



Framework Convention on Climate Change

Distr.: General
7 April 2011

English only

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

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

Contents

	<i>Paragraphs</i>	<i>Page</i>
I. Introduction and summary	1–13	3
A. Introduction	1–4	3
B. Summary	5–13	3
II. Technical assessment of the reviewed elements	14–150	5
A. National circumstances relevant to greenhouse gas emissions and removals, including legislative arrangements and administrative procedures	14–32	5
B. Policies and measures, including those in accordance with Article 2 of the Kyoto Protocol.....	33–90	9
C. Projections and the total effect of policies and measures, and supplementarity relating to the Kyoto Protocol mechanisms	91–117	20
D. Vulnerability assessment, climate change impacts and adaptation measures.	118–123	27
E. Financial resources and transfer of technology, including information under Articles 10 and 11 of the Kyoto Protocol	124–133	29
F. Research and systematic observation	134–138	31
G. Education, training and public awareness.....	139–143	32
H. Evaluation of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol.....	144–146	33
I. Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol.....	147–150	34
III. Conclusions and recommendations.....	151–164	35
IV. Questions of implementation	165	38
Annex		
Documents and information used during the review.....		39

I. Introduction and summary

A. Introduction

1. For Japan, the Convention entered into force on 21 March 1994 and the Kyoto Protocol on 16 February 2005. Under the Kyoto Protocol, Japan committed itself to reducing its greenhouse gas (GHG) emissions by 6.0 per cent compared with the base year¹ level during the first commitment period from 2008 to 2012.

2. This report covers the in-country in-depth review (IDR) of the fifth national communication (NC5) of Japan, coordinated by the UNFCCC secretariat, in accordance with the guidelines for review under Article 8 of the Kyoto Protocol (decision 22/CMP.1). The review took place from 8 to 13 November 2010 in Tokyo, Japan, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: Ms. Jane Ellis (Organisation for Economic Co-operation and Development), Ms. Thelma Krug (Brazil), Mr. Kishan Kumarsingh (Trinidad and Tobago) and Mr. Lu Xuedu (China). Ms. Ellis and Ms. Krug were the lead reviewers. The review was coordinated by Ms. Ruta Bubniene and Ms. Katia Simeonova (UNFCCC secretariat).

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

4. In accordance with decision 22/CMP.1, a draft version of this report was communicated to the Government of 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 NC5 complies in general with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications" (hereinafter referred to as the UNFCCC reporting guidelines). As required by decision 15/CMP.1, supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol² is provided in the NC5. The ERT acknowledged that Japan has considered some recommendations provided in the Report on the in-depth review of the fourth national communication of Japan³ (such as quantifying the effects of some individual policies and measures (PaMs)) and improved its reporting of this information in the NC5.

6. The supplementary information on the minimization of adverse impacts referred to in paragraph 3 above was provided by Japan in the lead-up to the in-country review and elaborated on during the review; it is to some extent complete and transparent. Japan has

¹ "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O), and 1995 for perfluorocarbons (PFCs), hydrofluorocarbons (HFCs) and sulphur hexafluoride (SF₆). The base year emissions include emissions from sectors/source categories listed in Annex A to the Kyoto Protocol.

² Decision 15/CMP.1, annex, chapter II.

³ FCCC/IDR.4/JPN.

not provided information on how it gives priority to actions aimed at the minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol (see para. 147 below).

1. Completeness

7. The NC5 covers all sections required by the UNFCCC reporting guidelines, and most of the information required by these guidelines. However, the NC5 does not provide information on:

- (a) How the PaMs are modifying longer-term trends (see para. 34 below);
- (b) Some information (such as types of PaMs, status of implementation) relating to some PaMs (see para. 35 below);
- (c) The total effect of adopted and implemented PaMs (see para. 110 below); projections of emissions and removals from the land use, land-use change and forestry (LULUCF) sector (see para. 94 below); to the extent possible, projections related to fuel sold to ships engaged in international transport (see para. 95 below);
- (d) How “new and additional” financial resources have been determined (see para. 124 below); success and failure stories of technology transfer using the format provided in the UNFCCC reporting guidelines (see para. 131 below).

8. Japan provided almost all supplementary information under Article 7, paragraph 2, of the Kyoto Protocol, except for:

- (a) Explicit information on how its use of the Kyoto Protocol mechanisms is supplemental to domestic action (see para. 114 below);
- (b) A description of how Japan strives to minimize adverse effects under Article 2, paragraph 3, of the Kyoto Protocol (see para. 90 below);
- (c) Steps it has taken to promote and/or implement any decisions by the International Maritime Organization (IMO) in order to limit or reduce emissions of GHGs from marine bunker fuels (see para. 71 below).

9. The ERT recommends that Japan enhance the completeness of its reporting by providing this information in its next national communication.

2. Transparency

10. The ERT acknowledged that Japan’s NC5, including supplementary information provided under Article 7, paragraph 2, of the Kyoto Protocol, is generally transparent and identifiable. The NC5 provides extensive information on all aspects of implementation of the Convention and its Kyoto Protocol. The ERT noted, however, that the structure of the NC5 does not fully follow the outline contained in the annex to the UNFCCC reporting guidelines (for example, summary common reporting format (CRF) tables on GHG emissions are not provided in an annex to the NC5).

11. 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. The ERT encourages Japan to enhance the transparency of its reporting by:

- (a) Providing more concise and focused information; more clearly identifying the key issues in each section of the national communication;
- (b) Enhancing the description of the linkages between historic GHG emission trends, PaMs and projections;
- (c) Enhancing consistencies within and across sections of the national communication.

12. Further recommendations are presented in the relevant chapters of this report.

3. Timeliness

13. The NC5 was submitted on 21 December 2009, before the deadline of 1 January 2010 mandated by decision 10/CP.13.

II. Technical assessment of the reviewed elements

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

14. In its NC5, Japan has provided a description of the national circumstances and has elaborated on the framework legislations and key policy documents on climate change. While the NC5 contained some information on the national system, it also referred to the more detailed description of this system in the national inventory report (NIR) of the Party's 2010 annual submission.⁴ Further technical assessment of the institutional and legislative arrangements for the coordination and implementation of PaMs are provided in chapter II.B.1 of this report.

1. National circumstances

15. In its NC5, Japan has provided a description of its national circumstances, and information on how these affect GHG emissions and removals in Japan over time. Information was provided on the government structure, population trends, geography and climate, the economy and relevant economic sectors. However, the ERT noted that, while the national circumstances were well described in the NC5, the analysis of how these national circumstances and changes therein as well as other drivers and factors affect the trends of GHG emissions and removals could be further enhanced.

16. The responsibility for climate change policymaking in Japan lies with the Cabinet Office (of the Prime Minister) and 11 ministries (see para. 48 below). The Cabinet is responsible, among other things, for the adoption of legal instruments related to climate change and their revision.

17. The key law underpinning the near-term (up to 2012) climate change policy of Japan is the Act on the Promotion of Global Warming Countermeasures, under which lies the Kyoto Protocol Target Achievement Plan. The promotion, monitoring and review of mitigation PaMs is carried out by a committee called the Global Warming Prevention Headquarters, which was created in 1997 and includes all the government cabinet ministers. The committee assesses on a biannual basis the progress of the climate change PaMs. Further legislative arrangements and administrative procedures, including those for the national system and the national registry, are presented in chapters II.A.2, II.A.3 and II.B of this report.

18. Japan has provided information on GHG emission trends for 1990–2007. This information is mostly consistent with the 2009 national GHG inventory submission. However, the ERT noted that Japan did not provide summary tables, including CRF trend tables for emissions in carbon dioxide equivalent (CO₂ eq), as an annex to the NC5. During

⁴ Available at:

<http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php>.

the review, the ERT assessed the recently submitted 2010 annual submission and has reflected the findings in this report.

19. Total GHG emissions excluding emissions and removals from LULUCF increased by 1.0 per cent between 1990 and 2008, whereas total GHG emissions including net emissions or removals from LULUCF decreased by 0.2 per cent. Emission increases were mainly attributed to CO₂ emissions, which increased by 6.2 per cent over this period, and which were almost entirely offset by the decrease in emissions of the other GHGs. Emissions of methane (CH₄) decreased by 33.2 per cent and emissions of nitrous oxide (N₂O) decreased by 28.6 per cent between 1990 and 2008. Emissions of fluorinated gases (F-gases) decreased by 61.8 per cent between 1990 and 2008 and their share dropped from 3.8 per cent of total GHG emissions in 1995 (the base year for these gases) to 1.8 per cent in 2008.

20. The ERT noted some inconsistencies between the sections of the NC5 relating to the contribution of individual sectors to the total GHG emissions and recommends that Japan ensure cross-section consistency in its next national communication. Table 1 illustrates the national circumstances of the country by providing some indicators relevant to GHG emissions and removals.

21. The ERT appreciates the efforts made by Japan during the review to provide a thorough overview of the GHG emission trends and their drivers. The ERT encourages Japan to improve its reporting on the drivers of GHG emission trends and to provide a better description of the linkages between the past and projected emission trends and PaMs.

22. By sector, trends in total GHG emissions were mostly underpinned by GHG emission trends in the energy sector, which accounted for 90.5 per cent of total emissions in 2008. The trends were mainly driven by the increased demand for electricity and the increased consumption of fossil fuels, in particular coal, in energy industries in both absolute and relative terms (emissions increased by 29.7 per cent over the period 1990–2008), as well as by increased transportation activities (emissions increased by 7.1 per cent in the period 1990–2008). The impact of the moderate economic growth of 13.2 per cent between 1990 and 2008 on emissions from the energy sector was much smaller than that of the increase in the consumption of fossil fuels. Despite such moderate economic growth in the last two decades, Japan remains among the largest economies worldwide, being ranked second in 2009, according to the World Bank data.⁵

23. The increase in emissions from the energy sector was partially compensated by a decrease in emissions from all other sectors. GHG emission reductions occurred in the following sectors: industrial processes (by 43.2 per cent) due to the reduction in emissions from F-gases as a result of the installation of destruction units in all manufacturing facilities; agriculture (by 17.5 per cent) as a result of decreased CH₄ and N₂O emissions from the reduction in the area for rice cultivation and the reduction in the amount of fertilizer applied to fields; waste (by 21.6 per cent) due to the implementation of PaMs aimed at waste reduction, separation, reuse and recycling.

24. The main reason for the decline in the total GHG emissions (without LULUCF) by 6.4 per cent between 2007 and 2008 was the drop in energy demand resulting from the global financial and economic crisis in the second half of 2008 and the related drop in the emissions from the energy sector by 6.5 per cent. The drop in emissions from the energy sector was, in turn, driven by a decrease in GHG emissions from manufacturing industries and construction (by 9.1 per cent), energy industries (by 6.1 per cent) and transport

⁵ Gross domestic product, 2009. *The World Bank: World Development Indicators Database*. World Bank. 27 September 2010. Available at <<http://siteresources.worldbank.org/DATASTATISTICS/Resources/GDP.pdf>>.

(by 4.1 per cent). An analysis of the drivers of GHG emission trends in each sector is provided in chapter II.B of this report. Table 2 provides an overview of GHG emissions by sector from the base year to 2008.

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

	1990	1995	2000	2005	2008	Change ^a 1990– 2000 (%)	Change 2000– 2008 (%)	Change ^a 1990– 2008 (%)
Population (million)	123.6	125.6	126.9	127.8	127.7	2.7	0.6	3.3
GDP (2000 USD billion using PPP)	2 870.7	3 095.6	3 250.3	3 467.6	3 597.6	13.2	10.7	25.3
TPES (Mtoe)	439.3	496.3	519.0	517.2	495.8	18.1	–4.5	12.9
GDP per capita (2000 USD thousand using PPP)	23.2	24.7	25.6	27.1	28.2	10.3	10.0	21.3
TPES per capita (toe)	3.6	4.0	4.1	4.0	3.9	15.0	–5.0	9.3
GHG emissions without LULUCF (Tg CO ₂ eq)	1 268.7	1 339.8	1 344.3	1 354.6	1 281.9	6.0	–4.6	1.0
GHG emissions with LULUCF (Tg CO ₂ eq)	1 205.3	1 265.9	1 264.0	1 268.4	1 203.1	4.9	–4.8	–0.2
CO ₂ emissions per capita (Mg)	9.3	9.8	9.9	10.1	9.5	6.8	–3.8	2.8
CO ₂ emissions per GDP unit (kg per 2000 USD using PPP)	0.4	0.4	0.4	0.4	0.3	–3.1	–12.5	–15.3
GHG emissions per capita (Mg CO ₂ eq)	10.3	10.7	10.6	10.6	10.0	3.2	–5.2	–2.2
GHG emissions per GDP unit (kg CO ₂ eq per 2000 USD using PPP)	0.4	0.4	0.4	0.4	0.4	–6.4	–13.8	–19.4

Sources: (1) GHG emissions data: Japan's 2010 greenhouse gas inventory submission (Common Reporting Format version 2.2, submitted on 18 October 2010); (2) Population, GDP and TPES data: International Energy Agency, 2010.

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

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

2. National system

25. In accordance with decision 15/CMP.1, Japan provided in its NC5 a description of how its national system for inventory preparation and management is performing the general and specific functions defined in the guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol (decision 19/CMP.1). The description includes all elements required in decision 15/CMP.1.

26. Japan has also provided in its NC5 a description of national legislative arrangements and administrative procedures that seek to ensure that the implementation of activities

under Article 3, paragraph 3, of the Kyoto Protocol and elected activities under Article 3, paragraph 4, of the Kyoto Protocol also contribute to the conservation of biodiversity and the sustainable use of natural resources. During the review, Japan further elaborated on the enhancement of the National Forest Resource Database, which integrates information required under Article 3, paragraphs 3 and 4, in particular in relation to age, species and volume based on aerial photos and high-resolution satellite data, as well as biophysical information on forests. These arrangements and procedures, together with the database, allow Japan to reliably identify afforestation, reforestation, deforestation and forest management areas.

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

Sector	GHG emissions (Tg CO ₂ eq)						Change (%)		Shares ^a by sector (%)	
	1990	1995	2000	2005	2007	2008	1990–2008	2007–2008	1990	2008
	1. Energy	1 078.86	1 156.41	1 190.63	1 226.78	1 241.78	1 160.52	7.6	–6.5	85.0
A1. Energy industries	325.21	346.40	359.34	408.21	449.10	421.69	29.7	–6.1	25.6	32.9
A2. Manufacturing industries and construction	372.91	372.52	379.01	373.52	372.62	338.72	–0.1	–9.1	29.4	26.4
A3. Transport	215.56	256.12	263.96	250.55	240.92	230.94	7.1	–4.1	17.0	18.0
A4.–A5. Other	162.12	179.71	187.25	194.06	178.70	168.72	4.1	–5.6	12.8	13.2
B. Fugitive emissions	3.07	1.66	1.08	0.43	0.45	0.45	–85.5	–1.7	0.2	0.0
2. Industrial processes	132.65	124.12	97.13	77.23	78.71	75.31	–43.2	–4.3	10.5	5.9
3. Solvent and other product use	0.29	0.44	0.34	0.27	0.16	0.16	–44.1	0.3	0.0	0.0
4. Agriculture	31.31	30.08	27.68	26.57	26.15	25.84	–17.5	–1.2	2.5	2.0
5. LULUCF	–63.36	–73.87	–80.26	–86.12	–81.80	–78.81	24.4	–3.7	–5.0	–6.1
6. Waste	25.56	28.76	28.52	23.71	22.25	20.05	–21.6	–9.9	2.0	1.6
7. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GHG total with LULUCF	1 205.32	1 265.93	1 264.03	1 268.43	1 287.23	1 203.08	–0.2	–6.5	NA	NA
GHG total without LULUCF	1 268.68	1 339.80	1 344.29	1 354.55	1 369.04	1 281.88	1.0	–6.4	100.0	100.0

Source: Japan’s 2010 greenhouse gas inventory submission (Common Reporting Format version 2.2, submitted on 18 October 2010).

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

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

^a The shares of sectors are calculated relative to GHG emissions without LULUCF; for the LULUCF sector, the negative values indicate the share of GHG emissions that was offset by GHG removals through LULUCF.

27. During the review, Japan provided further information on the national system, elaborating on institutional arrangements, the phases and responsibilities of the inventory

compilation process, the data providers, the archiving of information, and the role of the Committee for the Greenhouse Gas Emission Estimation Methods. In 2009, Japan established the GHG Inventory Quality Assurance Working Group aimed at enhancing the quality of its national inventory. The ERT commends Japan for the further strengthening of the national system for GHG inventory preparation and management.

28. The ERT concluded that the national system continues to perform its required functions as set out in decision 19/CMP.1.

3. National registry

29. In its NC5, Japan has provided information on the national registry. This information includes a description of how its national registry is performing the functions defined in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and how it complies with the requirements of the technical standards for data exchange between registry systems. The Party also provided a reference to the 2009 annual submission, which contains a more detailed description of the national registry.

30. During the review, Japan provided additional information on: (a) the measures put in place to safeguard, maintain and recover registry data; (b) the security measures employed in the registry to prevent unauthorized manipulations; (c) the measures put in place to protect the registry against security compromises; (d) the test procedures related to the performance of the current version of the national registry; and (e) the recording of the changes to and discrepancies in the national registry. In response to questions raised by the ERT, Japan provided documents demonstrating how it records the changes related to the national registry and how it maintains these records. The ERT noted that updates of databases and applications, implemented security measures, and changes to the national registry software are documented on a regular basis by nominated responsible staff.

31. The ERT took note of the recommendations of the standard independent assessment report (SIAR)⁶ that, in its next annual submission, Japan should provide an internet address where the public information referred to in paragraphs 44–48 of the annex to decision 13/CMP.1 is located and should further improve its reporting on notifications and non-replacements by explicitly stating a non-occurrence of notifications and non-replacements if none occurred during the reporting period. During the review, the ERT was informed that the Party has already addressed these recommendations. The ERT commends Japan for its efforts to ensure the reliable performance of its national registry.

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

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

33. As required by the UNFCCC reporting guidelines, Japan has provided in its NC5 extensive information on its package of PaMs in place or being considered in order to fulfil its commitments under the Convention and its Kyoto Protocol. Each sector has its own textual description of PaMs. In general, the package of PaMs in the NC5 is similar but enhanced compared to that presented in the Party's fourth national communication (NC4).

⁶ SIARs of 2010 are available at http://unfccc.int/kyoto_protocol/registry_systems/independent_assessment_reports/items/4061.php.

34. The ERT noted that, in its NC5, Japan did not provide information on how it believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals. Some information on this was provided for a limited number of sectors during the review.

35. The ERT also noted that Japan provided only partial information or organized the information on PaMs not fully in accordance with the UNFCCC reporting guidelines, as follows:

(a) Information on PaMs was presented in the NC5 by gas and subdivided by sector, while the UNFCCC reporting guidelines require this information to be organized by sector and then subdivided by gas;⁷

(b) A textual description of the principal PaMs by sector supplemented by a summary table on PaMs by sector;

(c) Information on the type of policy instrument and status of implementation was not presented for several PaMs.

36. The ERT identified that information on a number of reporting elements was missing in the NC5. The ERT encourages Japan to include this information in its future national communications, including information on: PaMs that increase emissions, PaMs described in previous national communications that have been discontinued and PaMs that influence GHG emissions from international transport. The ERT also encourages Japan to further elaborate on how progress in relation to PaMs is monitored and evaluated over time and to streamline the PaMs section of future national communications by focusing and reporting in detail on the most important PaMs.

37. Some of the recommendations from the review of the NC4 were taken into consideration to improve reporting in the NC5, including the provision of a summary table outlining individual PaMs with their expected levels of emission reductions.

38. Japan's NC5 outlines near-term framework PaMs designed to meet its target under the Kyoto Protocol and included in the Kyoto Protocol Target Achievement Plan, which was prepared under the framework of the Act on the Promotion of Global Warming Countermeasures. This act is the Party's key climate policy instrument and has been revised and strengthened four times since it was first enacted in 1998, with the most recent update in 2008. Measures developed under this plan include those for reducing GHG emissions in the energy, industry, transport, residential, agriculture and forestry sectors; those for increasing GHG removals; as well as cross-sectoral measures, such as a system for the calculation, reporting and publication of emissions data.

39. The key instruments used to meet the Party's Kyoto Protocol targets are voluntary measures, such as the voluntary action plan (VAP) in the energy and industry sectors, and regulatory measures, such as cross-sectoral energy efficiency standards. Compared to the 'business-as-usual' baseline, energy-efficiency measures in the transport, residential and commercial sectors are estimated to lead to an emissions reduction in 2010 of 151.2⁸ Mt of

⁷ Japan reported information on PaMs by gas, subdivided by sector, which means that information on, for example, PaMs in the industry sector, is spread over several different places.

⁸ This number includes effects of the following PaMs: *in the industrial sector*: dissemination of energy-efficient devices in the manufacturing field; dissemination of fuel-efficient construction machineries in the construction field; energy management in factories and workplaces; implementation of emission reduction measures in small and medium size enterprises; efforts in agriculture, forestry and fisheries industry; *in the commercial and other sector*: development of energy efficient performance of buildings; dissemination of energy management systems; improvement of the energy efficiency of devices based on Top-runner standards; dissemination of high-efficient energy-saving devices; dissemination of commercial-use energy-saving refrigerator-

CO₂ and voluntary agreements in the energy and industry sectors are estimated to lead to a reduction of almost 82.1 Mt of energy-related CO₂ in 2010.⁹ Under these voluntary agreements, entities establish their own targets (e.g. in the form of energy or CO₂ intensity, absolute CO₂ emission reductions, or F-gas recovery goals) and report on them annually. In order to meet these voluntary targets, entities can use credits from the Kyoto mechanisms – predominantly the clean development mechanism (CDM). Mandatory measures, mostly in the form of standards, are significant in some sectors, including the transport and residential/commercial sectors.

40. In 2009, the Government of Japan announced a medium-term national GHG reduction target of 25 per cent by 2020 compared to 1990, which has been inscribed in the Copenhagen Accord.¹⁰ This target is premised on the establishment of a fair and effective international framework by all major economies that have agreed on ambitious GHG-related targets. As part of plans to strengthen its climate policy framework, similarly to all major economies that have agreed on ambitious GHG-related targets, the Japanese Cabinet has approved the Strategic Energy Plan of Japan. It is estimated that a reduction in energy-related CO₂ emissions of 30 per cent by 2030 could be achieved implementing the PaMs included in the Plan. The estimated amount is almost half the amount of the reduction in energy-related CO₂ emissions by 80 per cent by 2050 compared to 1990 levels.

41. Further, the Government of Japan has developed a “Bill of Basic Act on Global Warming Countermeasures”, which is to be deliberated by the parliament in the coming months. The aim of the “Bill of Basic Act on Global Warming Countermeasures” is to establish a framework through which medium-term targets can be achieved. Only after approval of this Act by the parliament are detailed operational measures under it expected to be implemented. Indeed, plans to establish feed-in tariffs for renewable energy, to introduce a ‘green’ tax system and to develop a domestic emissions trading scheme are some of the principal policy measures under this Act. Future PaMs may therefore give a much larger role to economic and fiscal measures than the current package of PaMs.

42. This extension of the current short-term framework to a longer time period and a simultaneous enhancement of PaMs are needed in order to move towards Japan’s medium-term and longer-term targets. According to the NC5, as well as more recent information provided to the ERT during the review, the stringency and likely focus of policy instruments could change significantly in the future.

43. In addition to information on federal and sectoral PaMs, Japan’s NC5 also provided information on climate mitigation PaMs at local government level. This includes the mandatory development of action plans by local governments (currently in place for two thirds of the approximately 1,800 local governments). Further information on PaMs implemented at local government level was provided during the review (see paras. 50 and 51 below).

44. In terms of the quantification of effects of individual PaMs, the ERT noted the improvement in the NC5 compared to the NC4, as the NC5 provided estimates of the effects of several PaMs by sector and by gas. However, in some cases, the Government of Japan indicated that it was difficult to disentangle the effects of different mitigation policy instruments in a given sector. For example, the NC5 indicates the expected effect of voluntary agreements in the transport and commercial sectors, but also indicates that these

freezer; *in the residential sector*: improvement of the energy efficiency performance of houses; *in the transport sector*: improvements in fuel efficiency of automobile promotion of modal shifts, increase of truck transport efficiency.

⁹ There are some overlaps between the effect of voluntary agreements and regulation, so the figures in this paragraph cannot be summed.

¹⁰ Decision 2/CP.15. Copenhagen Accord.

effects could be attributed to some extent to other PaMs. Information provided during the in-country visit also highlighted that it could sometimes be difficult to distinguish the effects of mitigation policies on emission trends from extraneous influences, such as the global economic crisis.

45. The regular monitoring and assessment of GHG emissions and mitigation actions is in place. In particular, the Act on the Promotion of Global Warming Countermeasures requires large emitters to calculate and report their GHG emissions annually. Further, each ministry that oversees mitigation activities (such as the Ministry of the Environment (MoE); the Ministry of Economy, Trade and Industry (METI); and the Ministry of Land, Infrastructure, Transport and Tourism (MLIT)) has a ‘council’ which reports annually on the status of these activities. These councils include external experts.

46. The NC5 contains only very limited information on the costs of implementation of the PaMs described. However, information provided to the ERT during the in-country visit expanded on this information for some sectors. Japan may wish to address the fiscal effects of implemented PaMs, such as taxes and subsidies, in its next national communication.

47. Table 3 provides a summary of the reported information on the PaMs of Japan.

Table 3

Summary of information on policies and measures

<i>Major policies and measures</i>	<i>Examples/comments</i>
<i>Overall policy guidance</i>	
Act on the Promotion of Global Warming Countermeasures	Framework act that underpins the implementation of the Kyoto Protocol for the first commitment period and other instruments such as the emissions reporting system.
Bill of Basic Act on Global Warming Countermeasures	Framework act (under discussion by the parliament) for medium- and longer-term mitigation actions to 2020 and beyond.
<i>Policy framework and cross-sectoral measures</i>	
Kyoto Protocol Target Achievement Plan	Regulation and action plan on the promotion of mitigation measures to achieve the target for the first commitment period of the Kyoto Protocol. The plan was approved in 2005 and revised in 2008.
Energy Conservation Act	Cross-sectoral regulation on energy conservation, covering the industry, transport, commercial and residential sectors (first enacted in 1979, revised several times, including in 2008). Includes requirements on process (energy management) as well as regular monitoring and public reporting.
<i>Policies and measures by sector</i>	
<i>Energy</i>	
Voluntary action plans in the energy and industry sectors	These plans aim to reduce CO ₂ emissions from industry (65 Mt) and energy supply (up to 15 Mt).
Energy Conservation Act	Mostly targets end-use energy efficiency improvements. Estimated impact in the residential/commercial sectors of 38 Mt CO ₂ and 8.2–10 Mt CO ₂ in industry.
Promoting renewable energy	A mix of measures, including renewable portfolio standards, renewable energy certificates and subsidies for certain renewable energy sources (38–47 Mt CO ₂).
Top-runner Standards	Energy-efficiency standards: estimated impact in the residential/commercial sectors of 26 Mt CO ₂ .
Promoting nuclear energy	A mix of measures, including the voluntary action plan of the Japanese Electric Utility Industry and electrical load levelling (14–15 Mt CO ₂).

<i>Major policies and measures</i>	<i>Examples/comments</i>
Promoting natural gas and fuel cells	Implemented through several measures, including research and development and the Green Purchasing Act (14–14.3 Mt CO ₂).
<i>Transport</i>	
Voluntary action plans in the transport sector	Estimated impact of 13 Mt CO ₂ (note that this impact overlaps with some of the impacts of other measures).
Energy Conservation Act (truck transport)	Estimated impact in the transport sector of 14 Mt CO ₂ .
Top-runner Standards	Estimated impact in the transport sector of around 25 Mt CO ₂ .
<i>Industrial processes</i>	
Promotion of blended cement	Promoting the pioneering introduction of green purchasing (1.12 Mt CO ₂).
Abatement of N ₂ O and hydrofluorocarbons (HFC) emissions	Promoting the development of substitute materials and the use of substitute products (64.4 Mt CO ₂ eq).
Global warming prevention measures	Installation of N ₂ O abatement devices in the production of adipic acid (9.85 Mt CO ₂ eq). Recovery of HFCs used as refrigerant (5.26 Mt CO ₂ eq).
<i>Agriculture</i>	
	Introduction of an advanced energy-saving heating system (0.174 Mt CO ₂ eq). Optimizing fertilizer application to reduce CH ₄ emissions from rice production (0.18 Mt CO ₂ eq).
<i>Forestry</i> ^b	
Forest management and promotion of wood use in public buildings	Special Measures Law for Promotion of Thinning (2008), Act for Promotion of Wood Use in Public Buildings (48 Mt CO ₂ over the period 2008–2012).
<i>Waste</i>	
Sound Material-Cycle Act	Sound Material-Cycle Plan under the Sound Material-Cycle Act (12.74 Mt CO ₂ eq in 2008).
Waste Management Act	Measures to significantly reduce waste volume (0.45 Mt CO ₂ eq in 2008). Establishing standards of sewage combustion (1.26 Mt CO ₂ eq in 2008).

Note: The greenhouse gas reduction estimates, given for some measures (in parentheses) unless indicated otherwise, are annual reductions in CO₂ or CO₂ eq for the year 2010, which is taken as the annual average for the first commitment period of the Kyoto Protocol.

1. Policy framework and cross-sectoral measures

48. The Prime Minister and individual ministers are in charge of developing climate change policy, and this is coordinated within the Cabinet by the Global Warming Prevention Headquarters (see para. 17 above). Individual ministries¹¹ are in charge of overseeing particular PaMs and expert councils for particular issues (which report to individual ministries and include external experts) are tasked with developing and deliberating on the jurisdiction and stipulation of laws. For example, the oversight, monitoring and review of the important programme on VAPs and their progress towards the targets set to achieve the Kyoto Protocol target is spread over several ministries and agencies including, for example: the METI (for energy and energy-intensive industry sector participants); the Ministry of Agriculture, Food and Fisheries ((MAFF) e.g. for agricultural

¹¹ Including the MoE; the METI; the Ministry of Culture, Sports, Science and Technology (MEXT); the MAFF; the MLIT; and the Ministry of Foreign Affairs (MoFA).

associations); the MLIT (e.g. for participants from the commercial and transport sectors); and the MoE (e.g. for industrial waste management).

49. In addition to the VAPs, these four ministries are in charge of implementing many of Japan's other climate-related policies. For example, the MoE supervises the implementation of the Act on the Promotion of Global Warming Countermeasures; the METI supervises energy-related laws, such as the Energy Conservation Act and the Law Concerning Special Measures for the Use of New Energy by Electric Utilities; and the MLIT is involved in the implementation of the transport-related laws. The federal government also provides guidelines for local government action, both on mitigation and adaptation.

50. It is mandatory for local governments to establish mitigation action plans and two thirds have already done so. During the in-country review, further information on local initiatives under way in the cities of Tokyo and Kitakyushu was provided. Both municipalities have also established a GHG emissions reduction target (25 per cent below 2000 levels by 2020 for Tokyo, and 50 per cent below 2005 levels by 2050 for Kitakyushu). Both municipalities have also initiated a range of policy instruments – including innovative approaches – in order to address the climate change challenge. For example, Kitakyushu has developed an integrated local energy system that uses waste heat from power generation to heat local factories, electricity generation is supplemented with micro-generation (e.g. from photovoltaic panels) and environmentally friendly housing has been developed.

51. Initiatives of the Tokyo Metropolitan Government (TMG) are also innovative and have the potential to be replicated elsewhere. Following a series of voluntary actions in the commercial and industrial sectors that did not lead to the desired results, in 2010, the TMG launched the world's first urban CO₂ emissions trading scheme (ETS). This ETS is focused on facilities that annually consume more than 1,500 kg litres of crude oil eq and has a total reduction target of 6 per cent for the first compliance period (2010–2014) compared to a baseline scenario. Allowances are allocated to entities 6–8 per cent below selected historical data levels and the allowances can be traded among scheme participants.

2. Policies and measures in the energy sector

52. Japan's emissions profile is an unusual one as the energy sector accounts for a very high share of total GHG emissions; for example, in 2008 this share was 90.5 per cent (or 1,160.52 Mt CO₂ eq) of total GHG emissions, of which 99.3 per cent were CO₂ emissions. Tackling emissions in the energy sector (particularly with respect to stationary energy combustion) is therefore of crucial importance in developing an efficient and robust mitigation response. Japan also has limited indigenous energy resources and, since the first oil crisis in 1973, has placed an emphasis on policies that reduce its energy import dependency. However, by 2007, energy imports accounted for 82 per cent of Japan's total energy use and between 1990 and 2008, emissions from the energy sector increased by 7.6 per cent.

53. The main drivers for this increase in emissions were an increase in the demand for electricity and an increase in the use of coal for power generation. Indeed, the share of coal-based power in the power generation sources more than doubled from 10 per cent in 1990 to 25 per cent in 2008, while the proportion of zero-emitting sources (nuclear and renewables) dropped slightly over the same period (from 38 per cent in 1990 to 34 per cent in 2008). This decrease more than offset reductions in CO₂ emissions from oil combustion (as a result of a reduction in the use of oil for electricity generation) and fugitive CH₄ emissions (as a result of the closure of two coal mines in 1997 and 2001) over the same time period.

54. The trend between 1990 and 2008 in GHG emissions from fuel combustion showed notable increases in energy industries (29.7 per cent) and in the transport sector (7.1 per cent). Emissions from energy use in “other” sectors (the residential, commercial, agriculture/forestry/fisheries sectors) also increased by 4.1 per cent. However, emissions from the transport sector have dropped by 13.1 per cent from their peak in 2001. In the residential and services sector, the impact on emissions from an increased demand for energy services, an increasing number of households and an increase in the floor area of commercial premises outweighed the gains from the increased energy efficiency of appliances.

55. **Energy supply.** The energy supply, incorporating emissions from electricity generation, accounted for 32.9 per cent of Japan’s total emissions in 2008. (This is larger than total emissions from the transport, residential/commercial and agriculture/forestry/fisheries sectors combined.)

56. The NC5 highlighted Japan’s current PaMs to promote renewables, including renewable portfolio standards (RPS). The RPS, combined with other PaMs to promote renewables, such as renewable energy certificates and subsidies for solar photovoltaic and biofuels, are estimated to reduce emissions by 38–47 Mt CO₂ in 2010. The NC5 also highlighted current PaMs to promote nuclear energy (estimated to reduce emissions by 14–15 Mt CO₂ in 2010). These include assessing and verifying the targets of the VAP of the Japanese Electric Utility Industry and implementing measures for electrical load levelling.

57. However, no information on any near-term PaMs that could increase emissions (such as on improving Japan’s energy security and the resulting increased share of coal-based power) was provided in the NC5. Further, only very limited information on PaMs to reduce emissions from coal-based power was included in the NC5. During the review, Japan noted the existence of a tax on coal and an aim to convert obsolete coal-fired power stations to gas-fired stations.

58. During the review, Japan presented information on longer-term goals (to 2030) in the energy supply sector that were enshrined in the 2010 Strategic Energy Plan of Japan (the plan was launched in 2003 and subsequently revised in 2007 and 2010). The goals include increasing the share of nuclear and renewable power to 70 per cent (by building 14 additional nuclear power plants by 2030 and by improving their capacity factor, and by significantly expanding the contribution of non-hydro renewable electricity) and ensuring that new coal-fired plants would be equipped with carbon dioxide capture and storage (CCS) by 2030. Measures to achieve these goals that were under consideration during the review, such as a feed-in tariff for renewable electricity, were also presented during the review.

59. **Renewable energy sources.** Renewable energy sources (primarily large-scale hydropower) accounted for 6 per cent of Japan’s primary energy supply and 8 per cent of Japan’s electricity generation in 2008. Japan is actively promoting an increase in renewable energy sources, in electricity generation as well as for other uses, and has a variety of PaMs in place to do so, notably the RPS. As Japan has no more potential for expanding its use of large-scale hydropower, an expansion of renewables will entail large increases in other renewable energy sources (including small-scale hydropower, biomass, wind and solar).

60. The 2002 RPS Law led to a more than twofold increase in renewable electricity generation in the period 2003–2009 across several renewable energy sources, including wind (where generation trebled from 9.9 to 37.3 TWh), biomass (where generation increased from 20.4 to 32.2 TWh), and solar (where generation more than quadrupled from 2.0 to 9.4 TWh, due also to the existence of measures to promote micro-solar electricity). As a result, energy production from solar and wind energy increased by 18.3 per cent from 2003 to 2008, and energy production from combustible renewables and waste increased by

14.9 per cent over the same period. The total generation from renewables reached 8.8 TWh in 2009. Once ‘banked’ generation (generation beyond the levels set by the goals for 2003–2004) has been taken into account, the goal of 10.4 TWh renewable electricity in 2009 has been met.

61. Longer-term target for renewables has also been set in terms of their contribution to total energy supply (an increase to 10 per cent by 2020). In terms of renewable electricity generation, an increase to 20 per cent of the share of renewables is estimated in line with 70 per cent target by 2030 for the electricity generation from renewables combined with nuclear power generation. As the measures to be put in place to meet these targets, the expansion of the feed-in tariff to wind, biomass, geothermal and small-mid scale hydropower is also currently under consideration.

62. **Energy efficiency.** Japan’s energy efficiency is already high in several areas, following a concerted effort to improve energy efficiency after the first oil crisis in 1973. The further improvement of energy efficiency is a mainstay of Japan’s energy and climate policy goals. This is done via a mixture of regulations as well as the use of VAPs in several sectors, including industry and residential/commercial. In terms of regulation, the Energy Conservation Act (enacted in 1979 and strengthened several times subsequently) plays a particularly important role – it covers energy efficiency in the industry and residential/commercial sectors and was strengthened in 2008, with its coverage expanded to include the transport sector.

63. The Energy Conservation Act requires annual reporting on indices relevant to energy efficiency and also sets target benchmark energy-efficiency levels for specified subsectors. These benchmarks are set to the energy-efficiency levels of the best performing companies (the top 10–20 per cent) in each sector, and companies aim to reach this level within approximately five years. Performance against these benchmarks is subject to regular review and update, and the government publicizes operators’ average values and the standard deviations of companies. Names of companies with outstanding achievements are also publicized by the government.

64. The Top-runner Standards are set under the Energy Conservation Act and cover the efficiency of 23 product categories in vehicles and appliances, including space heaters for passenger vehicles and electric toilet seats. These standards are set higher than the best performance currently available. The Top-runner Standards have helped to significantly reduce Japan’s emissions compared to the baseline levels. For example, the energy efficiency of air conditioners improved by 67 per cent between 1997 and 2004 and that of gasoline passenger vehicles improved by 22.5 per cent between 1995 and 2005. The impact of this programme on all categories contributed to a reduction in emissions of more than 51 Mt CO₂ in the transport, commercial and residential sectors in 2010.

65. Longer-term goals and possible measures to further strengthen energy efficiency are also outlined in the Strategic Energy Plan (see para. 57 above). Goals include making net-zero energy houses available by 2020, raising the share of sales of next-generation vehicles (including electric vehicles and plug-in hybrids) to 50 per cent by 2020, and replacing all lights with highly efficient lights by 2030. Measures under consideration include setting compulsory energy-saving standards for houses and introducing new integrated standards for energy consumption in all buildings.

66. **Residential and commercial sectors.** The regulations highlighted above, namely the Energy Conservation Act and its Top-runner Standards, play a key role in addressing energy efficiency in the residential and commercial sectors. Indeed, the NC5 highlights that this Act is estimated to have reduced emissions in buildings by 38 Mt CO₂ in 2010 by having encouraged improvements in their energy efficiency. The Green Purchasing Act of the government has also had an impact. Japan also highlighted other PaMs used to promote

energy efficiency in the residential and commercial sectors to complement the regulations already in place. These include economic and fiscal incentives, such as the availability of low-interest loans to buy energy-efficient houses, and subsidies to promote energy efficiency in small- and medium-sized enterprises. Energy labelling is also used. Actions in this area by municipalities, such as the municipality of Tokyo, are also increasingly important. In the longer-term, the Strategic Energy Plan (see para. 57 above) is expected to have a pivotal role in continuing the promotion of energy efficiency in buildings.

67. **Transport sector.** Mitigating emissions in the transport sector is a major success story in Japan, as emissions from this sector have been declining since 2001. The transport sector has been tackled chiefly by regulation and fiscal measures and, to a lesser extent, by VAPs. Regulations are a key element of Japan's mitigation response in this sector, with such as the Top-runner Standards accounting for the vast majority of the 25 Mt CO₂ impact on mitigation in 2010 generated by improving the fuel efficiency of cars. The PaMs in place mainly targeted energy-efficiency improvements in transport and, to a lesser extent, a modal shift and the promotion of zero-emitting vehicles.

68. Fiscal measures, such as the introduction of a 'green automobile tax' (2001) have been providing increasing incentives for more environmentally friendly cars whose fuel consumption is more than 50 per cent better than the average car. Environmentally friendly cars are exempted from the acquisition tax and the annual tax for these cars is reduced by 50–75 per cent.

69. Other PaMs are also used but have a smaller expected mitigation impact. These include measures to promote a modal shift (e.g. by constructing more railway lines) and to improve the GHG intensity of vehicle transport. The Government of Japan estimates that non-climate related factors, such as the global economic crisis and a declining population, may have also played a role in reducing emissions from this sector.

70. During the review, the ERT was also provided with information on longer-term transport-related goals. These include raising the share of next-generation vehicle sales to 50 per cent by 2020 and 70 per cent by 2030. Several possible measures to achieve this goal are under consideration, including the introduction of fuel standards for 2020. In the longer-term, the Strategic Energy Plan (see para. 57 above) is expected to have a pivotal role in continuing the promotion of energy efficiency and new technologies in transport.

71. As regards bunker fuels, the ERT noted that Japan did not provide in its NC5 the information required by decision 15/CMP.1, in accordance with Article 2, paragraph 2, of the Kyoto Protocol on the identification of the steps it has taken to promote and/or implement any decisions by the International Civil Aviation Organization (ICAO) and the IMO in order to limit or reduce GHG emissions not controlled by the Montreal Protocol from aviation and marine bunker fuels. During the review, Japan provided the ERT with information on several measures that it has taken to reduce GHG emissions from aviation bunker fuels, mainly in the framework of the international programme "ASPIRE". These measures centre on enhancing flight efficiency, improving flight efficiency by reducing flight duration, improving airport facilities to reduce energy consumption and utilizing biofuel to blend the aviation fuel in order to reduce CO₂ emissions. With regard to maritime bunker fuels, Japan also reported that the Government of Japan was very actively engaged in facilitating the GHG mitigation policy process led by the IMO. The ERT recommends that Japan include in its next national communication the relevant information on PaMs on aviation and maritime bunker fuels as required by the Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol (decision 15/CMP.1).

72. **Industrial sector.** VAPs in the industry sector play by far the largest role in Japan's mitigation efforts under the Kyoto Protocol Target Achievement Plan. These VAPs are drawn up on an industry association basis (e.g. the Chemical Industry Association, the Iron

and Steel Federation), where each industry sets its own target compared to a the base year and works towards achieving this target. The target is to be met mainly by domestic actions by the association, but the use of Kyoto units is also allowed (see para. 117 below).

73. Industries with a VAP can choose to express the target in terms of CO₂ intensity, CO₂ emissions, energy intensity or energy consumption. In total, 108 energy and industry sectors have established VAPs. This comprises all 62 bodies and corporations participating in the Japanese business association (“Keidanren”), as well as non-Keidanren members. The METI supervises several important VAPs in the industry sector, covering emissions of 331 Mt CO₂. Progress towards these VAPs is positive in the industry sector, with emissions from sectors covered by VAPs dropping from 369 Mt CO₂ in the base year to 365 Mt in 2007. However, the more detailed picture varies by subsector; for example, all the associations in paper, glass and cement met their targets in 2008, whereas four out of six associations in the chemicals and non-ferrous metals sector did not. The government plans to evaluate the level of non-achievement for those industries that have not achieved their target with the aim of identifying the content and effect of future measures to be undertaken to compensate for this.

74. Regulations also play a role in the industry sector. This includes improved energy efficiency and energy management under the Energy Conservation Act. Some of the impact of these regulations is included in industries’ VAPs, so clearly identifying which measure has led to which level of GHG mitigation is not straightforward. In particular, robust monitoring and reporting requirements are in place for all large emitters. Under such requirements, all high-emitting industries are required to monitor and report annually their energy and emission levels and to make these reports publicly available.

75. In terms of future goals, the Strategic Energy Plan aims to enhance Japan’s already very good energy efficiency by replacing existing technologies with advanced ones. Further enhancements to the Energy Conservation Act were also under consideration in 2010.

3. Policies and measures in other sectors

76. Between 1990 and 2008, GHG emissions from the industrial processes (including solvent and other product use), agriculture and waste sectors together decreased by 36.1 per cent, mainly driven by the reduction in N₂O and F-gases, the reduced amount of waste disposed on land, and the reduction in crop acreage and in the amount of fertilizer applied to cropland.

77. **Industrial processes.** Between 1990 and 2008, GHG emissions from the industrial processes sector decreased by 43.2 per cent, mainly driven by the reduction in emissions of F-gases and in N₂O emissions from adipic acid production. Between 1990 and 1995, N₂O emissions from the industrial processes sector remained relatively stable, but between 1995 and 2008 they decreased 6.5 times due to the installation of devices to destroy N₂O generated in the adipic acid production process. Emissions of F-gases (hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆)) decreased from 51.5 Mt CO₂ eq in 1995 to 23.6 Mt CO₂ eq in 2008. Emissions decreased by 53.8 per cent, mainly driven by the installation of devices to destroy HFCs generated in the hydrochlorofluorocarbon (HCFC) production process (HFC emissions decreased from 23 Mt CO₂ eq in 1995 to 2.5 Mt CO₂ eq in 2008), the installation of SF₆ recovery devices for SF₆ used for insulating gas appliances (SF₆ emissions decreased from 17 Mt CO₂ eq in 1995 to 3.8 Mt CO₂ eq in 2008) and the replacement of HFCs and PFCs used as cleaning agents and solvents (HFC and PFC emissions decreased from 10.4 Mt CO₂ eq in 1995 to 1.3 Mt CO₂ eq in 2008).

78. The ERT noted that, during the same reporting period, between 1990 and 2008, the emissions of HCFCs from refrigeration and air-conditioning equipment increased

significantly from 0.8 Mt CO₂ eq to 13.2 Mt CO₂ eq, mainly driven by the replacement of chlorofluorocarbon (CFC) with HCFC, and this trend is expected to continue in the future with emissions growing substantially by 2020. The Government of Japan recognized the need to shift this trend and has supported the study of a technology to replace HCFCs in the refrigeration and air-conditioning sector with CO₂. The main barrier to applying this technology is the high cost. The ERT encouraged the Government of Japan to include in its next national communication information on the progress of the new refrigerant technology development and its application.

79. VAPs, regulations and fiscal incentives are in place to promote the reduction of GHG emissions from industrial processes. The ERT noted that the significant reductions in emissions of industrial gases, namely N₂O, HFCs, PFCs and SF₆, have been achieved through the VAPs by the industrial sectors and through government regulations. The regulations (the Fluorocarbons Recovery and Destruction Law (2002, amended in 2007), the Designated Home Appliances Recycling Law (2001) and the End-of-Life Vehicle Recycling Law (2005)) introduced by the Government of Japan also contributed to the reduction in emissions of F-gases. In addition, Japan has provided financial support for developing alternative air-conditioning products and installing devices to destroy industrial gases, and has supported relevant research and development.

80. **Agriculture.** Between 1990 and 2008, GHG emissions from the agriculture sector decreased by 17.5 per cent, mainly driven by the reduction in crop acreage and in the amount of fertilizer applied to cropland.

81. The ERT noted that the Government of Japan planned to conduct a review of organic matter and water management in rice paddies to control the CH₄ emissions from paddy rice, and to continue the optimization of the fertilizer application to reduce N₂O emissions.

82. During the in-depth review, Japan provided further information on measures and actions taken to reduce GHG emissions in horticulture, which includes support for an advanced heating system and energy conservation equipment, the verification of oil-free horticulture systems and the labelling of products to indicate the associated CO₂ emissions/carbon footprint.

83. **LULUCF.** LULUCF is a net sink for Japan, with total net removals of 78.8 Mt CO₂ eq in 2008. Net removals have increased by 24.4 per cent since 1990. The trend was mainly driven by the development of forest management activities, such as thinning and tending, and the expansion of protection and conservation areas where logging and land-use control are regulated by legislation. The ERT noted that Japan is introducing a number of additional measures and new legislation to enhance removals from forest management, including the Special Measures Law for the Promotion of Thinning adopted in 2008, aimed at reducing the financial burden on forest owners, and the 2010 Act for the Promotion of Wood Use in Public Buildings, which is expected to stimulate the use of wood, increase demand and provide forest owners with financial means to enhance thinning activities.

84. Under Article 3, paragraph 4, of the Kyoto Protocol, Japan has elected forest management and revegetation. Revegetation activities are aimed at the conservation, expansion and management of urban parks and green areas. Japan is planning to use all its cap of 13 Mt carbon annually for forest management, which will contribute 3.8 per cent to meeting the Kyoto Protocol target for the first commitment period.

85. The ERT noted that Japan provided little information on afforestation, reforestation and deforestation in its NC5, although the Party noted its limited capacity to develop additional afforestation and reforestation activities. The ERT encourages Japan to include

in its next national communication information on how individual measures in the LULUCF sector are expected to contribute to the total effect of PaMs.

86. **Waste management.** Between 1990 and 2008, GHG emissions from the waste sector decreased by 21.6 per cent, mainly due to an active governmental policy to promote effective waste management. This policy and the relevant “Sound Material-Cycle Plan” put in place under the relevant act, is aimed at the minimization, separation, reuse and recycling of waste, and improving the efficiency of waste incineration and the recovery of waste energy.

87. The PaMs portfolio in waste is based on economic instruments and incentives (charges on waste collection by municipalities and subsidies for waste incineration facilities and the use of biofuels for waste collection vehicles), as well as support of the Government of Japan for the VAP of the National Federation of Industrial Waste Management Associations.

88. In the context of waste minimization, efforts were geared towards decreasing the amount of incineration of plastics and oil products contained in waste and enhancing the efficiency of waste incineration facilities. Between 2000 and 2008, the amount of plastics and oil products incinerated steadily decreased: from 6.9 to 2.6 times (plastic) and from 2.31 to 1.72 times (oil products). The implementation of this policy brought Japan a saving of 12.74 Mt CO₂ eq in emissions from waste incineration in 2008, which is more than two times higher than the planned value of 5.8 Mt CO₂ eq saved. N₂O emission savings in 2008 were estimated at 0.14 Mt CO₂ eq, slightly below the planned saving of 0.18 Mt CO₂ eq. Also, the introduction of standards for sewage combustion resulted in savings of 1.26 Mt CO₂ eq in 2008.

89. Efforts were also made to reduce the final disposal of biodegradable waste. The quantity of such waste decreased more than five times between 2000 and 2008, which resulted in a saving of 0.45 Mt CO₂ eq emissions. But the goals set for waste heat recovery were not fully achieved, mostly because the overall decrease in the amount of municipal waste was a result of policies aimed at waste minimization and separation.

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

90. In its NC5, Japan has not reported information on how it strives to implement PaMs under Article 2, paragraph 3, of the Kyoto Protocol in such a way as to minimize adverse effects, including the adverse effects of climate change and effects on international trade and social, environmental and economic impacts, on other Parties, especially developing country Parties. Relevant information on how Japan strives, under Article 3, paragraph 14, of the Kyoto Protocol, to implement its commitments under Article 3, paragraph 1, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on the developing country Parties, was provided by Japan in the lead-up to the in-country review and the assessment by the ERT of this information is presented in chapter II.1 of this report.

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

91. In its NC5, Japan has provided information on projections for all GHG emissions, broadly following the Intergovernmental Panel on Climate Change (IPCC) sector and source categories, for a ‘with additional measures’ (WAM) scenario that reflects the updated estimates of effects from PaMs in place that were prepared in 2008 and the effects from the enhancement of some measures undertaken in 2008. It has also reported some

information on the ‘with measures’ (WM) scenario which takes into account PaMs in place up to 2005. Projections reflect the progress in the implementation of the Kyoto Protocol Target Achievement Plan towards achieving the target of a 6 per cent emissions reduction for the first commitment period compared to 1990 levels, based on the evaluation conducted in 2008 and the expected levels of emissions during the first commitment period, taking emissions in 2010 as the average annual emissions for this period. Updated projection estimates were prepared in the context of the mid-term and long-term targets and goals for GHG emission reductions announced by the Prime Minister of Japan (see para. 107 below) and provided to the ERT during the in-country visit. However, these projections have not yet been formally adopted by the Government of Japan.

1. Projections overview, methodology and key assumptions

92. In its NC5, Japan reported a WAM scenario for a single year, 2010, and presented projected emission levels relative to actual inventory data for 1990, 2006 and 2007, which is in accordance with the mandatory requirements of the UNFCCC reporting guidelines. No projections were provided for 2015 and 2020, although the reporting guidelines refer to such years for the reporting on projections. Overall, Japan’s reporting on projections is complete and transparent, and meets almost all mandatory (minimum) reporting requirements. However, both completeness and transparency could be improved, for example by providing information that is beyond the mandatory reporting requirements for scenarios and years for which projections are required.

93. Projections are reported on a gas-by-gas basis for all GHGs, namely CO₂, CH₄, N₂O, PFCs, HFCs, and SF₆ (treating PFCs and HFCs collectively in each case), and for the energy-related CO₂ emissions, by sector. Within the energy sector, the allocation of emissions among sectors is different from the GHG inventory data as emissions from electricity and heat production are allocated to the end-use sectors and not in the energy industry sector. Emissions for non-energy related GHGs are presented by gas, but not aggregated by sector using global warming potentials (GWPs). Altogether, this makes it somewhat difficult to compare projections with Japan’s GHG inventory data that follow the IPCC sector and source categories. Moreover, sector categories used in the projections section of the NC5 are not fully consistent with those used in the PaMs section of the NC5, as required by the UNFCCC reporting guidelines.

94. Projections of emissions and removals from the LULUCF sector are not reported. However, some estimates of the net removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol have been prepared, which suggest that Japan could fully use its allowances under the cap on forest management set in accordance with decision 16/CMP.1 (around 13 Mt carbon annually over the first commitment period). The ERT recommends that Japan report projections on emissions and removals from the LULUCF sector in its next national communication.

95. Projections for emissions from bunker fuels are reported for aviation bunker fuels and not included in the national totals, following the requirements of the UNFCCC reporting guidelines. Projections for marine bunker fuels are not reported due, as explained by Japan, to methodological difficulties. The ERT recommends that Japan, to the extent possible, report projections related to fuel sold to ships engaged in international transport in its next national communication.

96. The base year for projections is 2007 and emission estimates used for this year seem to be consistent with GHG inventory data for this year. The results of projections are presented in a tabular format and also in diagrams that illustrate the projection results. The ERT recommends that Japan report, in its next national communication, projections on a sectoral basis and then on a gas-by-gas basis, following, to the extent possible, sector

categories used in both the PaMs and the projections sections; and also that the Party report, to the extent possible, projections for marine bunker fuels.

97. As required by the UNFCCC reporting guidelines, the WM scenario reported by Japan in the NC5 encompasses the effect of all implemented and adopted PaMs up to 2005. The WAM scenario builds on the WM scenario and reflects the revised estimates of the effect of the enhanced PaMs in place in 2008, when the Kyoto Protocol Target Achievement Plan was revised. In 2008, further measures were identified and some of the measures were further strengthened, with a view to delivering a further emissions saving of 37 Mt by 2010. This includes enhancing the VAP (19 Mt), extending the regulation under the Energy Conservation Act to smaller buildings (2 Mt), a further increase in renewable energy (1.3 Mt) and further support for mitigation action for small- and medium-sized businesses (1.7 Mt). The ERT noted that the WAM scenario does not strictly follow the definition in the UNFCCC reporting guidelines, which includes planned measures in addition to the implemented and adopted measures. The ERT therefore encourages Japan to provide WM and WAM scenarios in its next national communication by adhering more strictly to the definitions set out in the UNFCCC reporting guidelines.

98. Energy-related CO₂ projections are prepared by the METI and the remaining projections are prepared by the MoE, which is also responsible for integrating the projections at the national level. Projections are updated on a regular basis every two–three years, while evaluating the progress towards the achievement of the Kyoto Protocol target.

99. Japan uses a complex set of models to prepare projections for energy-related emissions. This includes three sets of econometric models: a top-down macroeconomic model; a secondary energy price model; and an energy/supply and demand model. These are coupled with a set of models that simulate existing and future technologies in all sectors of energy demand and supply in a very detailed bottom-up way. In addition, an optimization model is used for the power generation sector. For non-energy related emissions, the methods used for projections are based on the relevant inventory methods and projections for the underlying activity data.

100. The methods and methodology used for the projections in the NC5 are consistent with those used in the NC4. Models and projection results are reported in a transparent way for energy-related CO₂ emissions, while transparency could be improved for non-energy related emissions. Estimates of the total effects of PaMs are obtained using a bottom-up approach, based on an assessment of the effects of key PaMs by sector, mainly through the monitoring and review of the VAPs (see para. 48 above) and taking into account possible overlaps and synergies among PaMs through the monitoring and evaluation of the progress of the Kyoto Protocol Target Achievement Plan.

101. Many key assumptions used for projections are clearly described in the NC5. This includes the outlook for population and employment, economic growth, exchange rates and energy prices (oil, coal and natural gas). No information on the assumptions of available energy sources and costs, as well as on the future development of energy markets and its impact on emissions and technological developments (which could help to better understand the emission projection results), was provided. During the in-country visit, Japan explained that, due to the very short time horizon for projections (2010), no major changes in the fuel and technology mix were assumed compared to the NC4. Overall, changes in assumptions on oil prices and economic growth since the NC4 reflect the recent economic development and are internally consistent.

102. The NC5 does not contain information on the sensitivity of projections to underlying assumptions, such as oil prices and gross domestic product (GDP) growth rates. During the in-country visit, Japan informed the ERT that such calculations are available, but are not

reported by Japan. The ERT encourages Japan to report the results from the sensitivity analysis in its next national communication.

103. During the review, Japan provided information to the ERT on the most recent projections prepared by the METI in the context of the Strategic Energy Plan of Japan, adopted by the Cabinet of Ministers in June 2010. It is estimated that by implementing the PaMs included in the Plan, Japan would achieve the amount of a 30 per cent reduction in energy-related CO₂ emissions by 2030 compared to 1990 levels. The estimated amount is roughly half the amount of the 80 per cent reduction by 2050 compared to 1990 levels (see para. 40 above). The results from these updated projections are discussed below, along with the results of projections reported in the NC5. However, no information or data were provided on the efforts associated with the 25 per cent reduction target by 2020, which has been inscribed in the Copenhagen Accord.

2. Results of projections

104. Key results of the GHG emission projections of Japan are provided in table 4 and the emission trends are illustrated in the figure below. The results suggest that Japan is expected to meet its target under the Kyoto Protocol by a combination of domestic efforts that have already been undertaken, the use of Kyoto Protocol units from related mechanisms and the use of units from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. Since the legislation that is expected to introduce the mid-term and long-term targets was under consideration by the parliament during the ERT in-country visit, it is still unclear how Japan could attain its possible mid-term emissions reduction below 1990 levels of 25 per cent by 2020, and the aspirational goal of 80 per cent by 2050. Some initial estimates on how the Party will achieve its possible 30 per cent emission reduction targets were provided to the ERT (see paras. 103 above, and 107 and 108 below).

105. Total emissions in 2010 taken as an average for the first commitment period in the WAM scenario are expected to be between 1.8 and 0.7 per cent below the base year level. This decrease suggests a reverse in emission trends compared to the situation before the revision of the Kyoto Protocol Target Achievement Plan in 2008. In the WM scenario, which reflects the emission trends before that revision, 2010 emissions are expected to be between 0.9 and 2.0 per cent above the base year level.

106. With regard to the projections by sector in the WAM scenario, energy-related CO₂ emissions are expected to grow the most and to be 1.3 to 2.3 per cent higher than the base year level in 2010. This growth is expected to be partly offset by a decrease in emissions from non-energy related sources, namely emissions of CH₄ (by 0.9 per cent), N₂O (by 0.6 per cent) and F-gases (by 1.6 per cent). As the projections for 2010 reported in the NC5 were based on statistical data from 2007, no visible changes in the distribution of the primary energy supply mix and in the structure of power generation capacity were envisaged.

107. According to the updated and most recent projections presented in the context of the Strategic Energy Plan of Japan and the associated possible reduction resulting from the medium- and long-term goals for energy-related CO₂ emissions (see para. 104 above), an emissions reduction of around 0.5 billion t CO₂ is expected to be achieved in 2030 compared to 2007 levels, which is almost a half of the amount of the reduction expected to be achieved in 2050 as the long-term goal.

108. The emission reductions between 2007 and 2030 are expected to stem from the efficiency improvements resulting from the implementation of new technologies at all levels of the energy demand and supply chain, for example net-zero energy buildings in the residential and commercial sectors, advanced coal technologies and next-generation vehicles. These improvements will in turn lead to a decline in the primary energy supply by

around 15 per cent between 2007 and 2030. In addition, the share of non-fossil fuels and energies within the primary energy supply is expected to grow from 6 per cent to 13 per cent for renewable energy sources and from 10 per cent to 24 per cent for nuclear energy for the same period.

Table 4

Summary of greenhouse gas emission projections for Japan

	<i>Greenhouse gas emissions (Tg CO₂ eq per year)</i>	<i>Changes in relation to base year level (%)</i>	<i>Changes in relation to 1990 level (%)</i>
Inventory data 1990 ^a	1 268.68	0.6	NA
Inventory data 2007 ^a	1 369.04	8.5	7.9
Inventory data 2008 ^a	1 281.88	1.6	1.0
Kyoto Protocol base year ^b	1 261.33	NA	-0.6
Kyoto Protocol target ^b	1 185.65	-6.0	-6.5
‘With measures’ projections for 2010 ^c	1 273.00–1 287.00	0.9 to 2.0	0.3 to 1.4
Gap to the Kyoto Protocol target for above projections	87.35–101.35	6.9 to 8.0	6.9 to 8.0
‘With additional measures’ projections for 2010 ^c	1 239.00 to 1 252.00	-1.8 to -0.7	-2.3 to -1.3
Gap to the Kyoto Protocol target for above projections	53.35 to 66.35	4.2 to 5.3	4.2 to 5.2
Mid-term projections for 2030 ^e for energy-related CO ₂ emissions ^d	730.00	Around -30	
Long-term projections for 2050 for energy-related CO ₂ emissions ^d	230.00	Around -80	

Abbreviation: NA = not applicable

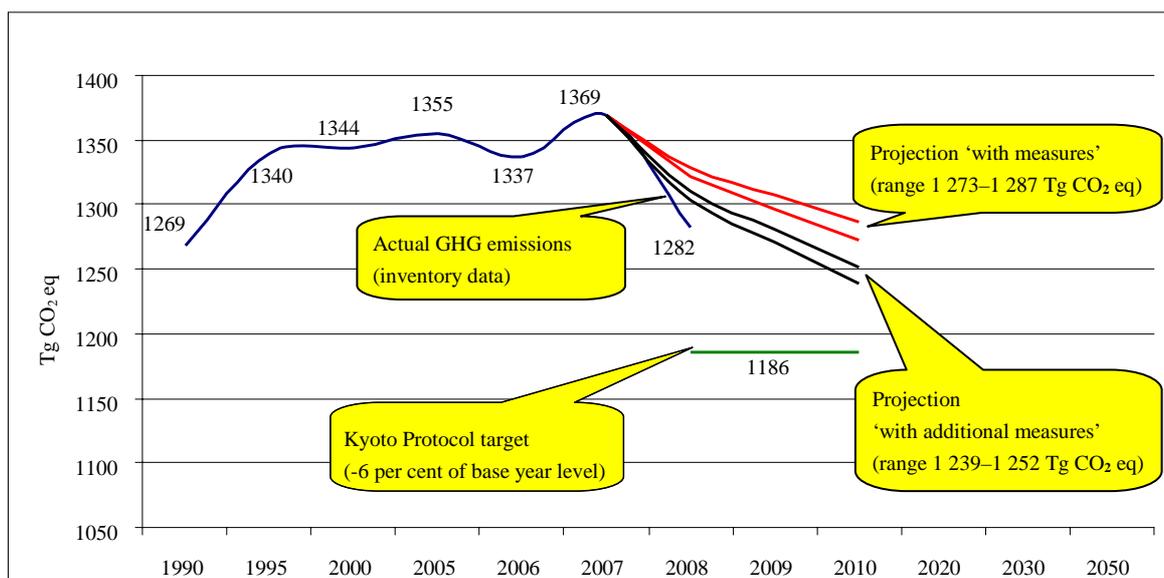
^a *Data source:* Japan’s 2010 greenhouse gas (GHG) inventory submission (Common Reporting Format version 2.2, submitted on 18 October 2010); the emissions are without land use, land-use change and forestry (LULUCF);

^b *Data source:* Based on the initial review report contained in document FCCC/IRR/2007/JPN;

^c *Data source:* Japan’s fifth national communication;

^d *Data source:* Updated projections provided by Japan during the in-depth review; the projections are for energy-related CO₂ emissions only. However, they are representative as they account for around 95 per cent of the total emissions of Japan.

Greenhouse gas emission projections



Sources: (1) Data for the years 1990–2008: Japan’s 2010 greenhouse gas inventory submission (Common Reporting Format version 2.2, submitted on 18 October 2010); the emissions are without land use, land-use change and forestry (LULUCF). (2) Data for the years 2009–2010: Japan’s fifth national communication; the emissions are without LULUCF.

3. Total effect of policies and measures

109. In its NC5, Japan presented the estimated effect of PaMs by sector. The data are obtained based on the assessment of the effects of the key PaMs by sector and taking into account possible overlaps and synergies among PaMs. Information is presented in terms of GHG emission reductions on a CO₂ eq basis in 2010 and as a percentage change to base year emissions. A wealth of information is provided on the factors and activities affecting emissions, and on the effect of measures for each sector and within each sector for key measures.

110. However, the ERT noted that Japan provided limited information on the expected total effect of adopted and implemented PaMs, which is required by the UNFCCC reporting guidelines. This information is provided only in a chart presenting the expected total effect of PaMs in 2010. During the in-country visit, the ERT was informed that the total effect of the additional PaMs is assessed, as a result of the review (in 2008) and the strengthening of the Kyoto Protocol Target Achievement Plan, as the difference between the WM scenario of existing measures and the WAM scenario. This total effect was estimated to be around 37 Mt CO₂ eq.

111. According to the information reported in the NC5, a major contribution to the overall emissions reduction will come from PaMs implemented in the energy sector, where, compared to 2005, energy-related measures implemented in the industrial, residential and commercial sectors are expected to deliver savings of around 30 Mt CO₂ each, and those in the energy industry sector savings of 13 Mt CO₂. Emissions of F-gases are expected to grow from 18 to 31 Mt CO₂ eq between 2005 and 2010. The transport sector is expected to deliver between 14 and 16 Mt CO₂ eq savings in 2010 compared to 2005 levels.

112. The effect of PaMs is not expected to be sufficient to reduce energy-related emissions from several sectors in which 2010 emissions are expected to be above the base year level; these include the commercial sector (3.4 to 3.6 per cent), the transport sector

(1.8 to 2 per cent) and the residential sector (0.9 to 1.1 per cent). The total effect of PaMs included in the WAM scenario is estimated to be between 120 and 132 Mt CO₂ eq; this includes both the effect of measures included in the WM scenario and the 37 Mt CO₂ effect in the WAM scenario.

113. The most effective PaMs and drivers behind GHG emission reductions are described in chapters II.B.1 and II.B.2 of this report. Table 5 provides an overview of the total effect of PaMs as reported by Japan.

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

114. Japan's NC5 provided some very general information on its expected use of Kyoto units in meeting its Kyoto Protocol target for the first commitment period, but did not provide explicit information on how its use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action and how its domestic action thus constitutes a significant element of the effort made to meet the target under the Kyoto Protocol. The NC5 did not outline Japan's understanding of "supplementarity". The ERT recommends that Japan provide information on how its use of Kyoto mechanisms is supplemental to domestic action in its next national communication.

115. In its NC5, Japan reported that it intends to achieve its GHG emissions reduction target under the Kyoto Protocol by domestic measures (9.6 per cent or around 120 Mt CO₂ eq – see para. 112), the use of units from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol (3.8 per cent or 13 Mt carbon annually over the commitment period) and the use of Kyoto units (1.6 per cent or 20 Mt). These estimates provide an indication that the use of mechanisms could be considered as supplemental to domestic actions.

116. During the in-country visit, Japan informed the ERT that the Government of Japan expected to purchase 100 Mt of Kyoto units (assigned amount units (AAUs), certified emission reduction units (CERs),¹² and emission reduction units (ERUs)) during the first commitment period and to use these to meet the Kyoto Protocol target. A maximum of 200 billion yen has already been allocated by the Government for this purpose. Of the 100 Mt Kyoto units, contracts for 97 Mt had been concluded by the time of the in-country visit. There is no indication of priority being given by the Government among the use of different Kyoto mechanisms, or priority areas for projects under the CDM, except for some concerns over the use of afforestation and reforestation projects under the CDM due to non-permanent removal units.

117. In addition to these government purchases, companies with VAPs may also purchase Kyoto units and use these to meet their voluntary targets. There is no explicit limit on the quantities of credits that can be used by companies and, according to the industry plans, they can use more than 300 Mt CO₂ eq to comply with their VAPs. Japan indicated to the ERT that there was an implicit limit and that an expected use of credits that was "too high" would not be allowed. However, it remained unclear if the credits purchased by companies under their VAPs are expected to be used by the government to meet the Kyoto Protocol target.

¹²The Government of Japan does not plan to buy credits from afforestation or reforestation CDM projects, as the credits expire after a given period of time.

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

Sector	<i>Effect of implemented and adopted measures (Tg CO₂ eq)</i>	<i>Relative value (% of 1990 emissions)</i>	<i>Effect of strengthened measures (Tg CO₂ eq)^a</i>	<i>Relative value (% of 1990 emissions)</i>
	2010			
Energy (without CO ₂ from transport)	66 to 76	5 to 6	32	3
Transport – CO ₂	10 to 13	0.8 to 1.0	4	0.3
Non-energy related CO ₂ emissions	6	0.5	NA	NA
CH ₄ emissions, including from waste and agriculture	1	0.08	NA	NA
N ₂ O emissions, including from industrial processes and agriculture	NA	NA	NA	NA
F-gases	NA	NA	NA	NA
Total	83 to 95	7 to 8	37	3

Abbreviation: NA = not available

Source: Japan's fifth national communication and information provided to the expert review team during the in-country visit.

Notes: The total effect of both implemented and adopted policies and measures, and additional policies and measures, is defined using a bottom-up approach based on the assessment of the effects of key policies and measures by sector.

^a The effect of strengthened measures (37 Mt CO₂ eq) refers to the effect of measures resulting from the 2008 revision of the Kyoto Protocol Target Achievement Plan.

D. Vulnerability assessment, climate change impacts and adaptation measures

118. In its NC5, Japan has provided the required information on the expected impacts of climate change, approaches to adaptation, and adaptation plans and actions. However, the ERT noted that Japan did not provide information on the actions taken to implement Article 4, paragraph 1 (e), of the Convention with regard to cooperation with non-Annex I Parties in preparing for adaptation to the impacts of climate change under the section on vulnerability and adaptation. However, it provided relevant information in the section on financial resources and transfer of technology, including information on the assistance provided to developing countries on project development, the training of officials and the promotion of adaptation research. Also, Japan provided limited information on the plans for integrated coastal zone management and on the specific results of scientific research on vulnerability assessment and adaptation. During the review, Japan provided information to the ERT on the results of scientific research in the field of impact assessment and adaptation.

119. Table 6 summarizes the information on vulnerability and adaptation to climate change presented in the national communication.

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

<i>Vulnerable area</i>	<i>Examples/comments/adaptation measures reported</i>
<i>Climate</i>	Vulnerability: Increase in the number of heavy rainfall days; fluctuation in precipitation; drastic decrease in snowfall; increase in the number of days with minimum temperature equal to or higher than 25 °C
<i>Natural disaster</i>	Vulnerability: Enhanced intensity of typhoons; increase in flooding; more frequent disasters; increase in high waves; increased danger of a storm surge Adaptation: Development of flood control facilities; regulations and guidance on land use in disaster-prone areas; formation of a regional disaster prevention network to handle the impact of climate change
<i>Food</i>	Vulnerability: Decrease in rice production and quality; shift in apple production areas; pests moving northwards; change in the rice planting season; habitats and species are expected to move northwards and to higher altitudes Adaptation: Development of adaptive technologies in the agriculture, forestry and fishery sectors, including the development of new varieties of agriculture products and technologies to predict the occurrence of disease and pests
<i>Natural ecosystem</i>	Vulnerability: Decline in distribution suited to beech trees; reductions in sea ice in the Okhotsk Sea; increase in the bleaching of coral and decline in sandy beaches Adaptation: Set up a monitoring network to monitor disasters
<i>Human health</i>	Vulnerability: Possible increase in heat- or stress-related deaths Adaptation: Educate the public in the prevention of heat stroke and distribute information to the public
<i>Public and urban life</i>	Vulnerability: Loss of assets, increase in mortality and heat stroke, impact on tourism
<i>Water environment and water resources</i>	Vulnerability: Increased risk of drought; increase in the water temperature of rivers, lakes, dammed lakes and ground water; increased risk for groundwater salination due to the rise in sea levels Adaptation: Water resource management; utilization of rainwater and reclaimed water

120. The impacts of climate change in Japan are already visible, as demonstrated by both the research results and observations. By using the IPCC climate change scenarios and by applying the integrated model for climate change impact assessment, Japan indicated in the NC5 that climate change could have an impact on agriculture, water resources, ecosystems, fishery, health and coastal zones, and that climate change may lead to trillions of yen of damage under different climate change scenarios.

121. Japan further provided information on adaptation actions undertaken at different levels of government, including on conducting research and the publishing of relevant reports by government agencies; the integration of adaptation into natural disaster prevention plans; the improvement of water resources management; the development of adaptive technologies in the agriculture, forestry and fishery sectors; and the dissemination of relevant climate information for early warning purposes.

122. Japan informed the ERT that the Government of Japan is now developing Guidelines to Climate Change Adaptation, and it is expected that the Guidelines will be approved and published in the near future. The Guidelines will provide guidance to the central government, local governments and responsible entities on specific policies and actions that could be undertaken to adapt to climate change.

123. The ERT recommends that Japan, in its next national communication, provide information on the actions taken to implement Article 4.1 (e) on the cooperation with non-Annex I Parties in preparing for adaptation, and encourages Japan to provide detailed information on the Guidelines and their implementation.

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

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

124. The information provided in the NC5 covers most of the issues on which information is required under the Convention and its Kyoto Protocol. However, the ERT noted that Japan has not provided the following reporting elements required by the UNFCCC reporting guidelines: an indication of what “new and additional” financial resources were provided pursuant to Article 4, paragraph 3, of the Convention; clarification on how such resources have been determined as “new and additional” and detailed information on the assistance provided to developing country Parties that are particularly vulnerable to the adverse effects of climate change to help them meet the costs of adaptation to those adverse effects. The ERT recommends that Japan enhance the completeness of its reporting by including this information in its next national communication.

125. To enhance the transparency of reporting, the ERT encourages Japan to report in its next national communication the following elements: financial contributions in a single currency in order to facilitate comparability; more detailed information on cooperation related to adaptation; a description of how it considers predictability and adequacy of financial flows; and more details on success and failure stories, using the format provided in the UNFCCC reporting guidelines, in its reporting of measures to promote, facilitate and finance technology transfer. The ERT noted the reporting of financial contributions through multilateral channels, other than what is to be reported in table 3 of the UNFCCC reporting guidelines, and encourages Japan to add such information to the table in its next national communication.

126. The ERT noted that Japan provided assistance to developing countries, mainly through bilateral, regional and multilateral economic cooperation, and that its focus was on countries in the Asia region. Bilateral financial assistance was provided mainly in the form of loans (96.3 per cent of loans, grants and technical assistance taken together). The ERT acknowledged with appreciation that Japan’s contribution to the Global Environment Facility (GEF) for the fifth replenishment (USD 505 million) increased by 65.6 per cent compared with that for the fourth replenishment (USD 305 million). The ERT acknowledged that Japan pledged USD 1.2 billion to the Climate Investment Fund (CIF).

127. Japan’s bilateral and intra-regional technical assistance related to the implementation of the Convention in 2007 was targeted mainly (52.3 per cent of all the technical assistance provided that year) at smaller scale projects on various issues (such as for example policy development, river development and high education), forestry (25.4 per cent), waste (11.7 per cent), energy (9.0 per cent) and agriculture (1.6 per cent). Also, Japan reported its

contribution to the Adaptation Fund to cover expenses of the secretariat of the Adaptation Fund in 2009.

128. The share of official development assistance (ODA) allocated to climate change increased by 60.6 per cent in the period 2004–2008. Funds to the African Development Bank showed significant increases, as did those to UNFCCC funds, while contributions to the International Finance Corporation showed the greatest decreases in 2006–2008. There was a single contribution to the Least Developed Countries Fund (LDCF) in 2007, contributions to the International Tropical Timber Organization (ITTO) doubled and trebled in 2006 and 2008, respectively, compared with 2004 and 2005, while contributions to other institutions, such as the United Nations Environment Programme (UNEP) and the United Nations Development Programme (UNDP), appeared to be relatively stable.

129. Table 7 summarizes the information on financial resources.

130. During the review, Japan further elaborated on its “fast-start financing” up to 2012, announced as the Hatoyama Initiative in December 2009, which aims to assist developing countries, especially those making efforts to reduce emissions as well as those which are vulnerable to the negative impacts of climate change, taking into account the developments in the international negotiations. The fast-start financing is composed of ODA (approximately USD 7.2 billion) and other official flows (approximately USD 7.8 billion). Out of USD 15 billion of the fast-start financing, more than USD 5.3 billion of assistance had been implemented as of 30 April 2010 in developing countries, including least developed countries (LDCs), small island developing States (SIDS) and Parties in Africa. Also, Japan has implemented projects and programmes in the fields of mitigation (USD 5.1 billion), including action on reducing GHG emissions from deforestation and forest degradation (REDD+) (USD 165 million) and adaptation (USD 225 million).

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

131. In its NC5, Japan has provided information on activities related to the transfer of technology, including information under Article 10 of the Kyoto Protocol which covers most of the information required by the UNFCCC reporting guidelines. However, the ERT noted that Japan did not provide in sufficient detail the description of activities related to technology transfer, including success and failure stories, using table 6, and its activities for financing access by developing countries to ‘hard’ or ‘soft’ environmentally sound technologies. The ERT recommends that Japan, in its next national communication, improve its clarity on the distinction between activities undertaken by the public and private sectors on technology transfer, and further elaborate on success and failure stories related to technology transfer using the format required under the UNFCCC reporting guidelines. The ERT encourages Japan to further elaborate on the steps taken by government to promote, facilitate and finance transfer of technology, and to support the development and enhancement of endogenous capacities and technologies of developing countries by identifying progress and lessons learned from these actions.

132. Japan’s technology transfer efforts were concentrated on partnerships and programmatic approaches and were mainly focused on the transfer of ‘soft’ mitigation technologies in terms of knowledge-sharing, know-how and capacity-building. The Asia-Pacific Partnership on Clean Development and Climate (APP) is one example of such partnership. Adaptation measures in Bangladesh, Kenya, Cambodia, and mitigation measures in Egypt and Bangladesh are also examples of technology transfer efforts by Japan. In its NC5, Japan highlighted priority technologies for transfer, namely those aimed at water protection, air pollution abatement, forestry and energy efficiency. The ERT

encourages Japan to provide more details in its next national communication on efforts relating to the transfer of adaptation technology, particularly to vulnerable countries.

Table 7

Summary of information on financial resources for 2004–2008

<i>Channel of financial resources</i>	<i>Years of disbursement</i>				
	<i>2004</i>	<i>2005</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>
Official development assistance (ODA) (million USD)	8 922	13 126	11 136	7 679	9 579
Climate-related aid in bilateral ODA (million USD)	1 921	2 223	1 407	1 332	3 085
Total multilateral except UNFCCC (million yen)	22 200	30 000	29 500	29 900	26 600
UNFCCC (million USD)	0.14	0.23	0.27	1.04	1.08
LDCF (million USD)	–	–	–	0.25	–
GEF (million yen)	12 189	12 189	8 422	8 422	8 422
Pledge to CIF (million USD)	NA	NA	NA	NA	1 200

Abbreviations: CIF = Climate Investment Funds, GEF = Global Environment Facility, LDCF = Least Developed Countries Fund, NA = not applicable, UNFCCC = United Nations Framework Convention on Climate Change.

Note: The figures include only grant aid, loan aid and technical cooperation on the basis of the Rio marker and do not include activities for adaptation, as it was not covered by the Rio marker.

133. During the review, Japan provided information on priority areas, where it has taken a variety of actions to promote technology transfer to developing countries through various mechanisms, such as the Climate Technology Initiative (CTI) and the APP. Through those mechanisms, Japan promotes the diffusion of climate-friendly and environmentally sound technologies, including knowledge-sharing of, inter alia, energy conservation technologies and production process, and technologies that generate co-benefits such as the control of air and water pollution and the enhancement of waste management. Japan is also utilizing approaches to capacity-building under programmes such as the CDM/joint implementation (JI) Feasibility Study, the Kyoto Mechanisms Consultation Service and the programme on Support for Capacity-Building for CDM/JI projects in developing countries.

F. Research and systematic observation

134. Japan has provided in its NC5 information on its actions relating to research and systematic observation, and has addressed both domestic and international activities. The ERT noted that, despite the impressive number of activities that Japan is carrying out in research and systematic observation, limited information is provided in the NC5 on research and development of mitigation and adaptation technologies, and on the long-term continuity of atmospheric, oceanic and terrestrial data, as well as on data exchange and availability. The information provided in the NC5 on the support for developing countries to establish and maintain observing systems and related data, and on monitoring systems, was also somewhat limited. The ERT encourages Japan to provide more detailed information on these elements in its next national communication.

135. Japan provided comprehensive information on governmental policies related to research and systematic observation, including the adoption, in 2006, of the Third Science and Technology Basic Plan for the period 2006–2010, which states that the science and technology sector should address climate change and energy problems. Part of the technological strategy of Japan is defined in the Cool Earth-Innovative Energy Technology

Programme and the Environment and Energy Technology Innovation Plan, adopted in 2008, in the context of achieving the transition to a low-carbon society. These instruments provide the measures anticipated by Japan for the development and dissemination of key mitigation technologies in the energy-consumption sectors, including the energy supply and industrial sectors, as well as in the residential, commercial, and transport sectors. The implementation of these measures is addressed in the Action Plan for Achieving a Low-Carbon Society, adopted by the Cabinet in 2008.

136. Japan has been actively participating in studies and projections on climate change and launched, in 2007, a five-year research initiative under the title “Innovative Programme on Climate Change Projections for the 21st Century” (the KAKUSHIN Programme). The results from these studies, programmes and research initiatives will be particularly relevant to the next Assessment Report of the IPCC, which is to be delivered in 2013.

137. With regard to systematic observation, Japan is one of the leading nations in the development of satellite missions for atmospheric, oceanic and terrestrial observations, and has provided in its NC5 information on its activities related to atmospheric climate observing systems, including atmospheric constituent measurement systems, as well as on oceanic and terrestrial observing systems for climate monitoring. The network approach presently in development in Japan, combining multi-sourced data from satellite, aircraft, ships, buoys and the ground, will provide a significant contribution to attaining the objectives of the 10-Year Implementation Plan of the Global Earth Observation System of Systems (GEOSS), as well as guiding the establishment of future advanced Earth observation systems.

138. Examples of capacity-building initiatives are concentrated mainly in the Asia-Pacific region. For many years, the Japan Aerospace Exploration Agency (JAXA) has provided capacity-building assistance on the use of Earth observation data for a number of relevant applications, including the use of data from Japan’s most recent Advanced Land Observing Satellite (ALOS). Information was also provided on the Asia-Pacific Network for Global Change Research (APN) initiative, which aims at providing support for regional cooperation in global change research on issues of particular interest to the region. Since the beginning of the creation of the APN, Japan has been the largest financial contributor, its contribution in 2010 totalling more than USD 2 million.

G. Education, training and public awareness

139. In its NC5 and during the review, Japan reported on a number of initiatives on education, training and public awareness. Education activities on climate change fall under the broader approach to environmental education, implemented through specific policies under Japan’s Strategy for a Sustainable Society (2007). The strategy is reflected in the Basic Plan for the Promotion of Education for the period 2008–2012, which has, as one of its objectives, “to foster an attitude to respect life, care for nature, and contribute to the protection of the environment”.

140. Japan’s actions in the area of environmental education include the promotion of environmental education in elementary and junior high schools, basic training seminars for teachers and citizens serving as environmental education leaders, and a certification scheme for model schools and environmentally friendly school facilities. These actions also include environmental education and studies through social education and other activities, which prioritize support to excellent regional efforts and urban greening, including the conservation, creation and management of green park areas and environmental education in households.

141. Japan has provided detailed information on several measures implemented under its national campaign against global warming (Challenge 25 Campaign), which focus specifically on actions to reduce emissions of GHGs and ensure a transition by Japan to a low-carbon society. Under this campaign, awareness of climate change issues and measures to help mitigate climate change have been introduced to the general public through the use of mass media. Recommendations are provided on the choice of environmentally friendly goods, energy-saving products, renewable energy, environmentally friendly buildings and houses, activities and products, and community activities that lead to the reduction of emissions, and community activities to prevent global warming. Under this campaign, initiatives such as the Cool Biz and Warm Biz have been launched to limit the use of air-conditioning and heating equipment, as well as the Lights-Down Campaign 2010, which aims to rationalize the use of energy efficiency.

142. The ERT noted that Japan is developing several awareness initiatives on climate change mitigation, including initiatives in relation to energy conservation, the 3R measures (reduce, reuse and recycle), nuclear power and the use of wood products and fuel-efficient vehicles. Japan has also introduced an innovative mechanism called the Eco-Action Point that provides economic incentives to citizens who purchase products or services that reduce GHG emissions or who take energy-saving actions. Japan has further initiated the Project to Promote the Spread of Green Appliances Using Eco-Action Points which, among other things, encourages households, business and industry sectors to use energy-efficient appliances.

143. The ERT encourages Japan to include in its next national communication information on how effective the education and awareness measures have been, as well as on its innovative measures, such as the Eco-Action Point scheme, so that other countries can benefit from Japan's experiences. Also, Japan could provide information on specific materials developed, particularly for schools, which could be useful to other countries when developing similar materials. In addition, Japan could provide more information on international activities.

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

144. In its NC5, Japan has provided almost all supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol, with exception of the following elements:

(a) A description of supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol;

(b) The identification of steps taken to promote and/or implement any decisions by the ICAO and the IMO in order to limit or to reduce GHG emissions not included in the Montreal Protocol from aviation and marine bunker fuels;

(c) Information on what efforts Japan is making to implement PaMs in such a way as to minimize adverse effects, including the effects of climate change, effects on international trade, and social, environmental and economic impacts on other Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention.

145. During the review, Japan provided additional information on these issues. The technical assessment of the information reported under Article 7, paragraph 2 is contained in the relevant chapters of this report. The ERT recommends that Japan include these reporting elements in its next national communication.

146. The supplementary information is placed in different sections of the NC5. Table 8 provides an overview of supplementary information under Article 7, paragraph 2, of the

Kyoto Protocol as well as references to the NC5 sections in which this information is provided.

Table 8

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

<i>Supplementary information</i>	<i>Reference</i>
National registry	Section 3.1
National system	Section 2.6
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Section 4.5.1
Policies and measures in accordance with Article 2	Section 3
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	Section 3.1.2
Information under Article 10	Sections 2.6, 5.8, 6, 7 and 8
Financial resources	Sections 6.1, 6.2, 6.3

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

147. Japan did not report the information requested in section I.H., “Minimization of adverse impacts in accordance with Article 3, paragraph 14”, of the annex to decision 15/CMP.1 as part of its 2010 annual submission. This section encompasses information on how the Party strives to implement commitments under Article 3, paragraph 1, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economical impacts on developing countries. In the lead-up to the in-country review, Japan provided the ERT with information on this matter that it had already submitted to the ERT dealing with the annual review of Japan in response to a potential problem identified by that ERT.

148. During the in-country review, Japan provided the ERT with additional explanation of this matter. The ERT took note of the information provided by Japan on how it strives to minimize adverse social, environmental and economic impacts on developing country Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention in implementing the commitments under Article 3, paragraph 1, of the Kyoto Protocol. The actions include technical assistance in the area of energy and environment, cooperation with oil-producing countries in relation to diversifying their economies, and continuation of its policy not to support the use of environmentally unsound and unsafe technologies.

149. Japan considers that climate change related PaMs may cause positive and negative effects, and direct and/or indirect effects for different stakeholders, and underlined that because there is no internationally agreed methodology to be applied for evaluating the adverse effects of PaMs on climate change and the effects on social, environmental and economic impacts on other Parties, it is difficult to assess such impacts and to be more specific in terms of priority being given to specific action and the relevant effects of its PaMs.

150. The ERT recommends that Japan report on how it gives priority to actions taken to minimize adverse impacts and encourages Japan to continue exploring the evaluation methods of adverse impacts from response measures and its reporting on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol in its annual submissions in a timely, transparent and complete way.

III. Conclusions and recommendations

151. The ERT concludes that the NC5 generally provides a good overview of the national climate policy of Japan. The information provided in the NC5 includes most mandatory information required by the UNFCCC reporting guidelines and almost all supplementary information under Article 7 of the Kyoto Protocol.

152. Japan's emissions for 2008 were estimated to be 1.0 per cent above its 1990 level excluding LULUCF (and 0.2 per cent below that level including LULUCF). The slight growth in emission levels resulted mainly from an increase in CO₂ emissions by 6.2 per cent over this period, while total non-CO₂ GHGs decreased significantly and almost offset the CO₂ emissions growth. Trends in CO₂ emissions, coming mainly from the energy sector, were chiefly driven by an increased demand for electricity and an increased share of coal within the primary energy supply mix (in particular for power generation). The increase in emissions from the energy sector was almost entirely offset by a decrease in emissions from all other sectors, in particular industrial processes, agriculture and waste. VAPs and regulations currently form the heart of Japan's mitigation policy to achieving its target under the Kyoto Protocol, and have contributed to reducing emissions compared to 'business-as-usual' levels. Recently, between 2007 and 2008, there was a drop in emissions by 6.4 per cent, driven by a decrease in energy demand resulting from the global financial and economic crisis in the second half of 2008.

153. In the NC5, Japan presents projections for GHG emissions for 2010 only. This reflects the progress in the implementation of the Kyoto Protocol Target Achievement Plan towards achieving the target of a 6 per cent emissions reduction for the first commitment period. Two scenarios are presented: a WM scenario that reflects the implementation of the Plan by 2008, based on measures in place in 2005, and a WAM scenario that reflects the revision of the Kyoto Protocol Target Achievement Plan, the strengthening of some existing measures and the launching of some new measures in 2008. The total effect of PaMs was estimated to be between 120 and 132 Mt CO₂ eq, which includes around 37 Mt CO₂ eq from the strengthening of existing measures and some new measures launched in 2008. A major contribution to the overall emissions reduction is expected from PaMs in the energy sector (between 99 and 108 Mt CO₂ eq), which reflects the emissions profile of the country, as the majority of emissions (95 per cent) are from this sector. According to projection estimates, emissions in 2010 are expected to be between 1.8 and 0.7 per cent below base year levels, which includes the effect of strengthened domestic measures. Japan is therefore expected to use Kyoto units and units from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, in addition to domestic efforts to reduce emissions, in order to meet its target under the Kyoto Protocol.

154. The NC5 does not contain explicit information on supplementarity. During the review, Japan provided some information on how its use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action, although it has not elaborated on supplementarity as such. Some limited information on the expected use of Kyoto units was provided, indicating Japan's intention to cover the gap between emission projections and the Kyoto target (a 6 per cent emissions reduction) by domestic measures (9.6 per cent), through the use of units under Article 3, paragraphs 3 and 4 (3.8 per cent), and through the use of Kyoto Protocol mechanisms by the government (1.6 per cent). Estimates of emission reductions provide an indication that the use of mechanisms could be considered as supplemental to domestic action. The majority of Kyoto Protocol units (100 million) that are planned to be used for compliance have already been purchased by the government. In addition, industries are planning to purchase Kyoto units (of around 300 million) and use them, if needed, for compliance with the VAPs.

155. Japan's current PaMs are focused on meeting its emission commitments under the Kyoto Protocol. The key instruments used to date are voluntary measures, such as VAPs in the energy and industry sectors and regulatory measures, such as cross-sectoral energy-efficiency standards. Mandatory measures are significant in some sectors, including the transport and residential/commercial sectors.

156. In 2009, Japan announced an ambitious medium-term national GHG emissions reduction target of 25 per cent by 2020 compared to 1990, which has been inscribed in the Copenhagen Accord. This target is premised on the establishment of a fair and effective international framework by all major economies and an agreement on their ambitious targets. Japan has also set a national long-term goal for the reduction of GHG emissions of 80 per cent in 2050 compared to 1990 levels. The ways in which the PaMs could be strengthened and/or changed in order to meet the long-term goal were still under consideration during the review. The ambitious goal set by Japan is likely to require a shift in climate policy towards a greater use of economic instruments, including emissions trading, which was also under consideration by the parliament during the review. In this context, the experience of the TMG, which, in 2010, launched the world's first urban ETS, could be very useful and potentially replicable.

157. Japan provided sizeable contributions to the implementation of the UNFCCC and the Kyoto Protocol, including contributions to the GEF (USD 505 million for the fifth replenishment), to the LDCF (in 2007), and to the Adaptation Fund (in 2008). Assistance was provided mainly in the form of loans, which constituted 96.3 per cent of resources provided for loans, grants and technical assistance taken together. Under the Copenhagen Accord, Japan has pledged an additional USD 15 billion up to 2012 aimed at mitigation, adaptation and REDD+ for Africa, the LDCs and the SIDS.

158. Japan's efforts to facilitate technology transfer efforts were concentrated on partnerships and programmatic approaches and were mainly focused on mitigation technologies. Japan has identified various mechanisms for action on technology transfer and has promoted the diffusion of climate-friendly and environmentally sound technologies. This includes knowledge-sharing of, inter alia, energy conservation technologies and production process, and technologies that generate co-benefits such as the control of air and water pollution and the enhancement of waste management.

159. By using the IPCC climate change scenarios and by applying the integrated model for climate change impact assessment, Japan assessed that climate change would impact on agriculture, water resources, ecosystems, fishery, health and coastal zones. Japan has undertaken some adaptation actions at different levels of government, including preparing and integrating adaptation into the natural disaster prevention plan, improving water resources management, developing adaptive technologies in the agriculture, forestry and fishery sectors, and disseminating relevant climate information for early warning purposes. Currently, Japan is developing Guidelines to Climate Change Adaptation for the central government, local governments and entities to take concrete actions to adapt to climate change.

160. The ERT acknowledged the impressive number of activities and initiatives undertaken by Japan on research and systematic observation. This includes research on new climate-friendly technologies in the context of achieving the transition to a low-carbon society, as well as research on climate change and its impacts. This also includes systematic observation, where Japan ascertained its role among the leading nations in the development of satellite missions for atmospheric, oceanic and terrestrial observations.

161. The ERT concluded that: (a) Japan's national inventory system continues to perform its required functions as set out in decision 19/CMP.1; and (b) that the national registry continues to perform the functions set out in decision 13/CMP.1 and decision 5/CMP.1, and

continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (CMP). The ERT noted that updates of databases and applications, implemented security measures and changes to the national registry software are documented on a regular basis by nominated responsible persons.

162. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol was not provided by Japan in its 2010 annual submission. In the lead-up to and during the review, Japan provided some information, which is to some extent complete and transparent. The ERT recommends that Japan include information on the minimization of adverse impacts in accordance with Article 3, paragraph 14 that is complete and transparent in its next annual submission, including an indication of how it gives priority to the actions taken in implementing its commitments under Article 3, paragraph 1, of the Kyoto Protocol.

163. In the course of the IDR, the ERT formulated several recommendations relating to the completeness and transparency of Japan's reporting under the Convention and its Kyoto Protocol. The key recommendations¹³ are that Japan provide, in its next national communication, information on:

- (a) The drivers and factors influencing the GHG trends;
- (b) How PaMs are modifying long-term trends, as well as relevant information on the PaMs used (such as the type of policy and measure) and their status of implementation;
- (c) The total effect of adopted and implemented PaMs; to the extent possible, emission projections related to fuel sold to ships engaged in international transport and projections for LULUCF;
- (d) How "new and additional" financial resources have been determined;
- (e) Success and failure stories of technology transfer using the format provided in the UNFCCC reporting guidelines;
- (f) Information on how its use of the Kyoto Protocol mechanisms (including by industry if they are subsequently used for compliance by the government) is supplemental to domestic action;
- (g) A description of how Japan strives to minimize adverse effects under Article 2, paragraph 3, of the Kyoto Protocol;
- (h) An outline of steps it has taken to promote and/or implement any decisions by the IMO in order to limit or reduce GHG emissions from marine bunker fuels.

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

- (a) Provide more concise and focused information and clearly identify the key issues, especially in the PaMs section;
- (b) Provide a better description of the linkages among historical GHG emission trends, PaMs and GHG projections;
- (c) Improve the consistencies within and across the sections, especially between the description of the GHG emissions inventory, GHG emissions trends and PaMs;
- (d) Provide further information on the following elements:

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

- (i) PaMs that increase emissions, PaMs relative to bunker fuels and the monitoring and evaluation of PaMs;
- (ii) Projections of emissions for the medium and long term, and information on methods as well as projection results for non-energy related emission projections;
- (iii) Efforts relating to the transfer of adaptation technology, particularly to vulnerable countries;
- (iv) Support for developing countries to establish and maintain observing systems and related data; policies and funding of systematic observation; the support for space-based climate observing systems, including the long-term continuity of data and data availability;
- (v) Research on innovative technologies and the associated funding.

IV. Questions of implementation

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

Annex

Documents and information used during the review

A. Reference documents

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

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

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

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

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

FCCC/SBI/2007/INF.6/Add.1. Compilation and synthesis of NC4s, Add.1: Policies, measures, past and projected future greenhouse gas emission trends of Parties included in Annex I to the Convention. Available at <<http://unfccc.int/resource/docs/2007/sbi/eng/inf06a01.pdf>>.

FCCC/SBI/2007/INF.6/Add.2. Compilation and synthesis of NC4s, Add.2: Financial resources, technology transfer, vulnerability, adaptation and other issues relating to the implementation of the Convention by Parties included in Annex I to the Convention. Available at <<http://unfccc.int/resource/docs/2007/sbi/eng/inf06a02.pdf>>.

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

FCCC/ARR/2009/JPN. Report of the individual review of the greenhouse gas inventory of Japan submitted in 2009. Available at <<http://unfccc.int/resource/docs/2010/arr/jpn.pdf>>.

FCCC/IRR/2007/JPN. Report of the review of the initial report of Japan. Available at <<http://unfccc.int/resource/docs/2007/irr/jpn.pdf>>.

FCCC/IDR.4/JPN. Report on the in-depth review of the fourth national communication of Japan. Available at <<http://unfccc.int/resource/docs/2007/idr/jpn04.pdf>>.

Fourth national communication of Japan. Available at <http://unfccc.int/national_reports/annex_i_natcom/submitted_natcom/items/3625.php>.

Fifth national communication of Japan. Available at <http://unfccc.int/resource/docs/natc/jpn_nc5.pdf>.

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

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

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Tatsuya Abe, Mr. Tomotaka Abe, Mr. Kazuharu Aizawa, Ms. Junko Akagi, Mr. Kengo Akashi, Mr. Kentaro Doi, Mr. Takeshi Enoki, Mr. Yasuo Fujishima, Mr. Takuya Fusamura, Mr. Daisuke Hashimoto, Mr. Yuki Hoshino, Mr. Hirotaka Ishikawa, Mr. Sei Kato, Mr. Taro Kawasato, Mr. Kazumasa Kawashima, Ms. Ayuko Kobayakawa, Mr. Nobuo Kobayashi, Mr. Hisashi Kudo, Mr. Teruo Kogu, Mr. Yusuke Nakamura, Mr. Yasushi Ninomiya, Ms. Atsuko Nishikawa, Mr. Masakazu Okada, Mr. Tsutomu Okamoto, Mr. Kohei Sakai, Ms. Shoko Sakai, Mr. Kenji Shiraishi, Mr. Takeo Sugii, Ms. Ayako Suzuki, Mr. Yasuo Takahashi, Mr. Naoya Tsukamoto, Mr. Hiroyuki Ueda, Mr. Yoshiyuki Wakamatsu, Mr. Hiroki Yamagata, Mr. Yasunori Yoshizawa, Mr. Kiyoharu Yoshizawa, Ministry of the Environment (MoE); Mr. Kenji Matsuda, Mr. Takashi Kitamura, Mr. Tetsuyuki Ueyama, Ministry of Foreign Affairs (MoFA); Mr. Shunichi Amada, Mr. Jun Arima, Mr. Michiya Marui, Mr. Akihiro Matsuta, Mr. Shigeharu Minakawa, Mr. Toshiaki Nagata, Mr. Koichi Naka, Mr. Koichi Noda, Mr. Kota Oda, Mr. Kensuke Onishi, Mr. Kazumi Takahashi, Mr. Yasuhiro Chino, Ministry of Economy, Trade and Industry (METI); Ms. Maki Hattori, Mr. Naoyuki Kitajima, Mr. Eiji Kyakuno, Mr. Mutsumi Shibamura, Mr. Tomoyasu Shimada, Ministry of Education, Culture, Sports Science and Technology (MEXT); Mr. Tomohiko Araki, Mr. Kotaro Chichibu, Mr. Shiro Fujita, Mr. Isamu Hirono, Mr. Toshimasa Matsui, Mr. Shinichi Nagata, Mr. Ryo Nakajima, Ms. Marika Nishimuro, Mr. Tomohiro Oishi, Mr. Yuji Okugawa, Mr. Takeshi Shiroki, Mr. Kenichi Suzuki, Mr. Shinji Takami, Mr. Masahiko Takei, Mr. Takayuki Tanaka, Mr. Akihiro Ueda, Ministry of Land, Infrastructure, Transport and Tourism (MLIT); Mr. Satoshi Akahori, Mr. Masamoto Chiba, Mr. Koike Fuminori, Mr. Junji Hashimoto, Mr. Shintaro Izumi, Mr. Takahashi Kenro, Mr. Masafumi Kinoshita, Mr. Fuminori Koike, Mr. Hidefumi Makino, Mr. Kanazawa Masanao, Mr. Tomio Miyama, Mr. Kiuchi Takeshi, Mr. Yukihiro Tashiro, Mr. Tanaka Tetuya, Ms. Naoko Tsukada, Mr. Tatsuya Watanabe, Ministry of Agriculture, Food and Fisheries (MAFF); Mr. Yoshihisa Nakamoto, Japan Meteorological Agency (JMA); Mr. Satoshi Abe, Japan Association of Corporate Executives; Mr. Masami Hasegawa, Nippon Keidanren; Mr. Kimiko Hirata, Kiko Network; Mr. Reiji Hitsumoto, City of Kitakyushu; Mr. Yuko Nishida, Tokyo Metropolitan Government (TMG), including additional material on updated policies and measures, GHG projections, the national registry and recent climate policy developments in Japan.
