UNITED
NATIONS

UNFCCC Framework Convention on Climate Change

Distr.
GENERAL

FCCC/IDR.4/JPN
15 February 2007

ENGLISH ONLY

Report of the centralized in-depth review of the fourth national communication of Japan

According to decision 4/CP.8, Parties included in Annex I to the Convention are requested to submit to the secretariat, in accordance with Article 12, paragraphs 1 and 2, of the Convention, a fourth national communication by 1 January 2006. This report reflects the results of the in-depth review of the fourth national communication of Japan conducted by an expert review team in accordance with relevant provisions of the Convention and Article 8 of the Kyoto Protocol.

CONTENTS

I. Introduction and summary

A. Introduction

1. Japan has been a Party to the UNFCCC since 1993 and to its Kyoto Protocol since 2002. Under the Kyoto Protocol, Japan committed itself to reducing its greenhouse gas (GHG) emissions by 6 per cent compared to the base year level during the first commitment period from 2008 to 2012. Japan's base year under the Kyoto Protocol is 1995 for fluorinated gases and 1990 for all other GHGs.

2. This report covers the centralized in-depth review (IDR) of the fourth national communication (NC4) of Japan, coordinated by the UNFCCC secretariat, in accordance with decision 7/CP.11. The review took place from 15 to 21 October 2006 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: Mr. Imran Habib Ahmad (Pakistan), Mr. Mohamed El Raey (Egypt), Mr. Domenico Gaudioso (Italy), Mr. Niklas Höhne (Germany), Mr. Normand Tremblay (Canada) and Mr. Paulus Agus Winarso (Indonesia). Mr. El Raey and Mr. Gaudioso were the lead reviewers. The review was coordinated by Mr. Harald Diaz-Bone (UNFCCC secretariat).

3. During the IDR, the expert review team (ERT) examined each part of the NC4. The ERT also evaluated the information contained in Japan's report demonstrating progress (RDP) in achieving its commitments under the Kyoto Protocol, and the supplementary information provided by Japan under Article 7, paragraph 2, of the Kyoto Protocol.

4. In accordance with relevant provisions for review under the Convention and 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 Japan, which provided comments that were considered and incorporated, as appropriate, in this final version of the report.

B. Summary

5. The ERT noted that Japan's NC4 complies in general with the UNFCCC reporting guidelines.[1] The RDP provides information on the progress made by Japan in achieving its commitments under the Kyoto Protocol. Supplementary information under Article 7, paragraph 2, of the Kyoto Protocol[2] is provided in both the NC4 and the RDP.

1. Completeness

6. The ERT noted that the NC4 covers all sections required by the UNFCCC reporting guidelines, except for the assessment of aggregate effects of policies and measures. The ERT also noted that Japan's RDP contains all parts stipulated by decisions 22/CP.7 and 25/CP.8. Furthermore, the ERT noted that Japan has provided the supplementary information required under Article 7, paragraph 2, except for one reporting element (see section III.B).

2. Timeliness

7. The NC4 and the RDP were both submitted on 6 February 2006. Decision 4/CP.8 requested the submission of the NC4 by 1 January 2006, and decision 22/CP.7 set the same date for Parties to submit their RDPs.

---

[1] "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications." Document FCCC/CP/1999/7, pages 80–100.
[2] Decision 15/CMP.1, annex, chapter II (FCCC/KP/CMP/2005/8/Add.2).

3. Transparency

8. The ERT acknowledged that Japan's NC4 is comprehensive. In the course of the review, the ERT formulated a number of recommendations that could help Japan to further increase the transparency of its reporting, for example, by providing quantitative estimates of the impacts of individual policies and measures for 1995 and 2000 (see also section IV). The ERT noted that the information contained in the NC4 and RDP is generally consistent.

II. Technical assessment of the reviewed elements

A. National circumstances relevant to greenhouse gas emissions and removals

9. In its NC4, Japan has provided a description of its national circumstances, how these circumstances affect GHG emissions and removals in Japan, and how national circumstances and changes in these circumstances affect GHG emissions and removals over time. The ERT noted that the list of the most important drivers of emission trends in Japan includes demographic developments (high population density, an increase in the number of households, an ageing society), a change in economic structure (a shift from industry towards the services sector), changes in primary energy use (a temporary major decline in the operating rate of nuclear power plants) and an increase in annual mean surface temperature (number of heating days, use of air conditioning). Table 1 illustrates the national circumstances of the country by providing some indicators relevant to GHG emissions and removals.

Table 1. Indicators relevant to greenhouse gas emissions and removals for Japan

	1990[a]	1995	2000	2004	Change[a] 1990–2000 (%)	Change 2000–2004 (%)	Change[a] 1990–2004 (%)
Population (million)	123.5	125.6	126.9	127.7	2.7	0.6	3.4
GDP (billion USD 2000 PPP)	2 873.6	3 100.3	3 302.0	3 431.6	14.9	3.9	19.4
TPES (Mtoe)	446.0	502.4	528.9	533.2	18.6	0.8	19.6
GDP per capita (thousand USD 2000 PPP)	23.3	24.7	26.0	26.9	11.8	3.3	15.5
TPES per capita (toe)	3.6	4.0	4.2	4.2	15.4	0.2	15.7
GHG emissions without LULUCF (Tg CO_2 eq)	1 261.4	1 342.1	1 345.5	1 355.2	6.7	0.7	7.4
GHG emissions with LULUCF (Tg CO_2 eq)	1 186.8	1 260.7	1 260.6	1 260.3	6.2	0.0	6.2
CO_2 emissions per capita (Mg)	9.3	9.8	9.9	10.1	6.7	1.9	8.7
CO_2 emissions per GDP unit (kg per USD 2000 PPP)	0.40	0.40	0.38	0.37	–4.6	–1.4	–5.9
GHG emissions per capita (Mg CO_2 eq)	10.3	10.7	10.6	10.6	3.0	0.1	3.1
GHG emissions per GDP unit (kg CO_2 eq per USD 2000 PPP)	0.44	0.43	0.41	0.39	–7.9	–3.1	–10.8

Sources: GHG emissions data are from Japan's 2006 inventory submission; population, GDP and TPES data are from the IEA.
Note 1: The ratios per capita and per GDP unit are calculated relative to GHG emissions without LULUCF; the ratios are calculated using the exact (not rounded) values and may therefore differ from a ratio calculated with the rounded numbers provided in the table.
Note 2: For the abbreviations used, see annex II.
[a] For emissions, base year data are used instead of 1990 data, whereas GDP, TPES and population data are for 1990, which leads to some inconsistency in the calculation of GHG emissions per capita and per GDP unit (see paragraph 1).

10. Japan has provided summary information on GHG emission trends by gas and by sector for the period 1990–2003. This information is consistent with the 2005 national GHG inventory submission. The ERT acknowledged that Japan has provided two separate tables for CO_2 emission trends by (sub)sector, one following the Intergovernmental Panel on Climate Change (IPCC) guidelines,[3] and one allocating CO_2 emissions from the generation process to each final energy consumption subsector. The ERT felt that the latter was in principle useful when assessing the technical mitigation potential for CO_2 emissions of specific policies and measures in the energy sector.

11. Total GHG emissions excluding emissions and removals from land use, land-use change and forestry (LULUCF) increased by 7.4 per cent between the base year and 2004, whereas total GHG

[3] IPCC/OECD/IEA. "Revised 1996 IPCC Guidelines for national greenhouse gas inventories." Volumes 1–3, 1997. Available at <http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm>.

emissions including net emissions/removals from LULUCF increased by 6.2 per cent (see table 2). This is mainly attributed to CO_2 emissions, which increased by 12.4 per cent over this period. In contrast, emissions of CH_4 and N_2O decreased, by 27.0 and 21.4 per cent, respectively. The main GHG was CO_2, which accounted for 90.7 per cent of total GHG emissions in the base year and 94.9 per cent in 2004. Emissions of fluorinated gases accounted for 4.1 per cent of total GHG emissions in the base year and 1.4 per cent in 2004. Table 2 provides an overview of GHG emissions by sector from the base year to 2004 (see also the discussion of sectoral trends in section II.B).

Table 2. Greenhouse gas emissions by sector for Japan, 1990–2004

	GHG emissions (Tg CO_2 equivalent)					Change (%)		Shares[a] by sector (%)	
	1990[b]	1995	2000	2003	2004	1990[b]–2004	2003–2004	1990	2004
1. Energy	1 069.5	1 144.1	1 175.3	1 205.8	1 205.4	12.7	0.0	84.1	88.9
A1. Energy industries	318.3	338.9	349.8	386.6	383.2	20.4	–0.9	25.0	28.3
A2. Manufacturing industries and construction	369.4	366.7	372.5	370.1	375.3	1.6	1.4	29.0	27.7
A3. Transport	215.6	256.1	264.1	258.7	258.3	19.8	–0.2	16.9	19.1
A4.–5. Other	163.2	180.7	187.8	189.9	188.1	15.3	–0.9	12.8	13.9
B. Fugitive emissions	3.074	1.661	1.082	0.432	0.419	–86.4	–3.1	0.2	0.0
2. Industrial processes	122.1	124.0	95.8	77.1	74.1	–39.3	–3.9	10.4	5.5
3. Solvent and other product use	0.3	0.4	0.3	0.3	0.3	3.6	–7.3	0.0	0.0
4. Agriculture	32.3	31.0	28.4	27.6	27.5	–14.9	–0.5	2.5	2.0
5. LULUCF	–74.62	–81.37	–84.96	–94.98	–94.88	27.1	–0.1	–5.9	–7.0
6. Waste	37.2	42.6	45.7	47.5	47.9	28.7	0.8	2.9	3.5
GHG total with LULUCF	1 186.8	1 260.7	1 260.6	1 263.3	1 260.3	6.2	–0.2	–	–
GHG total without LULUCF	1 261.4	1 342.1	1 345.5	1 358.3	1 355.2	7.4	–0.2	–	–

Note 1: The changes in emissions and the shares by sector are calculated using the exact (not rounded) values and may therefore differ from values calculated with the rounded numbers provided in the table.
Note 2: For the abbreviations used, see annex II.
[a] The shares of sectors are calculated relative to GHG emissions without LULUCF; for the LULUCF sector, the negative values indicate the share of GHG emissions which was offset by GHG removals through LULUCF.
[b] Base year data are used instead of 1990 data (see paragraph 1).

B. Policies and measures

12. In its NC4, Japan has provided well-organized information on its package of planned policies and measures. Each sector has its own textual description of the principal policies and measures, supplemented by summary tables on planned policies and measures by sector. Japan has also provided information on how it believes its planned policies and measures are modifying longer-term trends in anthropogenic GHG emissions and removals consistent with the objective of the Convention. However, the ERT noted that Japan has provided limited information on its adopted or implemented policies and measures, and that this information is dispersed over several sections of the NC4 outside the chapter on policies and measures.

13. In the absence of estimated effects of adopted or implemented policies and measures, the ERT was unable to review the mitigation impacts of these policies and measures. The ERT recommends the Party to follow the UNFCCC reporting guidelines and provide complete and transparent information on adopted or implemented policies and measures in the chapter on policies and measures of its next national communication. Table 3 provides a summary of the information reported on Japan's planned policies and measures.

Table 3. Summary information on planned policies and measures

Major policies and measures	Examples / comments
Framework policies and cross-sectoral measures	
Kyoto Protocol Target Achievement Plan	Regulation concerning the promotion of mitigation measures (approved in 2005)
Energy sector	
Integrated introduction of new energy sources and energy interchange	Implementation of a network of dispersed new energy sources Promotion of biomass (building 'biomass towns') (1,000 Gg) Energy conservation through cooperation among multiple businesses (3,200 Gg)
CO_2 saving in business facilities	Energy management according to the Energy Conservation Law (commercial and other sector) (3,000 Gg) Improvement of energy performance of commercial buildings (25,500 Gg) Promotion of energy management systems for buildings (11,200 Gg)
CO_2 saving in households	Improvement of energy performance of residential buildings (8,500 Gg) Promotion of home energy management systems (11,200 Gg)
CO_2 saving in energy industries	Promotion of nuclear energy (17,000 Gg) Promotion of new energy sources (biomass, photovoltaic power generation) (46,900 Gg) Promotion of co-generation (11,400 Gg) and fuel cells (3,000 Gg)
Transport	
Design of CO_2 saving transport systems	Promotion of public transport (3,800 Gg) Promotion of eco-driving (environmentally friendly use of motor cars) (1,300 Gg) Introduction of anti-idling cars (600 Gg) Transport demand management (300 Gg) Promotion of intelligent transport systems (3,600 Gg) Promotion of transport alternatives, such as teleworking, through information campaigns (3,400 Gg)
CO_2 saving distribution systems	Improvement in environmental performance of marine transport (1,400 Gg) Modal shift to rail in freight transport (900 Gg) Increase in efficiency of trucking (7,600 Gg) Reduction of distances on land in international freight transport (2,700 Gg)
Efficiency improvements in transport	Increase in fuel efficiency of cars according to top-runner standards (21,000 Gg) Promotion of clean energy cars (3,000 Gg) Introduction of sulphur-free fuel (and cars that can run on such fuel) (1,200 Gg) Improvement of energy efficiency in aviation (1,900 Gg)
Industrial processes	
Promotion of blended cement	Promotion of the use of blended cement in public construction projects (1,110 Gg)
Abatement of N_2O and HFC emissions	Installation of N_2O abatement devices in the production of adipic acid (8,740 Gg) Limitation of HFC emissions in industry (15,100 Gg)
Recovery and destruction of fluorinated gases	Recovery of HFCs charged as refrigerant from end-of-life equipment and vehicles (12,400 Gg)
Research and development	Promotion of new substitute materials and technologies to substitute fluorinated gases (13,900 Gg)
Agriculture	Cultivation of green manure on farmland
Waste management	
Waste Disposal Law – Recycling Plan	Promotion of the reduction, reuse and recycling of waste (500 Gg)
Improved waste incineration	Upgrading combustion in incineration facilities (7,000 Gg)
Forestry	
Forest management	Promotion of appropriate forest management practices
Afforestation and reforestation	Establishment of new forests
Urban greening	Creation of urban parks and green spaces by central and local administrations

Note 1: The GHG reduction estimates given for some measures (in parentheses) are reductions in CO_2 or CO_2 eq for the year 2010.
Note 2: For the abbreviations used, see annex II.

1. Policy framework and cross-sectoral measures

14. Since 1998, Japan has been promoting mitigation measures through the government strategy Outline for the Promotion of Efforts to Prevent Global Warming. After a revision in 2002, the strategy included a step-by-step approach that regularly assesses the progress made as a result of those policies and measures, which were implemented in order to meet Japan's commitments under the Kyoto Protocol. The period between the inception of this step-by-step approach and the end of the first commitment period is divided into three phases (2002–2004, 2005–2007 and 2008–2012) and two review steps on the effectiveness of the policies measures were scheduled for 2004 and 2007. The ERT encourages the Party to provide a brief summary of the outcome of the 2004 and 2007 reviews of effectiveness in its next national communication.

15. The 2004 review of effectiveness resulted in April 2005 in Cabinet approval of the Kyoto Protocol Target Achievement Plan, which formulates the policy package necessary for Japan to meet its Kyoto Protocol target. The Central Environmental Council of the Ministry of the Environment, the Industrial Structure Council and the Advisory Committee on Natural Resources and Energy of the Ministry of Economy, Trade and Industry, as well as the Panel on Infrastructure Development and the Council of Transportation Policy of the Ministry of Land, Infrastructure and Transport, were responsible for the implementation of the technical examinations that led to the formulation of the Kyoto Protocol Target Achievement Plan.

16. The ERT noted that, with the implementation of the step-by-step approach, Japan has taken a proactive position that enables it to monitor its progress in achieving its commitment under the Kyoto Protocol and to identify any potential need to enhance and strengthen the implementation of its policies and measures. The ERT acknowledged this proactive step and encourages the Party to include a cost-benefit analysis of the implemented policies and measures in its reviews of effectiveness.

2. Policies and measures in the energy sector

17. In 2004, GHG emissions from the **energy sector** amounted to 1,205,368 Gg and accounted for 88.9 per cent of total GHG emissions. During the period 1990–2004, energy-related emissions increased by 12.7 per cent. Within the energy sector, the three largest contributors were energy industries, manufacturing industries and construction, and transport.

18. GHG emissions from **energy industries** increased by 20.4 per cent during the period 1990–2004, at the end of which they accounted for 28.3 per cent of total GHG emissions. This increase mainly reflected the growth in demand for electricity. Between 2001 and 2002 alone, CO_2 emissions from energy industries increased by 9.2 per cent, mainly due to a temporary decline in the operating rate of nuclear power plants.

19. In 2004, GHG emissions from **energy use in manufacturing industries and construction** accounted for 27.7 per cent of total GHG emissions. Between 1990 and 2004, emissions from this subsector fluctuated slightly (between 95.6 and 101.9 per cent) around the 1990 value, largely reflecting several changes in diversified market needs.

20. In 2004, GHG emissions from **energy use in transport** accounted for 19.1 per cent of total GHG emissions. After a 21.7 per cent increase during the period 1990–1996, these emissions declined slightly, by 0.9 per cent, between 1997 and 2004. The reasons for the increase during the first phase included growth in the vehicle fleet, a modal shift from public towards private passenger transport, and an increase in freight transport. The ERT noted with interest the slight decline in GHG emissions from transport since 1996 and recommends that the Party provide an analysis of the factors behind this trend.

21. GHG emissions from **energy use in other sectors** (mainly from fuel combustion in the residential sector) accounted for 13.9 per cent of total GHG emissions in 2004. The substantial increase of 15.3 per cent over the period 1990–2004 was mainly the result of changes in social conditions, reflected in the increase in the number of households, and lifestyle changes.

22. Japan has put forward a scheme for the energy sector that relies on five basic principles:

(a) Moving from a patchwork of single measures towards an integrated policy approach to restructuring the country's energy supply and demand, which aims at reducing CO_2 emissions through reforms in the socio-economic structure of Japan;

(b) Transcending the boundaries between individual stakeholders in order to improve energy efficiency through collaboration with other energy suppliers and users, and move towards a CO_2-saving approach in the commercial and residential, and transport sectors;

(c) Combining supply- and demand-side approaches and giving priority to demand-side measures in order to produce results during the first commitment period – by setting a target for Japan to become a world's model nation of energy conservation;

(d) Approaches which give priority to improving patterns of energy consumption and to lowering the CO_2 intensity of energy consumption by increasing the efficiency of energy use;

(e) Effective measures to respond to the factors behind the increases in emissions in end-user sectors such as the commercial and residential sector and passenger transport.

23. The ERT noted that the implementation of this challenging scheme, covering all aspects of energy production and use, requires a high level of cooperation between all interested stakeholders, particularly end-users, if it is to lead to concrete mitigation effects. The NC4 states that such cooperation is a clear priority for Japan as regards the roles of central and local administration, corporations and citizens in the implementation of policies and measures.

3. Policies and measures in other sectors

24. GHG emissions from the non-energy sectors accounted for 15.9 per cent of total GHG emissions in 1990 and 11.1 per cent in 2004. Between the base year and 2004, GHG emissions from industrial processes (including solvent and other product use) and agriculture decreased by 39.2 and 14.9 per cent, respectively, whereas GHG emissions from waste increased by 28.7 per cent. Lower cement production and technological development (relating to the use of PFCs for metal cleaning and to the use of SF_6 in electrical equipment) were the main drivers for the declining trend in emissions from industrial processes, whereas the overall decline in agricultural activities, in particular rice cultivation, was responsible for the reduction in GHG emissions from agriculture. The increasing trend in emissions from waste management was related mainly to increased waste incineration, whereas emissions of CH_4 from landfills were declining.

25. ***Industrial processes.*** To further reduce CO_2 emissions from cement production, Japan is planning to promote the use of blended cement in public construction projects through the Law Concerning the Promotion of Procurement of Eco-Friendly Goods and Services by the State and Other Entities. The NC4 states that special efforts will be required to tackle the increase in emissions of HFCs used as substitutes for ozone-depleting substances. The Government of Japan is planning to support and monitor the adoption of voluntary measures by the industry, promote the use of substitute materials and substitute products, and ensure the recovery and destruction of HFCs in the refrigerant sector, according to the Law for Recycling of Certain Home Appliances, the Law for Ensuring the Implementation of Recovery and Destruction of Fluorocarbons concerning Specified Products, and the Law for the Recycling of End-of-Life Vehicles.

26. ***Agriculture.*** Reductions in CH_4 and N_2O emissions are expected from improved farmland management, the development of feeding management skills, the promotion of appropriate use of animal manure, a reduction in the use of compost for agricultural purposes, and green manure cultivation, in addition to further reductions in agricultural production.

27. ***Waste.*** In addition to general waste management policies aimed at the reduction, reuse and recycling of waste, the Government of Japan is planning to address the increase in emissions of CH_4 and N_2O from incineration facilities through the establishment of emission standards and the promotion of systems equipped with continuous furnaces.

28. ***Forestry.*** Planned policies and measures in this sector will aim at promoting appropriate management and conservation of existing forests in order to reach the amount of removal units allowed for forest management under the Marrakesh Accords. Further plans address the establishing of new

forests, urban parks and green spaces, with the participation of citizens, and promoting the use of timber and wood biomass.

29. According to decision 16/CMP.1, accounting of LULUCF activities under Article 3, paragraph 4, of the Kyoto Protocol, undertaken to remove CO_2 through forest management, is capped to a maximum of 47.67 Tg CO_2. This cap equals 3.8 per cent of the 2006 estimate of Japan's total GHG emissions in the base year.[4] According to Japan's 2006 inventory submission, LULUCF activities on forest land removed 93.9 Tg CO_2 in 2004,[5] which equals 7.3 per cent of base year emissions. However, national forest experts raised their concerns that, based on the national definition of forest management under Article 3.4 of the Kyoto Protocol, removals from forest management could fall below the cap of 47.67 Tg CO_2 eq if forest practices remain unchanged. In response to a question raised during the review, the ERT was informed that projections of removals from LULUCF indicate that, in order to achieve the full potential (of 47.67 Tg CO_2) for removals from forest management during the first commitment period, it is necessary to further enhance forest practices. The ERT encourages the Party to carefully monitor its activities in forest management, timber supply and utilization, to provide projections of changes in carbon stocks in its next national communication, and to involve local governments, productive sectors and citizens in the implementation of the relevant policies and strategies.

30. In line with its observations on the reporting of policies and measures in the energy sector, the ERT noted that the NC4 provides a comprehensive description of non-energy-related policies and measures under consideration, but limited information about the impacts of policies and measures that have been adopted or implemented. The ERT recommends the Party to follow the UNFCCC reporting guidelines more closely and include such estimates in its next national communication.

C. Projections and the total effect of policies and measures

1. Projections

31. In its NC4, Japan provides projections of GHG emissions until 2010 which include "with measures" and "with additional measures" scenarios, and which are presented relative to actual inventory data of the 2005 inventory submission. The projections are presented on a sectoral basis, using the same sectoral categories used in the policies and measures section, and on a gas-by-gas basis for all relevant greenhouse gases. In addition, projections are provided in an aggregated format for each sector, as well as for a national total, using global warming potential (GWP) values. Emission projections related to fuel sold for use by ships and aircraft engaged in international transport are reported separately and not included in the totals, as required by the UNFCCC reporting guidelines. The ERT noted that projections for the LULUCF sector are not provided.

32. The NC4 projections for Japan are based on various sources and methodologies. Energy-related CO_2 emissions are estimated using an econometric model with inputs from various sub-models. Emissions of CO_2, CH_4 and N_2O, as well as emissions from LULUCF and international transport, are estimated by extrapolating from activity data and by making assumptions as regards the emission factors. However, limited information is available on the methods used. Fluorinated gases are estimated by groups of gases, using either a bottom–up or a top–down method.

[4] In 2006, the inventory was recalculated and is therefore inconsistent with the emission trend displayed in the NC4 and RDP. Prior to this recalculation, the cap for accounting of LULUCF activities under Article 3, paragraph 4,of the Kyoto Protocol, undertaken to remove CO_2 through forest management equalled 3.9 per cent of Japan's estimated total GHG emissions in the base year.

[5] Of the 93.9 Tg CO_2, 90.8 Tg CO_2 are reduced from forest land remaining forest land, and 3.1 Tg CO_2 from land converted to forest land.

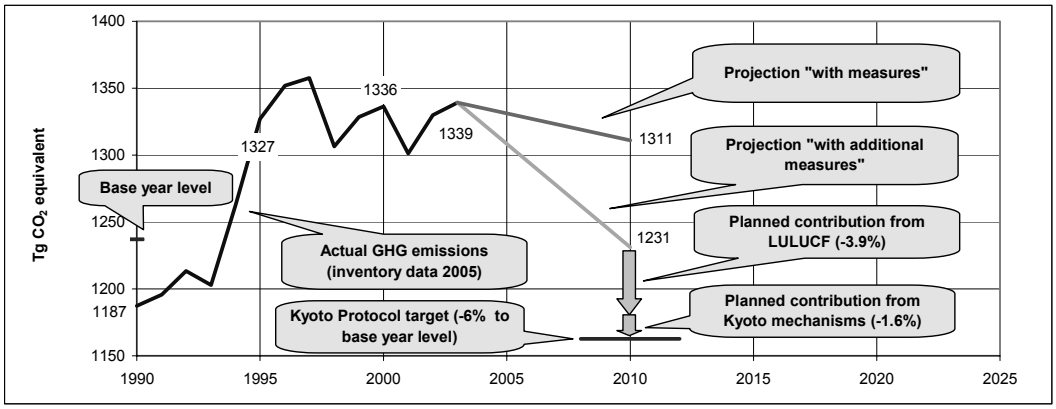
Table 4. Summary of greenhouse gas emission projections for Japan

	GHG emissions (Tg CO_2 equivalent per year)	Changes compared to base year level (%)
Inventory data 1990[a]	1 272	0.8
Inventory data 2004[a]	1 355	7.4
Kyoto Protocol base year[b]	1 237	0.0
Kyoto Protocol target	1 163	–6.0
"With measures" projections for 2010[b]	1 311	6.0
"With additional measures" projections for 2010[b]	1 231	–0.5

[a] *Source*: Japan's 2006 GHG inventory submission; the emissions are without LULUCF.
[b] *Source*: Japan's NC4; the projections are for GHG emissions without LULUCF.
Note: For the abbreviations used, see annex II.

33. The ERT noted that Japan intends to achieve its Kyoto Protocol target using a combination of domestic measures, accounting of LULUCF activities and use of the Kyoto Protocol mechanisms. Planned domestic policies and measures are estimated to reduce total GHG emissions from 6 per cent above to 0.5 per cent below the base year level by 2010 (see table 4). An additional 3.9 per cent reduction is to be achieved through accounting for LULUCF activities (see paragraph 29). The remaining gap of 1.6 per cent is to be closed through the use of the Kyoto Protocol mechanisms (see figure 1).

Figure 1. Greenhouse gas emission projections for Japan



Source: Inventory data: Japan's 2005 inventory submission; projections: Japan's RDP; data are for GHG emissions without CO_2 from LULUCF.
Note: In 2006, the inventory was recalculated and is therefore inconsistent with the displayed past emission trend.

34. The ERT recommends that the Party provide projections for LULUCF, particularly in the light of the prominent role assigned to this sector by the Kyoto Protocol Target Achievement Plan, and to expand the time horizon for all projections to 2020 (at least) in its next national communication. It further recommends that Japan provide more detailed information on the methodologies and assumptions applied, particularly for the non-energy sectors and non-CO_2 gases.

2. Total effect of policies and measures

35. The ERT noted that Japan has not provided the following reporting elements required by the UNFCCC reporting guidelines: the estimated and expected total effect of implemented and adopted policies and measures (paragraph 39); an estimate of the total effect of policies and measures, in accordance with the "with measures" definition, compared to a situation without such policies and measures, presented in terms of GHG emissions avoided or sequestered, by gas (on a CO_2 equivalent basis), for 1995 and 2000 (paragraph 40); and relevant information on driving factors and activities for each sector for the years 1990–2020 (paragraph 48). The ERT noted that, in contrast to Japan's third

national communication (NC3), no "without measures" scenario is included in the NC4. In the absence of an estimated total effect of planned measures, the ERT calculated the effect of additional (or planned) policies and measures based on the difference between the "with additional measures" and the "with measures" scenario. Table 5 provides an overview of the total effect of policies and measures as reported by Japan.

Table 5. Projected effects of planned, implemented and adopted policies and measures in 2010

	Effect of implemented and adopted measures (Tg CO_2 equivalent)	Relative value (% of base year emissions)	Effect of planned measures (Tg CO_2 equivalent)	Relative value (% of base year emissions)
Energy (without CO_2 from transport)	NA	NA	–50.0	–6.0
Transport - CO_2	NA	NA	–9.0	–4.1
Industrial processes	NA	NA	–15.6	–13.6
Agriculture	NA	NA	NA	NA
Land-use change and forestry	NA	NA	NA	NA
Waste management	NA	NA	–6.1	–24.0
Total	**NA**	**NA**	**–80.7**	**–6.5**

Source: Japan's NC4.
Note 1: The total effect of planned policies and measures was calculated by the ERT as the difference between the "with measures" and "with additional measures" scenarios.
Note 2: For the abbreviations used, see annex II.

36. Japan plans to implement its Kyoto Protocol target with additional measures in the energy sector, and over proportionally in industrial processes and waste, where the additional measures will make a contribution that is more than proportionate to their share in total GHG emissions.

37. The ERT recommends the Party to follow the UNFCCC reporting guidelines (paragraphs 39 and 40) and include the estimated aggregated effect of implemented policies and measures in its next national communication.

D. Vulnerability assessment, climate change impacts and adaptation measures

38. In its NC4, Japan provides information on expected impacts of climate change in the country and on adaptation options. Table 6 summarizes the information on vulnerability and adaptation to climate change presented in the NC4.

39. As in previous IDRs, the ERT noted that the vulnerability assessment is more complete than the discussion on adaptation options, and it recommends that the Party provide in its next national communication a description of all steps taken towards the development and implementation of a national adaptation strategy. An economic analysis of the impacts of climate change at the sectoral level, including the fisheries and forestry sectors, could also be carried out in this context.

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

Vulnerable area	Examples / comments / adaptation measures reported
Agriculture and food security	***Vulnerability***: Agriculture can be affected by climate change ***Adaptation***: Changes in agricultural practices, and development of new varieties of cultivated crops, fertilizers, agricultural chemicals and agricultural machinery
Biodiversity and natural ecosystems	***Vulnerability***: Habitats and species are expected to move northwards and to higher altitudes; adaptation to climate-induced changes in land use may be also required; some species in the high mountains in the north and west may be affected ***Adaptation***: Protection and management of sites of special scientific interest; support to agri-environmental schemes by conducting a macro-scale quantitative evaluation of the effects of global warming
Coastal zones	***Vulnerability***: Flooding is likely to increase as a result of rising sea levels, more intense rainfall and possibly increased storminess ***Adaptation***: Flood defence measures by continuous monitoring of sea level, and coastal land-use planning
Drought	***Vulnerability***: No drought/desertification projected for Japan; however, an extended impact of desertification on the Eurasian continent may indirectly affect the climate in Japan
Fisheries	***Vulnerability***: Global warming may affect the Japan Current; changing of sea currents is projected to change epipelagic fish resources
Forests	***Vulnerability***: Global warming may result in considerable damage to forests in Japan, e.g. due to decreasing snowfall, resulting in a drier climate
Human health	***Vulnerability***: Possible increase in heat- or stress-related deaths
Infrastructure and economy	***Vulnerability***: Economic impacts may include business disruptions, agricultural losses, costs associated with higher water demand and impact on the insurance industry ***Adaptation***: Building regulations; protection against natural disasters
Water resources	***Vulnerability***: Increased and more intense rainfall, and changes in the seasonal distribution of rainfall are likely ***Adaptation***: Water resource management, efficient use of water

E. Financial resources and transfer of technology

1. Financial resources

40. In its NC4, Japan provides detailed information on measures taken to give effect to its commitments under Article 4, paragraphs 3, 4 and 5. Japan also provides detailed information on the assistance provided for the purpose of assisting developing country Parties that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation to those adverse effects. Furthermore, Japan provides information on financial resources related to the implementation of the Convention provided through bilateral, regional and other multilateral channels. The ERT noted that the information contained in the NC4 meets the UNFCCC reporting guidelines and represents a significant improvement in Japan's reporting since the NC3. However, the ERT noted that Japan has not provided a clarification of how it has determined its financial resources as being "new and additional" in its national communications (UNFCCC reporting guidelines, paragraph 51).

41. In Japan, the Official Development Assistance Charter adopted by the Cabinet in 2003 governs official development assistance (ODA). This document spells out the philosophy and principles of Japan's ODA, which identify addressing global issues including "environmental problems" as one of the priority issues. The principles of Japan's ODA also underpin environmental conservation and development, which are to be pursued in tandem.

Table 7. Summary information on financial resources

Official development assistance (ODA)	180 billion JPY from 1997 to 2003
Climate-related aid in bilateral ODA	NA
Climate-related support programmes	NA
Contributions to GEF (USD million)	1240 million USD
Pledge for third GEF replenishment	420 million USD
Activities implemented jointly (AIJ)	NA
JI and CDM under the Kyoto Protocol	NA
Other (bilateral/multilateral)	NA

Note: For the abbreviations used, see annex II.

42. The Kyoto Initiative announced during the third session of the Conference of the Parties remains a major instrument in Japan's assistance to countries that are particularly vulnerable to adverse effects of climate change and focuses on assisting developing countries to combat global warming. Assistance is provided based on three pillars: (1) cooperation in capacity-building; (2) ODA loans with most concessional terms (annual interest rate 0.75 per cent; repayment period 40 years); and (3) effective use and transfer of Japanese technology and know-how. From 1998 to 2004, around 13,000 international experts have been trained, and from December 1997 to March 2005 the Government of Japan provided a total of 83 concessional loans totalling JPY 1.9 trillion (about USD 16 billion).

43. In terms of multilateral funding, Japan remains a major donor to international organizations, including the World Bank, the Asian Development Bank, the United Nations Development Programme, the Global Environment Facility (GEF) and the United Nations Environment Programme (see table 7). Japan is one of the largest contributors to the GEF and has pledged USD 420 million to the third GEF replenishment. It has also been a major contributor to the IPCC. Japan supports the IPCC task force on inventories, established in 1999, funding its operational costs and providing support in terms of human resources to the work of the IPCC.

44. The ERT recommends that the Party elaborate on how the financial resources have been classified as "new and additional" in its next national communication.

2. Transfer of technology

45. In its NC4, Japan provides details of measures related to the promotion, facilitation and financing of the transfer of, or access to, environmentally sound technologies. The ERT acknowledges the Party's detailed reporting on transfer of technology: it clearly delineates the various measures undertaken by the Government of Japan itself and through promoting international cooperation in the private sector. Major initiatives of the Government of Japan include the Kyoto Initiative, the Japan Kyoto Mechanisms Acceleration Programme (JKAP), support to the Climate Technology Initiative (CTI), and the Asia-Pacific Network for Global Change Research (APN).

46. The JKAP aims to implement a variety of support measures: capacity-building in host countries, the provision of information and advice, and carrying out clean development mechanism (CDM)/joint implementation (JI) feasibility studies in a more effective and user-friendly manner. The NC4 also provides two tables listing examples of projects that promoted environmentally sound technologies. The ERT noted that Japan's climate-related efforts in financial assistance and technology transfer are considerable compared to those of other Annex II Parties.

F. Research and systematic observation

47. Japan provides information on its actions relating to research and systematic observation, and addresses both domestic and international activities, including the World Climate Research Programme, the International Geosphere–Biosphere Programme, the Global Climate Observing System (GCOS), the Global Earth Observation System of Systems (GEOSS) and the IPCC. The NC4 also reflects action taken to support related capacity-building in developing countries. Furthermore, Japan provides summary information on GCOS activities in accordance with paragraph 64 of the UNFCCC reporting guidelines.

48. The ERT recommends the Party to provide clearer and more consistent and comprehensive information on its support to research and systematic observation, as well as capacity-building programmes for developing countries.

G. Education, training and public awareness

49. In the NC4, Japan provides information on its actions relating to education, training and public awareness, as required by the UNFCCC reporting guidelines (paragraph 65), with regard to the prevention of global warming.

50. Japan intends to encourage voluntary action by every individual citizen and to offer funds to cover capacity-building as part of various programmes, networks and strategies for government officials from developing countries. The ERT noted that Japan presents a broad range of programmes on education, training and public awareness.

51. The ERT recommends that the Party include a discussion on the enforcement/policy rules of such programmes in its next national communication.

III. Evaluation of information contained in the report demonstrating progress and of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

A. Information contained in the report demonstrating progress

52. Japan's RDP includes all the sections required by decisions 22/CP.7 and 25/CP.8. In each section, the RDP summarizes the related information included in the NC4, with links to the NC4 for further details concerning, in particular, the description of domestic policies and measures, and the evaluation of the contribution of domestic policies and measures to the achievement of Japan's commitment under Article 3 of the Kyoto Protocol. The ERT found the information contained in the RDP to be consistent with that provided in the NC4.

53. Within the Cabinet, the Global Warming Prevention Headquarters is responsible for coordinating and implementing climate change policy. The framework for promoting climate change policies was established in 1998 through the adoption of the Outline for the Promotion of Efforts to Prevent Global Warming, and subsequently revised in 2002 and 2004. In April 2005, following the entry into force of the Kyoto Protocol, the Cabinet adopted the Kyoto Protocol Target Achievement Plan which includes additional policies and measures and the necessary monitoring arrangements.

54. According to the "with measures" projection provided in the NC4 and the RDP, Japan's GHG emissions will increase by 6 per cent by 2010, compared to base year levels. Japan's Kyoto Protocol target is to reduce its GHG emissions by 6 per cent during the first commitment period (see also paragraph 1).

55. Japan intends to achieve its Kyoto target using domestic measures, accounting for LULUCF activities and the use of Kyoto Protocol mechanisms. Planned domestic policies and measures are estimated to reduce national emissions by 6.5 per cent (comprising reductions in CO_2 from the energy sector, 4.8 per cent; in CO_2, CH_4 and N_2O from other sectors, 0.4 per cent; and in fluorinated gases, 1.3 per cent). An additional 3.9 per cent reduction is to be achieved through accounting for LULUCF activities (see paragraph 29). The remaining gap of 1.6 per cent will be closed through the use of Kyoto Protocol mechanisms.

56. According to decision 16/CMP.1, accounting of LULUCF activities under Article 3, paragraph 4, of the Kyoto Protocol to remove CO_2 through forest management is capped to a maximum of 3.9 per cent (47.67 Tg CO_2 equivalent) of Japan's total GHG emissions in the base year (see paragraph 29). The ERT noted that the timely implementation of sustainable forest policies – with the involvement of all interested local governments, productive sectors and citizens – is therefore crucial if Japan is to be able to use the full extent of removal units for forest management activities under Article 3, paragraph 4.

B. Supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

57. Japan has provided most of the supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol in its NC4 and RDP. This information reflects the steps taken by Japan to implement the relevant provisions of the Kyoto Protocol. The supplementary information is placed in different sections of the NC4 and of the RDP. Table 8 provides references to the NC4 and RDP chapters in which supplementary information is provided.

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

Supplementary information	Reference
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	NC4, p. 134 RDP, p. 4
Policies and measures in accordance with Article 2	NC4, p. 99
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	NC4, pp. 95–99, 143–160; RDP, pp. 1–2
Information under Article 10	NC4, pp. 81, 87, 203–218, 248 RDP, pp. 5–8
Financial resources	NC4, pp. 204, 205, 220–232 RDP, pp. 6–7

Note: For the abbreviations used, see annex II.

58. Japan has not reported the supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol as regards the efforts it is making to implement policies and measures in such a way as to minimize adverse effects, including the effects of climate change, the effects on international trade, and social, environmental and economic impacts on other Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention. The ERT also noted that Japan has provided only limited information about cooperation with other countries in implementing policies and measures (Article 2 of the Kyoto Protocol). The ERT recommends that the Party include these reporting elements in its next national communication.

IV. Conclusions

59. GHG emission trends in Japan depend on a number of factors, such as demographic developments (high population density, an increase in the number of households and an ageing society), changes in economic structure (a shift from industry towards the services sector) and changes in primary energy use (a temporary major decline in the operating rate of nuclear power plants). Total national GHG emissions excluding emissions and removals from LULUCF increased by 7.4 per cent between the base year and 2004. GHG emissions from the energy sector accounted for 84.1 per cent of the total emissions in 1990, and 88.9 per cent in 2004. Key policies and measures therefore focus on energy-

related emissions, and rely on five basic principles (see paragraph 22) which aim at integrating supply and demand, further increasing energy end-use efficiency and involving every stakeholder in the implementation of energy conservation measures.

60. The GHG emission projections provided by Japan include "with measures" and "with additional measures" scenarios until 2010. GHG emissions in 2010 are expected to be 6 per cent above the base-year level in the "with measures" scenario, and to decrease to 0.5 per cent below the base-year level in the "with additional measures" scenario. Japan intends to achieve its Kyoto Protocol target with domestic measures, accounting for LULUCF activities and use of the Kyoto Protocol mechanisms. Planned domestic measures are estimated to reduce national emissions by 6.5 per cent of the base-year emissions by 2010. An additional 3.9 per cent reduction is to be achieved through accounting for LULUCF activities (see paragraph 29). The remaining gap of 1.6 per cent is to be closed through use of the Kyoto Protocol mechanisms.

61. The ERT noted that Japan has taken a proactive position with the implementation of the step-by-step approach and regular review of progress. Japan has not, however, provided an estimate of the effect of policies already implemented.

62. According to the Kyoto Protocol Target Achievement Plan, Japan's strategy to meet its Kyoto Protocol target depends to a great extent on the mitigation effect of planned measures in the energy sector (targeted effect: 4.8 per cent of base-year emissions) and on forest management activities under Article 3, paragraph 4, of the Kyoto Protocol (targeted effect: 3.9 per cent of base-year emissions). In the absence of quantitative estimates for the mitigation effects of individual policies and measures in the energy and forestry sector, the ERT was unable to assess the associated risks. Given the high level of targeted effects in these two sectors, the ERT encourages the Party to ensure timely and full implementation of its planned measures and continuous monitoring of their effect.

63. In the course of the IDR, the ERT formulated a number of recommendations relating to the completeness and transparency of Japan's reporting under the UNFCCC and its Kyoto Protocol. The key recommendations[6] are that Japan:

- Provide complete and transparent information on policies and measures that have been implemented and/or adopted, as well as on the quantitative estimated impacts of the individual policies and measures on GHG emissions in the years 2000, 2005, 2010 and 2015;
- Provide an explanation of the reasons for the temporary decline in the operating rate of nuclear power plants;
- Provide an analysis of the factors behind the slight decline in CO_2 emissions from transport since 1996;
- Provide projections for LULUCF, particularly in the light of the prominent role assigned to this sector by the Kyoto Protocol Target Achievement Plan; expand the time horizon for projections for all sectors to 2020 or 2030; and provide more information on methodologies, references and assumptions concerning projections, especially for non-energy, non-CO_2 emissions;
- Provide the aggregated effect of implemented policies on emissions in the past;
- Provide clear, consistent and supporting information on the support provided to research, systematic observation and capacity-building programmes for developing countries.

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

Annex I

Documents and information used during the review

A. Reference documents

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

UNFCCC. Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol, decision 15/CMP.1. FCCC/KP/CMP/2005/8/Add.2. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>.

UNFCCC. Guidelines for review under Article 8 of the Kyoto Protocol, decision 22/CMP.1. FCCC/KP/CMP/2005/8/Add.3. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>.

UNFCCC. Report on the in-depth review of the third national communication of Japan. FCCC/IDR.3/JPN. Available at <http://unfccc.int/resource/docs/idr/JPN03.pdf>.

UNFCCC. Synthesis of reports demonstrating progress in accordance with Article 3, paragraph 2, of the Kyoto Protocol. FCCC/SBI/2006/INF.2. Available at <http://unfccc.int/resource/docs/2006/sbi/eng/inf02.pdf>.

UNFCCC. Report of the individual review of the greenhouse gas inventory of Japan submitted in the year 2005. FCCC/ARR/2005/JPN. Available at <http://unfccc.int/resource/docs/2006/arr/JPN.pdf>.

Government of Japan (2006). Japan's Fourth National Communication under the United Nations Framework Convention on Climate Change. Available at <http://unfccc.int/resource/docs/natc/japnc4.pdf>.

Japan. Report Indicating Demonstrable Progress toward Achieving the Commitment. Available at <http://unfccc.int/resource/docs/dpr/jpn1.pdf>.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Masato Yasuda (Ministry of the Environment) including additional material on projections of removals from LULUCF.

Annex II

Acronyms and abbreviations

CDM	clean development mechanisms
CH_4	methane
CHP	combined heat and power
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CRF	common reporting format
EC	European Community
EIT	economy in transition
EMAS	Environmental Management and Audit Scheme
ERT	expert review team
ETS	emissions trading scheme
EU	European Union
GCOS	Global Climate Observing System
GDP	gross domestic product
GEF	Global Environment Facility
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the weighted sum of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 without GHG emissions and removals from LULUCF
GWP	global warming potential
HFCs	hydrofluorocarbons
IDR	in-depth review
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
JI	joint implementation
JKAP	Japan Kyoto Mechanisms Acceleration Programme
JPY	Japanese yen
kg	kilogram (1 kg = 1 thousand grams)
kWh	kilowatt hour
LULUCF	land use, land-use change and forestry
Mg	megagram (1 Mg = 1 tonne)
mg	milligram (1000 mg = 1 gram)
Mtoe	millions of tonnes of oil equivalent
NA	not available
N_2O	nitrous oxide
NC3	third national communication
NC4	fourth national communication
NGO	non-governmental organization
Nm^3	standard cubic metre
ODA	official development assistance
PFCs	perfluorocarbons
PPP	purchasing power parities
RDP	Report demonstrating progress under the Kyoto Protocol
RES	renewable energy sources
SF_6	sulphur hexafluoride
SO_2	sulphur dioxide
Tg	teragram (1 Tg = 1 million tonnes)
toe	tonnes of oil equivalent
TPES	total primary energy supply
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States dollar
VAT	value-added tax

- - - - -