter; land converted to forest land, carbon stock change in soils) and in waste (N_2O emissions from wastewater handling). Estimates of CO_2 from the use of lubricants and waxes and of N_2O from wastewater handling were provided in the course of the review. The ERT recommends Norway to include these categories in its future inventory submissions in order to improve the completeness of the inventory. The CRF tables are almost completely filled in; some cells are blank (e.g. in industrial processes). The ERT recommends the Party to make further efforts to reduce the number of subcategories that are not estimated (e.g. there are blank cells in 1990 for AD in lime production, limestone and dolomite use, plastic and metal production, other).

Transparency

26. The notation keys are used almost throughout the CRF tables. However, they are not always correctly used (e.g. in industrial processes and LULUCF) and sometimes they are inconsistent with the information in the NIR (in LULUCF). In some CRF tables the documentation boxes are not used (e.g. in LULUCF). The NIR provides a great deal of the information needed for the assessment of the inventory, but the quality of the sectoral chapters varies. Inconsistencies were also found between the NIR and underlying documentation reports (e.g. in industrial processes). In some sectors additional information could improve the transparency of the NIR, for example: (a) more explanations of the trends in emissions and implied emission factors (IEFs) (e.g. in energy and industrial processes); (b) more information on important background data, and the use of figures and graphs (e.g. in industrial processes). The ERT recommends that Norway: (a) be more consistent in its use of the notation keys and documentation boxes; (b) improve consistency as between the NIR, the CRF tables and the underlying documentation reports; (c) improve the quality checks for the NIR, for example, by facilitating review of the draft NIR by the SSB and the Norwegian Forestry and Landscape Institute and by improving the timetable for the compilation of the NIR (as part of the inventory development plan); and (d) prepare guidance for the compilers of the sectoral chapters to make them more consistent and complete (e.g. by including explanations of the trends in emissions and IEFs, including important background data, and using figures and graphs).

Consistency

27. The time series are generally consistent, but explanations for inter-annual fluctuations are sometimes missing (in particular in industrial processes and LULUCF). The ERT recommends that

Norway provide more explanations for the inter-annual fluctuations (in particular in industrial processes and LULUCF) in its future inventory submissions.

Comparability

28. The inventory is comparable with those of other Parties, as defined in the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories" (hereinafter referred to as the UNFCCC reporting guidelines), as Norway is using the methodologies and formats agreed by the CMP for estimating and reporting inventories (except for leakage rates for HFCs from refrigeration and mobile air conditioning in industrial processes). The allocation of the source/sink categories follows the split in the Revised 1996 IPCC Guidelines and the IPCC good practice guidance with a few minor exceptions in energy, industrial processes and waste.

Accuracy

29. Norway's inventory is in general accurate, as defined in the UNFCCC reporting guidelines. During the in-country review the ERT identified a few categories where the methods or EFs used were not fully in accordance with the IPCC good practice guidance and this might lead to overestimation of emissions in the base year or underestimation of emissions in the most recent year (e.g. N_2O and CH_4 from ferroalloy production, CO_2 from the use of lubricants and paraffin waxes, CH_4 from solid waste disposal on land, CH_4 from wastewater handling and N_2O emissions from human sewage). The ERT recommended Norway to revise its estimates for these categories. After the in-country review, Norway provided revised estimates for these categories for the base year and 2004 in accordance with the recommendations of the ERT. Further details are provided in the sectoral sections below.

Recalculations

30. The national system can ensure that recalculations of previously submitted estimates of GHG emissions by sources and removals by sinks are prepared in accordance with the IPCC good practice guidance. Recalculations have been mainly made in response to recommendations stemming from the UNFCCC review reports. The rationale for them is provided in the NIR, and they have resulted in real improvements to the inventory.

31. The ERT noted that recalculations of the time series from the base year to 2003 had been undertaken taking into account the recommendations of previous reviews as well as new information and methods. The major changes include: N_2O from agricultural soils (1990, 2003); CH_4 from solid waste disposal (1990, 2003); and CO_2 from energy industries (2003). The total effect of these recalculations is a 0.8 per cent decrease in estimated total national emissions for 2003 and a 0.7 per cent decrease for the base year, 1990. During the review process, following recommendations from the ERT, Norway submitted revised estimates in the industrial processes and waste sectors.

Uncertainties

32. The information provided on uncertainties is in line with the UNFCCC reporting guidelines and the IPCC good practice guidance. A tier 2 uncertainty analysis has been performed both excluding and including LULUCF, for each source category and for the inventory in total. The results of this analysis are presented and discussed in the NIR. Compared to the previous uncertainty analysis, the uncertainty for total GHG emissions in 1990 (excluding LULUCF) has been reduced from 21 per cent to 7 per cent. This is mainly due to revisions of the uncertainty estimates for N_2O emissions from soils, but in part it also reflects the use of improved methodologies in the inventory. The uncertainty estimates for CO_2 have not changed, but those for CH_4 for 1990 have declined from 22 per cent (in the 2005 inventory submission) to 15 per cent (in the 2006 inventory submission). Although the Party provided further information on the uncertainty estimates (comparison at a detailed level), the reason for this decline is

not fully transparent. Moreover, compared with those of other Parties, the CH_4 uncertainties seem to be rather low (other Parties have around 25 per cent). The ERT recommends that Norway investigate this further and provide an explanation/discussion in the NIR of its future inventory submissions.

33. The uncertainty estimates have been updated as recommended in the 2005 review report. However, improvements to methods, which are expected to reduce uncertainties (e.g. in the industrial processes where many recalculations were made), are not always reflected in the updated uncertainty estimates. In the NIR Norway provides very detailed documentation of the uncertainties of EFs and AD and the source of the uncertainty estimates, but table 6.2 of the IPCC good practice guidance is not included in the NIR. The uncertainty estimates are reflected in the tier 2 key category analysis, which is used to prioritize improvements to the inventory (e.g. the use of higher-tier methods). The ERT recommends the Party to improve the links between methodological changes and the uncertainty estimates and to provide table 6.2 of the IPCC good practice guidance in the NIR of its future inventory submissions.

3. Areas for further improvement identified by the Party

34. The NIR identifies several areas for improvement. The further implementation of the national system will formalize all the institutional, legal and procedural arrangements, as well as the reporting and archiving of inventory information (which was submitted to the UNFCCC secretariat as part of the initial report). Several improvements are planned for the LULUCF sector, for example: (a) definition of the area of forest and other wooded land at higher altitudes; (b) improvements to the forest inventory in Finnmark; (c) improved use of national aerial photography to supplement field surveys, focusing on regions with high levels of economic activity; and (d) the development of more reliable inventory methods targeted for use in areas for which only limited information is available. In addition, Norway indicates its intention to further improve the estimates of HFC and PFC emissions from products. However, Norway has not yet prepared an inventory improvement plan. In its response to the issues raised during the review, Norway indicated that it will: (a) prepare an inventory improvement plan by autumn 2007; (b) strengthen the QA/QC procedures; (c) improve the archiving systems; and (d) improve the timetable for inventory preparation.

4. Areas for further improvement identified by the ERT

35. The ERT identified the following cross-cutting issues for improvement. The Party should:

(a) Prepare an inventory improvement plan and set up independent peer reviews; Norway may also wish to consider comparing its own data with the data of other Parties;

(b) Improve the working procedures internally in every institution in order to meet the agreed timelines for the preparation of the inventory;

(c) Further strengthen the QA/QC procedures at the three relevant institutions and elaborate the QC reports further;

(d) Improve the transparency and consistency of the CRF and the NIR by: (i) reducing the number of empty cells in the CRF tables; (ii) being more consistent in its use of the notation keys and documentation boxes; (iii) improving consistency as between NIR, the CRF and the underlying documentation reports; (iv) improving the quality checks for the NIR; (v) providing more explanations of the trends in emissions and IEFs, and providing more information on important background data; (vi) preparing guidance for the compilers of the sectoral chapters (e.g. explanation of trends of emissions and EFs, inclusion of important background data, use of figures and graphs) in order to make them more consistent; and (vii) improving the links between methodological changes and the uncertainty estimates.

36. Recommended improvements relating to specific source categories are presented in the relevant sectoral sections of this report.

5. Energy

Sector overview

37. In 1990, emissions from the energy sector amounted to 29,496.27 Gg CO_2 equivalent and accounted for 59.4 per cent of the total national emissions of Norway. According to the tier 2 key category analysis undertaken by the Party, this sector includes 18 key categories, one of which has been identified on the basis of qualitative criteria: eleven categories for CO_2 (liquid, gaseous and other fuels from stationary combustion; road transportation, navigation, civil aviation and other transportation from mobile combustion; and oil and natural gas from fugitive emissions); five sources for CH_4 (biomass from stationary combustion, oil and natural gas, and coal from fugitive emissions) and two sources for N_2O (liquid fuels from other sectors and road transportation from mobile combustion). The secretariat's tier 1 key category assessment identified 10 key categories. In general, the aggregated results of the Party's assessment are in agreement with those of the secretariat.

38. The NIR and the CRF contain emission estimates for all direct and indirect GHGs from practically all subcategories. Certain subcategories under fugitive emissions are reported as included elsewhere ("IE"). However, neither in the NIR nor in the CRF is it explained how the emissions from each of these subcategories are estimated and allocated. The absence of these estimates may not indicate gaps; however, the ERT recommends that Norway re-examine whether these estimates should be reported as "IE" or as not estimated ("NE").

39. Overall, the methodological approach, the AD, the EFs and the energy contents used to estimate emissions for the energy sector are presented in the NIR in a transparent manner. Tier 2 methods and country-specific EFs are used for a large number of categories. With a few exceptions, AD are compiled by the SSB, which is also in charge of estimating the emissions of the energy sector, based on its own databases and on plant-specific data compiled by the SFT. The NIR provides the annual energy balances for the period 1990–2004 and gives an overall description of the energy accounts and energy source balance sheets, although it does not give enough specific information about how they are used in inventory preparation. The ERT recommends that Norway enhance the transparency of its reporting by including a description of the energy statistics and specifying what information is required for the preparation of the inventory. In particular, this means (a) replacing the energy balance sheets provided in annex IV to the NIR by the energy sources balance sheets which contain disaggregated information for petroleum products; and (b) including further information about those cases where the classifications in the AD used to estimate emissions and the energy statistics provided in the NIR differ.

40. Specific QC checks include comparisons between plant-specific data from the SFT and estimates made by the SSB, comparisons of bottom-up and top-down fuel consumption in road transportation, and independent methods to estimate EFs for coal mining. In spite of these checks, small errors and inconsistencies were detected during the in-country visit, such as the misallocation of coke oven gas and refinery gas under gaseous fuels in the tier 2 category assessment and inconsistent information reported for the previous (2005) submission in CRF table 8(a)s1. The ERT recommends that the implementation of QC procedures be strengthened.

41. Energy statistics are compiled at the SSB by the Department of Economic Statistics, which is also responsible for providing statistical information to the International Energy Agency (IEA) and is in charge, together with staff from the SFT, of the preparation of the inventory for the energy sector. During the in-country visit, Norway provided a thorough description of the principles, methodology, data sources and uncertainty associated with the national energy balance. In addition, the ERT was given detailed information on the statistics of deliveries of petroleum products and of energy use in manufacturing industries and mining. The Norwegian inventory team confirmed to the ERT that the

figures sent to the IEA are completely consistent with those used to estimate emissions in the national GHG inventory. The inventory team also explained that different data processing (using, for example, values for the energy content of fuels) and aggregation approaches as between the IEA and Norway's inventory team may be the main underlying reason for the discrepancies between these two sets of data. The ERT encourages Norway's plan to assess these discrepancies and suggests that Norway carry out a comparative evaluation between the data reported by the IEA and those originally sent by the Party to the IEA.

42. Emission estimates have been recalculated for all years, mainly due to the updating of AD and the revision of the energy accounts. There are some inconsistencies in the information reported for the previous (2005) submission in CRF table 8(a)s1. Using the data of the 2005 submission, the ERT estimated that the recalculations for 1990 in the energy sector result in an increase in the figures for the aggregated emissions of CO_2, CH_4 and N_2O of 212.01 Gg CO_2 equivalent. The increases in the figures for the emissions of CO_2 (0.9 per cent) and CH_4 (3.1 per cent) are mainly due to the inclusion for the first time of the activities of Russian coal power plants in Svalbard under public electricity and heat production and fugitive emissions from coal mining and handling, respectively. The decrease in the figures for the emissions of N_2O (by 16.1 per cent) is due to the change of the EFs under road transportation.

Reference and sectoral approaches

Comparison of the reference approach with the sectoral approach and international statistics

43. In 1990, CO2 emissions estimated by the reference approach are 13.1 per cent higher than those estimated by the sectoral approach. By type of fuel, the differences are 19.7 per cent for liquid fuels, –40.6 per cent for solid fuels and 2.1 per cent for gaseous fuels. However, the differences in energy consumption are larger, with 37.2 per cent for liquid fuels, 56.0 per cent for solid fuels and–10.9 per cent for gaseous fuels. Although explanations are not provided in the CRF, the NIR summarizes the inter-annual fluctuations in the differences between the two approaches in the period 1990–2004 and proposes possible causes. During the in-country visit, the Norwegian inventory team confirmed that for some years there have been comparatively large differences between the values of apparent consumption and use for oil and natural gas in the energy balance. These statistical differences may be caused by the uncertainty of the data reported for production and exports. Although efforts are made to ensure complete coverage of the production of all oil and gas fields, some inconsistencies remained, which could be explained by difficulties with the split between different oil products and between crude oil, condensate and natural gas liquids, and non-registered distribution losses for gas. There are plans to review the methods used for data revision and for processing the statistics of production and foreign trade statistics, and to assess possible ways to improve them. The ERT encourages Norway in its efforts to reconcile the methods used in estimating the AD for the two approaches.

International bunker fuels

44. Jet kerosene consumption in international aviation is estimated as the difference between total sales and domestic consumption by civil and military aviation. For the period 1990–1994, domestic consumption is estimated by extrapolating fuel consumption for the period 1995–2004, for which the data set is complete, on the basis of kilometres flown. Sales figures are used for the minor use of aviation gasoline. Sales figures for international transport from the SSB are used as the AD for marine gas oil, heavy distillates and heavy fuel oil use in international navigation.

Feedstocks and non-energy use of fuels

45. In the reference approach, the non-energy use of bitumen, lubricants, liquefied petroleum gas (LPG), coal, coke oven coke and petroleum coke is taken into account. The IPCC default values are used for the fraction of carbon stored in bitumen and the use of LPG as feedstock, and a country-specific value

is used for lubricants, while the amounts of carbon present in the coal, coke oven coke and petroleum coke that are used as reducing agent are directly subtracted. In the sectoral approach, this type of use is accounted for in the industrial processes sector in line with the IPCC good practice guidance.

Key categories

Stationary combustion: liquid, gaseous, biomass, other fuels – CO_2, CH_4, N_2O

46. In energy industries, manufacturing industries and construction, plant-specific data are used to estimate emissions, which can be considered as a methodological refinement according to the IPCC good practice guidance. Key issues concerning the inclusion of this type of data – namely the statistical relationship between the AD for individual plants and the whole subcategory, the availability of plant-specific data for CO_2 but not for the other GHGs, time-series consistency and recalculations back to 1990 – are adequately explained. The ERT commends Norway for its effort to implement a system that is capable of handling these estimations. However, there is room for improvement. The ERT recommends that Norway: critically assess any possible under-/overestimations that may lead to bias; exploit the information compiled and evaluate the possibility of updating the inventory EFs; and assess the consistency of the links between the GHG inventories, annual reporting from companies and information from emissions trading. The Norwegian inventory team may also like to consider preparing a background document on the use of plant-specific data in the GHG inventories.

Stationary combustion: liquid, gaseous, other fuels – CO_2

47. Plant-specific CO_2 emission data for the largest plants have been used for the inventory over the last ten years. A major revision of the plant-specific CO_2 data was undertaken in 2005–2006. The CO_2 emissions reported amount to about 3,000 Gg in 1990, increasing to about 4,500 Gg in 2004. Around 70 per cent of these emissions are associated with the use of coke oven gas, while the remaining 30 per cent are mainly associated with the use of coke, residual fuel oil and refinery gas. The SFT has performed checks of emissions versus energy consumption; however, the SSB has not yet rechecked whether the same energy data have been used by both institutions. The SSB will include checks of reported emissions against energy consumption in its future inventory work. There is also an ongoing process to improve the coordination of consumption data that the plants report to the SFT and the SSB. The ERT encourages Norway's efforts to reconcile the AD compiled from different information sources.

Stationary combustion: liquid fuels – CO_2

48. The IEFs for CO_2 from petroleum refining for most years in the period 1990–2004 (35.6–44.7 t/TJ) are the lowest of reporting Parties (the range is 34.3–87.1 t/TJ) and lower than the IPCC default range (63.1–100.8 t/TJ). During the in-country visit, the Norwegian inventory team informed the ERT that these low IEFs may be associated with an erroneous allocation of reported emissions from one refinery to carbon monoxide (CO). The ERT recommends Norway to review this and, if necessary, reallocate the emissions. During the course of the review, Norway informed the ERT that this has been corrected.

Fugitive emissions: oil and natural gas – CO_2, CH_4

49. Emissions from the subcategory oil exploration (1.B.2.a.i) are reported as "IE" and the CRF tables state that these emissions are included under flaring (1.B.2.c). Emissions from the subcategory oil production (1.B.2.a.ii) are reported as "IE" and the CRF tables state that these emissions are included under refining/storage (1.B.2.iv). Emissions associated with natural gas from the subcategories exploration (1.B.2.b.i), production/processing (1.B.2.b.ii), transmission (1.B.2.b.iii) and distribution (1.B.2.b.iv) are reported as "IE" and the CRF states that all these emissions are included under other leakage at industrial plants and power stations (1.B.2.v.i). However, the NIR does not explain how the estimates for each of these subcategories are calculated and included under the corresponding

subcategories. The ERT recommends that Norway clarify whether these emissions are included elsewhere or are not in fact estimated. The ERT also recommends Norway to include in the NIR a list of the main activities carried out at the two existing gas terminals for which the associated GHG emissions have been accounted for in the inventory.

6. Industrial processes and solvent and other product use

Sector overview

50. In the base year (1990), the industrial processes sector accounted for 27.5 per cent of total national GHG emissions, one of the highest shares among reporting Parties. CO_2 represented 44.0 per cent of the sector's emissions in 1990, N_2O 15.1 per cent, PFCs from aluminium production 24.7 per cent and SF_6 from use in magnesium foundries 15.7 per cent. Between 1990 and 2004, emissions from the sector fell by 24.2 per cent, mainly due to decreases in PFC emissions from aluminum production (by 73.9 per cent), in CO_2 emissions from carbide production (74.6 per cent) and in N_2O emissions from nitric acid production (10.5 per cent). CO_2 emissions from aluminium production and HFC emissions from refrigeration have increased significantly since 1990. Both actual and potential emissions for individual F-gases are reported. CO_2 emissions from solvent and other product use decreased by 12.2 per cent from 1990 to 2004.

51. For industrial processes, Norway, using the tier 2 key category analysis, identified 10 key categories, which are the same as those identified by the secretariat. In addition to the Party, the secretariat identified CO_2 from iron and steel production as a key category (on both level and trend assessment) in 2004.

52. The ERT found that significant improvements have been made in the time-series consistency of this sector as a result of a thorough analysis of the methods and plant-specific data used in the sector, for which the Party is commended. This resulted in recalculation of the full time series of almost all categories. The ERT noted that the documentation could be further improved by updating the methodology sections where recalculations have occurred. The ERT also recommends Norway to improve the transparency of the recalculations by presenting the time series of changes at subcategory level showing the differences each year.

53. The Party has made significant improvements in the documentation in the NIR of this sector compared to the 2005 submission. However, the transparency and comparability of the emissions reported, which are mostly based on higher-tier methods using plant-specific data reported by individual companies, could still be improved, as previous review reports have noted. The methods used and explanations of significant trend fluctuations and inter-annual variations, in particular regarding the IEFs as provided in the documentation in the NIR, are not described with sufficient transparency to make it possible to assess the consistency of the time series (e.g. the IEF for CO_2 from aluminium production shows inter-annual fluctuations of between –3.6 per cent and +2.5 per cent). The ERT recommends the Party to include this information in the NIR where applicable and wherever it is required to assess the emission trends.

54. The Party puts much effort into the collection and QA/QC of plant-specific data, which are available for most categories in this sector. The QA/QC system for plant-specific data, first by the SFT and then by the inventory compilation team, is currently focusing on the trends in emissions and production data, rather than on (I)EFs. The ERT recommends Norway to add an analysis of values and trends in the EFs and IEFs used in the CRF tables. In addition, the ERT recommends Norway to document source-specific QC performed by plants for key categories, as described in the IPCC good practice guidance.

55. The Party uses higher-tier methods for all key categories. Norway also uses plant-specific or country-specific EFs for almost all key categories and often for other categories as well, for which it is commended. The CRF tables are mostly complete, except for a few missing AD (e.g. for lime production, limestone and dolomite use, ammonia production (in 1990), metal production – other (2.C.5), food and drink production (2.D.2)), some of which are included in the 2007 submission. The notation keys (e.g. for methanol production (2.B.5), consumption of halocarbons and SF_6 in electronic equipment, other consumption of halocarbons and SF_6 (2.F.9)) are sometimes used incorrectly, and some IEFs (e.g. for HFC-134a in 2000, 2003 and 2004) are missing. The ERT recommends that Norway enhance the completeness of the reporting in its future inventory submissions.

56. Norway reports a complete time series of emissions for all gases and categories, except for CO_2 from the use of lubricants and waxes. As suggested by the ERT, during the review Norway provided estimates of the corresponding CO_2 emissions of these missing sources. The ERT recommends the Party to report CO_2 emissions from limestone use in magnesium production under limestone use (2.A.3) instead of under metal production, other (2.C.5) and CO_2 from flaring of natural gas from production of methanol under methanol (2.B.5) instead of under waste incineration (6.C) as recommended in the Revised 1996 IPCC guidelines (and also noted in the waste section, paragraph 91).

57. Improvements to methods are not always reflected in the uncertainty estimates. The ERT recommends Norway to improve the link between methodological changes and the uncertainty estimates and to update the uncertainties where appropriate, for example, by a systematic analysis of the standard deviation in IEFs, by comparison with specific measurement data and by reassessing relatively low or high uncertainties.

Key categories

Cement production – CO_2

58. The methodology used and the inter-annual fluctuations of the EF for cement production, in particular between –6 per cent and +7 per cent from 2001 to 2004, are not well explained in the NIR. During the review the Party explained that the EF is determined by the plant from the annual average lime (CaO) content in the different clinker types and using a cement kiln dust (CKD) factor of 1. As in previous review reports, the ERT recommends Norway to use this information in the NIR to explain and justify the values and changes over time.

Ammonia production – CO_2

59. The IEF for CO_2 from ammonia production shows a decreasing trend, including from 1990 to 1991, and a peak in 1997, which is not well explained in the NIR. During the review Norway explained the trend by the capture and sale of part of the CO_2 generated and by production problems in 1997. The ERT recommends the Party to present in the NIR the time series of gross CO_2 emissions to enable it to review the actual IEF values and their trends and to compare them with those of other Parties. In addition, as in previous reviews, Norway is recommended to clarify in the NIR and corresponding documentation box of the CRF, how much CO_2 emissions per year is captured and sold or reported elsewhere in the inventory and in which subcategory this amount is reported.

Nitric acid production – N_2O

60. The IEF of N_2O from nitric acid production is 36.7 cent higher in 1990 than in 1993, which is not well documented in the NIR. During the review the Party provided sufficient information to explain this trend, which was due to the starting up of a new integrated production facility in 1993 with a significantly lower EF than the other four existing facilities; the new facility has also had a large share in total production since then. In addition, the ERT observed that inter-annual fluctuations in the period 1997–2004 are not explained in the NIR, but was also informed that at some facilities emissions are

determined by monthly measurements. The ERT recommends Norway to perform additional QC on the accuracy in annual emissions achieved with monthly measurements and to provide an explanation and justification of the level and trend of the IEF in the NIR, as provided during the review.

Carbide production – CO_2

61. The Party has changed its method for calculating CO_2 from silicon carbide production from the mass balance method described in the Revised 1996 IPCC Guidelines (using input of reducing agents) to an EF-based method (using crude silicon carbide production as activity data), although data on the input of reducing agents are available. The ERT concluded that the two methods provide very similar results, except for 1990, and that the use of the present method is justified. Norway checked the AD used for 1990 in both methods and responded that the relatively large difference in 1990 is caused by a higher uncertainty in the carbon consumption data in the early 1990s due to the use of purchase data as a proxy for carbon consumption, instead of the (more accurate) silicon carbide production data. The ERT concluded that this is a fair explanation of the difference and recommends Norway to include this information in the NIR.

62. In addition, the ERT recommends that the Party better explain and justify in the NIR why the EF-based method is now being used instead of the mass balance method. Moreover, the trend in CO_2 emissions (e.g. the increase of about 20 per cent over the period 1994–1998 and the 41.6 per cent decrease between 2003 and 2004) and the 14.5 per cent increase in the IEF in 2004 are not explained. The ERT recommends Norway to provide this information in the NIR.

Ferroalloys production – CO_2

63. The IEF of CO_2 from ferroalloys production in 1990 is the highest among reporting Parties. The decreasing trend from 1990 to 1993 and the peak around 2002 are not explained in the NIR. During the review the Party explained that the declining trend to 2000 and the peak around 2002 are due to sales of CO for energy production and that the decrease from 1990 to 1993 is due to incomplete activity data (input of reducing agents), but certified that the CO_2 emissions were reported correctly. The use of the revised data for total reducing agents for 1990 provides an IEF at a normal value. The ERT recommends Norway to provide this additional information in the NIR. The Party also intends to do this. In addition, as in previous reviews, Norway is recommended to clarify where in the energy sector the CO_2 emissions from combustion of CO are reported.

Aluminium production – PFC

64. The decreasing trend of PFC emissions from aluminium production from 1990 to 1992 (of 30.5 per cent) and onwards (a total of 82.8 per cent in the period 1990–2004) is not explained in the NIR. During the review, data provided by the Party showed that most of the changes can be explained by the changing shares of different production technologies: the three distinct decreases are mainly due to changes from centre worked prebaked (CWPB) or Vertical Stud Søderberg (VSS) to point feed prebaked (PFPB). Further decreases are due to further process optimization that reduces the anode effect minutes. The ERT recommends Norway to provide this information in the NIR as it explains and justifies the level and trend of the IEF (e.g. trends in shares of process technologies).

Consumption of halocarbons – HFCs

65. The IEFs of HFCs from leakage ("product life factor") from commercial and industrial refrigeration, refrigerated transport and for mobile air conditioning are lower than the IPCC default ranges, and the IEF for mobile air conditioning is also lower than those of several other comparable Parties. The ERT recommends Norway to reassess the present country-specific values and provide more justification in the NIR of the leakage rates used. It also recommends Norway to clarify in the NIR which leakage rates are used per application and to identify which of them are country-specific values.

Non-key categories

Ferroalloys production – N_2O, CH_4

66. Norway reports N_2O emissions from ferroalloys production, a source not described in the Revised 1996 IPCC Guidelines. In the 2006 inventory submission these N_2O emissions for 1990 were 20.8 per cent higher than in 1991, and the determination of the EF and the rationale for its application are not described in the NIR. In the course of the in-country review, following the ERT's recommendation, Norway provided revised estimates for both N_2O and CH_4 emissions for this category, which resulted in a 93.1 per cent lower value for CH_4 (1.0 Gg CO_2 equivalent) and a 92.8 per cent lower value for N_2O (5.2 Gg CO_2 equivalent). The revision of the estimates reduces estimated N_2O and CH_4 emissions from total metal production in 1990 by 0.8 per cent (81.9 Gg CO_2 equivalent) compared to the estimates in the 2006 inventory submission. In addition, some documentation on the presence of N_2O and CH_4 emissions, and revised EFs which differ by type of metal produced and by type of process, were provided. Although Norway could not fully explain how these EFs were determined, the ERT concluded that the set of EF values used largely represent the longer-term average N_2O and CH_4 concentration measurements outside the peaks in concentrations. The peaks in concentration occur due to avalanches (sudden fall of large amount of colder charge into the furnace) that occur from time to time, and thus can be regarded as conservative and acceptable, in particular for the early 1990s when the avalanches were more frequent. However, the ERT recommends Norway to explain transparently in the NIR how the EFs were determined and encourages Norway to reassess the EFs used while incorporating the impact of the peaks in the EF value.

Lubricant and paraffin wax use – CO_2

67. In its 2006 inventory submission, Norway has not estimated CO_2 emissions from the use of lubricants and paraffin waxes. In the course of the review, following the recommendation of the ERT, Norway provided estimates of 9.0 Gg CO_2 equivalent from category other (2.G) for 1990. The ERT concluded that the method used to estimate CO_2 from paraffin wax use from the production, import and export of candles ensures that paraffin wax in imported candles (which are not part of the energy statistics) are included in the AD, and that this is in line with the IPCC good practice guidance. As this is a rather small source, the ERT considers the use of a fixed country-specific fraction of all candles made of paraffin waxes also good practice. CO_2 from lubricant use is estimated only for the use in two-stroke engines, resulting in 100 per cent CO_2 emissions. The ERT concluded that other uses of lubricants (e.g. as grease) are apparently neglected or are assumed not to result in CO_2 emissions (i.e., oxidation factor = 0), and that the assumption that no emissions occur from other lubricant uses ensures that the emissions from lubricant use are not overestimated. The ERT recommends Norway in future submissions to revise the estimates for feedstocks and non-energy use of fuels (1.A(d)) accordingly and to include (more) explicitly the non-energy use of paraffin waxes.

Solvents and other product use – CO_2

68. The ERT observed inconsistencies in the time series for CO_2 from degreasing and chemical products for the two years 1992–1993, which the Party explained during the review as being caused by allocation issues due to a change in economic classifications. The ERT encourages Norway to improve the allocations and recommends it to explain why these subcategories show these inconsistencies of trend in the NIR. In addition, the ERT observed that CO_2 from other non-methane volatile organic compounds (NMVOCs) (3.D.5) has been kept constant since 2000, which the Party explained as being due to a lack of recent monitoring data. The ERT encourages Norway to update this category, which the Party intends to do in the 2008 submission.

7. Agriculture

Sector overview

69. In the base year (1990), GHG emissions from the agriculture sector amounted to 4,444.62 Gg CO_2 equivalent, or 9.0 per cent of national total emissions. The largest contributors in the sector were N_2O from agricultural soils (45.8 per cent of total sectoral emissions), CH_4 from enteric fermentation (43.8 per cent of total sectoral emissions), and emissions from manure management (CH_4 and N_2O) (9.7 per cent of total sectoral emissions). These are also key categories.

70. The inventory report includes information on key categories, methods, data sources, EFs used, uncertainty estimates and QA/QC procedures, and contains most of the information needed for replication of the inventory. Recalculations have been made for the whole time series due to revision of the statistics of animal populations, changes in the ammonia (NH_3) model, and improvements to the activity data. The ERT recommends that Norway continue its efforts to give more details on the methods and models used in the estimates. In particular, Norway should provide more information on the country-specific methods and models used.

Key categories

Enteric fermentation – CH_4

71. Enteric fermentation contributed 1,946.11 Gg CO_2 equivalent emissions in the base year, or 3.9 per cent of total national GHG emissions. These emissions have been fairly stable over the time series with some minor fluctuations. They decreased by 2.6 per cent over the period 1990–2004. Norway has changed its methodology to a tier 2 methodology for estimating CH_4 emissions from cattle and sheep in the 2006 submission in response to the recommendations of previous reviews. CH_4 emission estimates for the other livestock categories are based on tier 1 methods. This is in line with the IPCC good practice guidance.

72. As indicated in previous reviews, Norway should provide more information in the NIR regarding the estimation parameters and the estimation of uncertainties. The ERT noted that the NIR states that new revised figures for the population of different animals have been used for the whole time period 1990–2002 and that no recalculations have been carried out since last year, but considers that this cannot be correct as Norway has moved to a tier 2 method for cattle and sheep, and thus recalculations have occurred. The ERT recommends Norway to reflect recalculations correctly in its future NIRs.

Agricultural soils – N_2O

73. In the base year, emissions of N_2O from agricultural soils amounted to 2,036.21 Gg CO_2 equivalent. They accounted for 4.1 per cent of total national emissions and had decreased by 3.0 per cent over the period 1990–2004. Following the recommendation of the previous ERT, Norway has clearly elaborated the information on country-specific values for nitrogen (N) lost due to leaching and surface run-off ($Frac_{LEACH}$) in the NIR. The ERT commends Norway's efforts.

Manure management – CH_4, N_2O

74. In the base year, CH_4 emissions due to manure management amounted to 298.17 Gg CO_2 equivalent. N_2O emissions due to manure management amounted to 133.36 Gg CO_2 equivalent. Norway uses the tier 2 methodology for estimating CH_4 emissions and tier 1 with country-specific values for N excretion and for the fraction of total excretion per species for each management system. This is in line with the IPCC good practice guidance.

75. As indicated in previous reviews, more information could be given in order to improve transparency and to explain the differences between country-specific parameters and the IPCC default parameters, especially regarding the NH_3 model.

8. Land use, land-use change and forestry

Sector overview

76. Norway has followed the IPCC good practice guidance for LULUCF. Consistent methodologies and data are used for 1990 and all subsequent years, and tier 2 and higher methodologies have been used to calculate removals from key categories. In the base year (1990), the LULUCF sector was a net sink (of 14,568.15 Gg CO_2 eq.) and offset 29.4 per cent of total national emissions. Change of living biomass in forests is a sink and dominates this sector; other categories are sources of emissions. According to the uncertainty analysis provided in the NIR, change in living biomass is considered to have a relatively high accuracy in comparison to other categories.

77. Net CO_2 removals by the sector increased by 80.6 per cent over the time series – from 14,568.15 Gg CO_2 equivalent in 1990 to 26,307.50 Gg CO_2 equivalent in 2004. The main factor in this growth was an increase in carbon stock change in living biomass of forest land by 94.1 per cent. This included a 52.1 per cent increase from 1997 to 1998 and a 28.5 per cent increase from 1999 to 2000. Cropland also contributed to the change in the sector: its emissions decreased by 71.6 per cent, from 479.33 Gg CO_2 equivalent in 1990 to 136.57 Gg CO_2 equivalent in 2004. These sudden changes are caused by incorporation of the results of an updated national forest inventory, although interpolation between the different forest inventory data sets has been applied in order to smooth out the variations.

78. The ERT notes some inconsistencies between the NIR and the CRF tables. For example, for the category land converted to forest land, only the land area is reported in the CRF tables, while the NIR indicates that the changes in carbon stocks have been calculated. The ERT recommends Norway to improve the consistency of the information in the NIR with that in the CRF tables. Furthermore, the documentation boxes of the CRF tables are mostly empty, and some inconsistencies were found in the use of the notation keys. For example, Norway reports land areas for cropland converted to settlement, wetlands converted to settlements, and other land converted to settlements, while the changes in carbon stocks are reported as not occurring ("NO"). The ERT recommends Norway to explain this in its future inventory submissions. Norway should also fill the documentation boxes correctly and use the notation keys in the CRF tables consistently.

79. The implementation of the category-specific QA/QC procedures is partly still under way. The ERT recommends Norway to allocate adequate resources to carrying out category-specific QA/QC and to pay careful attention to consistent reporting and completeness in this sector.

Key categories

Forest land remaining forest land – CO_2

80. Norway has applied an updated country-specific method, which is tier 3, to estimate the change in carbon stocks in living biomass, dead organic matter and soil organic matter. This is in line with the IPCC good practice guidance for LULUCF for a key category. Living biomass is the most significant subcategory in forest land remaining forest land and the change in carbon stock in this pool is responsible of the increase in the trend of the net removals in the LULUCF sector. The rapid increase in the carbon stock in living biomass has been explained by the incorporation of the results of the updated national forest inventory which provided new AD and parameters. According to the Norwegian forest statistics, net increment of tree volume increases steadily and is the main driver behind the change in living biomass. The ERT encourages Norway to find ways to reconcile the difference between the trends in the driver and in the change in biomass stock.

81. Improved equations for biomass calculation have been applied by Norway for living biomass in its 2006 submission. The ERT appreciates the effort made by Norway to perform recalculations for the whole time series taking into account the new information in order to fulfil the requirements of the IPCC good practice guidance. Recalculations are reported not only for living biomass but also for dead organic matter and soil organic carbon. The recalculations have resulted in an increase in estimated net removals compared to the previous (2005) submission.

82. Drained organic soil is also a significant subcategory and Norway has estimated the emissions of CO_2 using national AD and the IPCC default EF. The ERT encourages the Party to develop country-specific EFs to be used in future submissions or to demonstrate that the default EF corresponds to its national circumstances.

Grassland remaining grassland – CO_2

83. The change in carbon stock in organic soils is identified as a significant subcategory and is the only subcategory that has been estimated. A country-specific EF and constant area for the whole time series have been used. The ERT recommends Norway to further clarify in its future submissions why the land area of organic soils has remained constant. The Party should also consider carbon stock change in living biomass. The ERT commends the intention of Norway to consider the uptake of carbon by abandoned organic soils in its future GHG inventory submissions.

Cropland remaining cropland – CO_2

84. CO_2 emissions from cropland remaining cropland decreased from 188.6 Gg CO_2 in 1990 to 42.9 Gg CO_2 in 2004. The main cause of this decrease was the changed tillage practice. The carbon stock change in histosols is the most significant subcategory and Norway has used the tier 2 method to estimate the CO_2 emissions, which is in line with the IPCC good practice guidance.

85. The whole time series has been recalculated due to changes in methods and the updating of parameters and data. Norway explained to the ERT during the review that the subcategory horticulture has been reported in the CRF tables by mistake and that there should be no net change. The ERT recommends the Party to correct this in its future submissions.

Non-key categories

Land converted to settlement – CO_2

86. From the NIR, the ERT identified that Norway has reported only emissions from conversion of forest. Emissions from this land-use conversion are calculated using forest inventory data and country-specific parameters. Emissions in 1990 (221.1 Gg CO_2 equivalent) were the lowest in the period 1990–2000 and 26.8 per cent higher than the emissions in 2004. The annual emissions fluctuate between 174.4 Gg CO_2 equivalent in 2004 and 650.7 Gg CO_2 equivalent in 1999 without any clear trend caused by variability in annually deforested areas. Recalculations have been made due to changes in AD and parameters, and have resulted in a decrease in estimated emissions. The ERT encourages Norway to continue reporting this category.

9. Waste

Sector overview

87. In the base year (1990), the waste sector contributed 3.7 per cent to the total national GHG emissions of Norway. Emissions decreased from 1,837.06 Gg CO_2 equivalent in 1990 to 1,575.68 Gg CO_2 equivalent in 2004 – a 14.2 per cent decrease. This trend, as explained by Norway in the NIR and during the in-country review, is the consequence of the implementation of several measures since 1990. The measures include a reduction in the amount of organic waste landfilled, and an increase in the

collection and combustion of methane from landfills. In addition, Norway indicates that the recycling of waste has significantly increased since 1990. CH_4 from solid waste disposal on land is the major contributor and is responsible for this trend: its contribution to the total emissions ranges from 88.0 per cent to 94.3 per cent over the inventory period (1990–2004).

88. The inventory in the waste sector is almost complete as it covers all categories and gases for all years 1990–2004 except N_2O emissions from wastewater handling, which are missing. Norway has made considerable improvements in both the methodologies used and data preparation. The methodologies used are transparent, but some additional information was provided during the visit to increase the overall transparency of methods, data and assumptions used. The ERT recommends Norway to report the additional information in its future submissions.

89. Recalculations are reported in the NIR for 1990 due to methodological changes and collection of new data. During the review process, Norway revised some estimates in response to questions raised by the ERT, not only to complete the emission estimates for wastewater handling but also to provide revised estimates for CH_4 emissions from landfills (already reported in the 2007 submission) and CH_4 and N_2O emissions from wastewater handling. The ERT recommends that in its future inventory submissions Norway report revisions in CH_4 and N_2O emissions from wastewater handling in order to improve the completeness and accuracy of the inventory.

90. Category-specific QA/QC procedures have been implemented on the input data as well as the emissions estimates. Norway has provided the uncertainty associated with the data used and emission estimates based on a tier 2 analysis, which is in line with the IPCC good practice guidance.

91. In general, emissions are reported under the appropriate categories, except for emissions from flaring of natural gas from production of methanol, which should be reported in the industrial processes sector in accordance with the IPCC good practice guidance, and not under waste incineration. The ERT recommends Norway to reallocate these emissions in its future inventory submissions.

Key categories

Managed waste disposal on land – CH_4

92. Norway used the first order decay model described in the recently published recognized international scientific literature to calculate CH_4 emissions from managed waste disposal on land. The model spreadsheets used and proper explanations were provided during the review. To apply the model, Norway collected and prepared sufficient historical and current data using different sources (surveys, literature) and techniques (interpolation, extrapolation). The spreadsheets used to implement the interpolation and extrapolation techniques in order to address some data gaps were provided by the Party and reviewed by the ERT during the in-country review visit. The ERT identified that the extrapolation and interpolation are either linear or with driver (population). The ERT encourages Norway, in future inventory submission, to use more drivers (e.g. policies, gross domestic product, population) for the extrapolation and interpolation, if this increases the accuracy of the estimates.

93. Norway has used a combination of IPCC default parameters (e.g. fraction of degradable organic carbon (DOC) dissimilated, oxidation factor, methane correction factor (MCF), and fraction of CH_4 in landfill gas) and country-specific data (e.g. DOC, half-life time). Documentation on the country-specific parameters has been provided only during the review. Norway is encouraged to indicate the references to data used in the future submissions.

94. During the in-country review, Norway presented the recalculations, already reported in the 2007 submission, and justified these recalculations by the fact that reliable information on the distribution of waste by material, the DOC and the half-life time has been collected from new studies. The documentation on the new data was provided to the ERT and the recalculations clearly show an

overestimation of emissions for the whole time series for the 2006 inventory submission. Following the recommendation of the ERT, during the review process Norway provided revised estimates for CH_4 emissions from landfills. The revised estimate – 1705.56 Gg CO_2 equivalent in 1990 – is 6.6 per cent lower than the initial estimate of the 2006 inventory submission. The ERT recommends that Norway report the reasons for the recalculation clearly in its future submissions.

Non-key categories

Wastewater handling – CH_4

95. From the NIR, the ERT identified that the IPCC tier 1 method used has not been properly applied. The parameter reported in the NIR as the MCF does not correspond to the IPCC definition. That parameter is actually the fraction of domestic and commercial wastewater treated in "sealed tank" and "separate toilet system" in Norway. That fraction, which is suspected to be high in the 1990s, is reported as a constant for the whole time series without any justification being given. In response to the recommendation from the ERT on the method to be used, during the review process Norway provided revised estimates of CH_4 emissions from wastewater handling (14.2 CO_2 equivalent for 1990) together with supporting material including, for example, the spreadsheet used, the appropriate MCF for "sealed tank" and "separate toilet system", and the data on population, all of which the ERT reviewed. IPCC default factors for biochemical oxygen demand (BOD5) and methane producing capacity (Bo) have been used to estimate emissions from domestic and commercial wastewater and sludge. The revised estimate for 1990 is 27.4 per cent lower than the initial estimate submitted in the 2006 inventory. The ERT recommends Norway to follow the revised methodology in its future inventory submissions.

96. During the review process, the Party also clarified how CH_4 emissions from wastewater of breweries, dairies and slaughterhouses have been calculated. The ERT recommends that, for transparency, Norway report that clarification in its future submissions.

Wastewater handling – N_2O

97. Norway has used a country-specific method based on nitrification and denitrification to estimate N_2O emissions from human sewage. The method is not transparently reported. Moreover, it applies only to the population connected to sewage plants, so that the estimate in this category is incomplete. During the in-country visit and following the recommendation of the ERT, the Party provided a calculation of the missing estimate of 26.0 Gg CO_2 equivalent for 1990 using the IPCC default method to the population not connected to sewage plants. Furthermore, during the review process, the Party provided revised estimates for the N_2O emissions from the nitrification and denitrification process. Taking into account the missing estimate and the revised estimate, the Party provided a new estimate of total N_2O emissions from wastewater handling, of 117.08 Gg CO_2 equivalent in 1990, which is 28.6 per cent higher than the initial estimate reported in the 2006 submission. The ERT recommends the Party to achieve completeness in this category and report these emissions using the revised method in its future inventory submissions.

98. The ERT appreciated that N_2O emissions from sludge spreading on agricultural soils are reported under agriculture. This is according to the IPCC good practice guidance.

Waste incineration – CO_2

99. Norway has estimated emissions from cremation and the incineration of solid wastes, as well as flaring of natural gas from the production of methanol, using country-specific parameters. Emissions from incineration with energy recovery are reported under energy sector to be in line with the IPCC good practice guidance, and CO_2 emissions from flaring of landfill gas are excluded following the recommendation of the previous (2005) review. However, the ERT recommends that Norway report CO_2 emissions from flaring of natural gas from production of methanol (2.B.5) under industrial processes and

not under waste incineration. Norway is also encouraged to report non-CO_2 emissions, since country-specific EFs are available.

C. Calculation of the assigned amount

100. The assigned amount pursuant to Article 3, paragraphs 7 and 8, has been calculated in accordance with the annex to decision 13/CMP.1.

101. Norway's base year is 1990 and the Party has chosen 1990 as its base year for HFCs, PFCs and SF_6. Norway's quantified emission limitation is 101 per cent as included in Annex B to the Kyoto Protocol.

102. Based on Norway's base year emissions – 49,792,386 tonnes CO_2 equivalent – and its Kyoto Protocol target (+1 per cent), the Party calculated its assigned amount to be 251,451,551 tonnes CO_2 equivalent.

103. In response to inventory issues identified during the review Norway submitted revised estimates of its base year inventory – 49,619,168 tonnes CO_2 equivalent – which resulted in a recalculation of the assigned amount. Based on the revised estimates, the Party calculates its assigned amount to be 250,576,797 tonnes CO_2 equivalent. The ERT agrees with this figure.

D. Calculation of the commitment period reserve

104. The calculation of the required level of the commitment period reserve is in accordance with paragraph 6 of the annex to decision 11/CMP.1.

105. Based on its calculated assigned amount – 251,451,551 tonnes CO_2 equivalent – Norway calculated its commitment period reserve to be 226,306,396 tonnes CO_2 equivalent.

106. In response to inventory issues identified during the review, the Party submitted revised estimates of its base year inventory, which resulted in a recalculation of the commitment period reserve. Based on the revised estimates, the Party calculates its commitment period reserve to be 225,519,117 tonnes CO_2 equivalent. The ERT agrees with this figure.

E. National registry

107. Norway has addressed most of the information on the national registry system required by the reporting guidelines under Article 7, paragraphs 1 and 2, of the Kyoto Protocol (decision 15/CMP.1). However, the coverage – of all required topics – is limited. The ERT therefore considers the information provided not to be transparent and therefore not fully in accordance with requirements of the UNFCCC reporting guidelines. The ERT recommends that Norway provide more complete and detailed information in its future submissions under the Kyoto Protocol.

108. In the initial report Norway mentions that it will use the Greta software which will fulfill all requirements of emissions trading under the Kyoto Protocol and will be in accordance with the UNFCCC data exchange standards (DES). In the course of the review Norway provided further information as follows:

(a) A list of registry information which will be publicly available: Norway did not provide a list but mentioned that all information required under decisions 5/CMP.1, 13/CMP.1 and 14/CMP.1 would be included in the next Greta software release and consequently made publicly accessible through the registry homepage. In addition, Norway mentioned that the information described in Annex XVI of the European Union (EU) Regulation on Registries (2216/2004) would be made publicly available when Norway joins the EU emissions trading scheme;

(b) A description of adequate procedures to minimize discrepancies in the issuance, transfer, acquisition, cancellation and retirement of Kyoto units, and to take steps to terminate transactions where a discrepancy is notified, and to correct problems in the event of a failure to terminate the transactions: Norway indicated that the communication between the Norwegian registry and the international transaction log (ITL) and the validation checks of the data entries would be implemented in accordance with the UN DES 1.0 document. In addition, Norway provided a general description of the procedures applied. Detailed procedures have been implemented and submitted to the ITL Operator in connection with the Norwegian registry initialization process. The procedures are only available in Norwegian;

(c) A description of adequate security measures to prevent and resolve unauthorized manipulations and minimize operator error, and procedures for updating them: Norway provided a draft of the completed Registry Readiness Questionnaire which addressed security measures in general terms. However, more detailed information on security measures is not provided;

(d) A plan for implementing the procedures and security measures mentioned above: Norway informed the ERT that most of the procedures and security measures mentioned have already been implemented or will be implemented before the Norwegian registry goes into live operation. However, no further details are provided, for example, an overview of which procedures/security measures are already in place and a concrete time plan for implementing those procedures/security measures which are not yet in place. However, during the review the Party stated that all these procedures and security measures will be implemented in the course of the initialization process.

109. Table 5 summarizes the information on the mandatory reporting elements on the national registry system, as stipulated by decisions 13/CMP.1 and 5/CMP.1.

110. During the in-country visit, information on the registry was not yet publicly available. The ERT noted that the initialization process was started on 13 June 2007 and was finalized on 21 September 2007.

111. During the in-country visit, the ERT gained the overall impression that the development of the registry is at a very early stage and that Norway could be more proactive in its development. Norway relies on the technical procedures (e.g. to minimize discrepancies) which are built in the Greta software being developed by the British Department of Environment, Food and Rural Affairs. Together with all other countries which are licensees of the Greta registry software, Norway actively participates in the development of these procedures, including procedures to minimize discrepancies. Implementation of procedures additional to those included in the Greta software is not planned.

112. The ERT took note of the results of the technical assessment of the national registry, including the results of standardized testing, as reported in the IAR that was forwarded to the ERT by the administrator of the international transaction log, pursuant to decision 16/CP.10, on 27 September 2007.

113. The ERT reiterated the main findings of this report, including that the registry has fulfilled all of its obligations regarding conformity with the DES. These obligations include having adequate conformity with transaction procedures, adequate security measures to prevent and resolve unauthorized manipulations and adequate measures for data storage and registry recovery.

114. Based on the results of the technical assessment, as reported in the independent assessment report, the ERT concluded that Norway's national registry is fully compliant with the registry requirements as defined by decisions 13/CMP.1 and 5/CMP.1, noting that registries do not have

obligations regarding operational performance or public availability of information prior to the operational phase.

Table 5. Summary of information on the national registry system

Reporting element	Provided in the initial report	Comments
Registry administrator		
Name and contact information	Yes	
Cooperation with other Parties in a consolidated system		
Names of other Parties with which Norway cooperates, or clarification that no such cooperation exists.	Yes	No such cooperation exists
Database structure and capacity of the national registry		
Description of the database structure	Yes	
Description of the capacity of the national registry	Partly	The initial report states that based on estimated activity in the Norwegian registry, the database possesses sufficient data capacity.
Conformity with data exchange standards (DES)		
Description of how the national registry conforms to the technical DES between registry systems	Yes	Covered in the Independent Assessment Report (IAR)[a]
Procedures for minimizing and handling of discrepancies		
Description of the procedures employed in the national registry to minimize discrepancies in the transaction of Kyoto Protocol units	Partly	General description available but no detailed information provided
Description of the steps taken to terminate transactions where a discrepancy is notified and to correct problems in the event of a failure to terminate the transaction	Partly	General description available but no detailed information provided
Prevention of unauthorized manipulations and operator error		
An overview of security measures employed in the national registry to prevent unauthorized manipulations and to prevent operator error	Partly	General description available but no detailed information provided Covered in the IAR
An overview of how these measures are kept up to date	No	
User interface of the national registry		
A list of the information publicly accessible by means of the user interface to the national registry	No	Covered in the IAR
The Internet address of the interface to Norway's national registry	Yes	<http://www.kvoteregister.no>
Integrity of data storage and recovery		
A description of measures taken to safeguard, maintain and recover data in order to ensure the integrity of data storage and the recovery of registry services in the event of a disaster	Yes	Covered in the IAR
Test results		
The results of any test procedures that might be available or developed with the aim of testing the performance, procedures and security measures of the national registry undertaken pursuant to the provisions of decision 19/CP.7 relating to the technical standards for data exchange between registry systems.	No	Not available at the time of the in-country review Test results covered in the IAR

[a] Pursuant to decision 16/CP.10, the administrator of the international transaction log (ITL), once registry systems become operational, is requested to facilitate an interactive exercise, including with experts from Parties to the Kyoto Protocol not included in Annex I to the Convention, demonstrating the functioning of the ITL with other registry systems. The results of this exercise will be included in an independent assessment report (IAR). They will also be included in the annual report to the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol.

F. Land use, land-use change and forestry parameters and election of activities

115. Table 6 shows the Party's choice of parameters for forest definition as well as elections for Article 3, paragraphs 3 and 4, activities in accordance with decision 16/CMP.1.

Table 6. Selection of LULUCF parameters

Parameters for forest definition		
Minimum tree cover	10%	
Minimum land area	0.5 ha	
Minimum tree height	5 m	
Elections for Article 3, paragraphs 3 and 4, activities		
Article 3, paragraph 3, activities	**Election**	**Accounting period**
Afforestation and reforestation	Mandatory	Commitment period
Deforestation	Mandatory	Commitment period
Article 3, paragraph 4, activities		
Forest land management	Elected	Commitment period
Cropland management	Not elected	Not applicable
Grazing land management	Not elected	Not applicable
Revegetation	Not elected	Not applicable

116. Norway's choice of the parameters to define forest are within the range specified by decision 16/CMP. The ERT noted that the forest categories and definitions used by Norway to report to the Food and Agriculture Organization of the United Nations (FAO) corresponds to the definition of forest to be reported under the Kyoto Protocol.

III. Conclusions and recommendations

A. Conclusions

117. The information in the initial report generally covers the elements as required by decision 13/CMP.1, section I of decision 15/CMP.1, and relevant decisions of the CMP. Additional information on all elements was provided to the ERT during the in-country review.

118. Norway has a national system in place in accordance with the guidelines for national systems under Article 5, paragraph 1. The legal, institutional and procedural arrangements have been made. QA/QC procedures are in place although there is some scope for improvement.

119. The GHG inventory is largely complete in terms of coverage of years, sectors and gases. Norway's GHG inventory is in general accurate as defined in the UNFCCC reporting guidelines and is consistent with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. During the in-country review the ERT identified a few categories where methods or EFs used were not fully in accordance with the IPCC good practice guidance. The ERT recommended Norway to revise its estimates for these categories. After the in-country review, Norway provided revised estimates for these categories for the base year and 2004 in accordance with the recommendations of the ERT and in line with the IPCC good practice guidance. The revisions resulted in a change of the base year emissions from 49,792,386 tonnes CO_2 equivalent as reported originally by Norway to 49,619,168 tonnes CO_2 equivalent.

120. The ERT did not recommend any adjustments to Norway's GHG inventory. The assigned amount pursuant to Article 3, paragraphs 7 and 8 (250,576,797 tonnes CO_2 eq.), has been calculated in accordance with the annex to decision 13/CMP.1, and is consistent with reviewed and revised inventory estimates. The calculation of the required level of the commitment period reserve is in accordance with

paragraph 6 of the annex to decision 11/CMP.1; it is 225,519,117 tonnes CO_2 equivalent. The ERT agrees with these figures.

121. Norway has included all the required information on parameters and elections for LULUCF under Article 3, paragraphs 3 and 4, of the Kyoto Protocol in accordance with decision 16/CMP.1. It has chosen the following LULUCF parameters: minimum tree crown cover 10 per cent; minimum land area 0.5 hectares; minimum tree height 5 metres. Norway has elected forest management as an activity under Article 3, paragraph 4, and has elected to account for Article 3, paragraphs 3 and 4, activities for the whole commitment period.

122. Norway has reported most of the information on the national registry system as required by the reporting guidelines under Article 7, paragraphs 1 and 2, of the Kyoto Protocol (decision 15/CMP.1). During the review, the ERT was provided with some additional and updated information on the national registry but considered the information to be not yet transparent as it is still limited. The ERT recommends that Norway provide more complete and detailed information on procedures to minimize discrepancies and on security measures and a concrete plan for implementing the procedures and security measures in its future submissions under the Kyoto Protocol. Based on the results of the technical assessment, as reported in the independent assessment report, the ERT concluded that Norway's national registry is fully compliant with the registry requirements as defined by decisions 13/CMP.1 and 5/CMP.1.

B. Recommendations

123. In the course of the review, the ERT formulated a number of recommendations relating to the QA/QC and to the transparency of Norway's information presented in the initial report. Most of the recommendations were implemented during the review process, including those relating to the potential problems that could have led to overestimations of emissions in the base year, which have been resolved. The key remaining recommendations[4] are that Norway:

(a) Prepare an inventory improvement plan and set up independent peer reviews; Norway may also wish to consider comparing its own data with the data from other Parties;

(b) Improve the working procedures internally in every institution in order to allow meeting the agreed timelines for the inventory preparation;

(c) Further strengthen the QA/QC procedures at the three relevant institutions and elaborate the QC reports further;

(d) Improve the transparency and consistency of the CRF and the NIR by:

(i) Reducing the number of empty cells in the CRF;

(ii) Using the notation keys and documentation boxes more consistently;

(iii) Improving consistency between the NIR, the CRF and underlying documentation reports;

(iv) Improving the quality checks for the NIR;

(v) Providing further explanations of trends in emissions and IEFs and more information on important background data;

[4] For a complete list of recommendations, the relevant sections of this report should be consulted.

(vi) Considering how to prepare guidance for the sectoral chapters of the NIR in order to make them more consistent (e.g. explanation of the trends in emissions and IEFs, inclusion of important background data, use of figures and graphs);

(e) Provide more complete and detailed information on the national registry system in its future inventory submissions under the Kyoto Protocol.

C. Questions of implementation

124. No questions of implementation were identified by the ERT during the initial review

Annex I

Documents and information used during the review

A. Reference documents

IPCC. Good practice guidance and uncertainty management in national greenhouse gas inventories, 2000. Available at <http://www.ipcc-nggip.iges.or.jp/public/gp/english/>.

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B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Audun Rosland, Mr. Eilev Gjerard (SFT), Mr. Ketil Flugsrud (SN) and Ms. Gro Hylen (Norwegian Forest and Landscape Institute) including additional material on the methodology, data and assumptions used.

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Annex II

Acronyms and abbreviations

AD	activity data
CH_4	methane
CMP	Conference of the Parties serving as the Meeting of the Parties
CO	carbon monoxide
CO_2	carbon dioxide
CO_2 eq.	carbon dioxide equivalent
CPR	commitment period reserve
CRF	common reporting format
DES	data exchange standards
DOC	degradable organic carbon
EF	emission factor
ERT	expert review team
EU	European Union
F-gas	fluorinated gas
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 without GHG emissions and removals from LULUCF
GJ	gigajoule (1 GJ = 10^9 joule)
GWP	global warming potential
HFCs	hydrofluorocarbons
IE	included elsewhere
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
kg	kilogram (1 kg = 1 thousand grams)
kgoe	kilograms of oil equivalent
LPG	liquefied petroleum gas
LULUCF	land use, land-use change and forestry
m^3	cubic metre
MCF	methane correction factor
Mg	megagram (1 Mg = 1 tonne)
Mt	million tonnes
Mtoe	millions of tonnes of oil equivalent
N	nitrogen
N_2O	nitrous oxide
NA	not applicable
NE	not estimated
NH_3	ammonia
NIR	national inventory report
PFCs	perfluorocarbons
PJ	petajoule (1 PJ = 10^{15} joule)
QA/QC	quality assurance/quality control
SF_6	sulphur hexafluoride
SFT	Norwegian Pollution Control Authority
SO_2	sulphur dioxide
SSB	Statistics Norway
Tg	teragram (1 Tg = 1 million tonnes)
TJ	terajoule (1 TJ = 10^{12} joule
UNFCCC	United Nations Framework Convention on Climate Change

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