
**Report on Japan's Assigned Amount
Pursuant to Article 3, Paragraphs 7 and 8
of the Kyoto Protocol**

**Under Article 7, paragraph 4 of the Kyoto Protocol, United
Nations Framework Convention on Climate Change**

The Government of Japan

August 2006

The government of Japan submits this report in accordance with paragraph 2, Decision 13/CMP.1.

Contents of this report consists of 2 part in accordance with paragraph 6 of Annex Modalities for the accounting of assigned amounts under Article 7, paragraph 4, of the Kyoto Protocol of Decision 13/CMP.1 and paragraphs 7 and 8 of the annex show the information should be contained. Correspondence between requirement and contents of this report are shown in the table below.

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Part One

I. Complete inventories of anthropogenic emissions by sources and removals by sinks of greenhouse gases not controlled by the Montreal Protocol for all years from 1990

Following paragraph 7 (a) of Annex of the decision 13/CMP.1, this chapter describes “Complete inventories anthropogenic emissions by sources and removals by sinks of greenhouse gases not controlled by the Montreal Protocol for all years from 1990”. For more details of GHG emissions and removal, please refer to chapter 2 of “National Greenhouse Gas Inventory Report of Japan” (August, 2006). For more details of estimation methods for GHG emissions and removals, also please refer chapter 3 – 9 of “National Greenhouse Gas Inventory Report of Japan” (August, 2006).

1. Greenhouse Gas Emissions and Removals

Total greenhouse gas emission in fiscal 2004¹ (the sum of emissions of CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆ converted to CO₂ equivalents by multiplying its global warming potential [GWP]² respectively; excluding for carbon dioxide removals) was 1,355 million tons (in CO₂ equivalents), an increase by 12.0% compared to emissions (CO₂, CH₄, N₂O, excluding carbon dioxide removals) in FY1990. Compared to emissions in the base year under the Kyoto Protocol (FY1990 for emissions of CO₂, CH₄, N₂O; FY1995 for emissions of HFCs, PFCs, and SF₆), it increased by 7.4%.

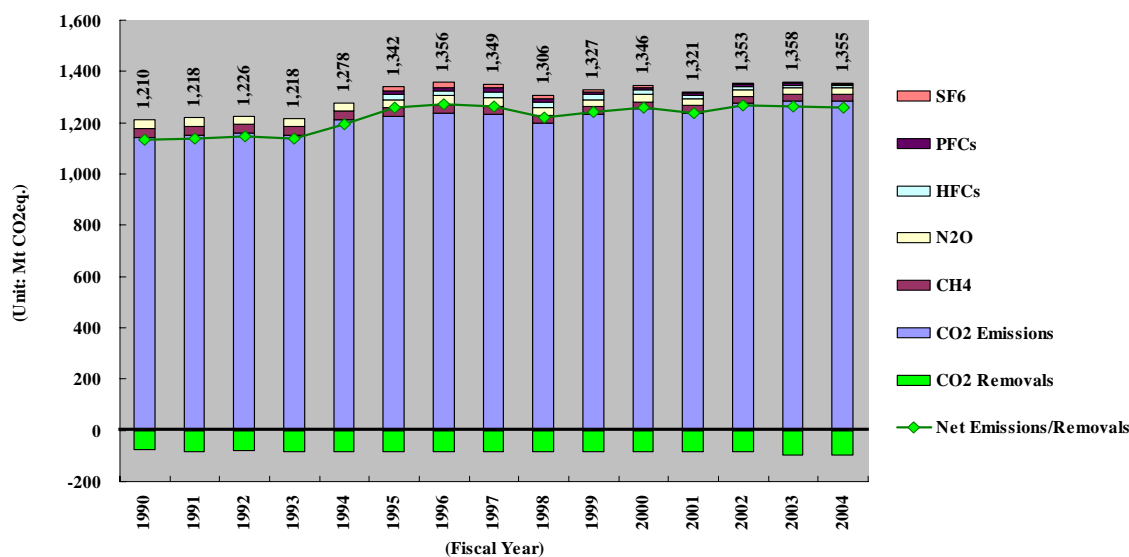


Figure 1-1 Trends in emission and removals of greenhouse gases in Japan

¹ “Fiscal” is used because CO₂ is the primary GHGs emissions and estimated on the fiscal year basis; from April of the year to March of the next year.

² Global Warming Potential (GWP): It is the coefficients that indicate degrees of greenhouse gas effects caused by greenhouse gases converted into the proportion of equivalent degrees of CO₂. The coefficients are subjected to the *Second National Assessment Report* (1995) issued by the Intergovernmental Panel on Climate Change (IPCC).

2. CO₂

CO₂ emissions in FY2004 were 1,286 million tons, comprising 94.9% of the total. It represents an increase by 12.4% from fiscal 1990, and an increase by 0.1% in comparison with the previous year.

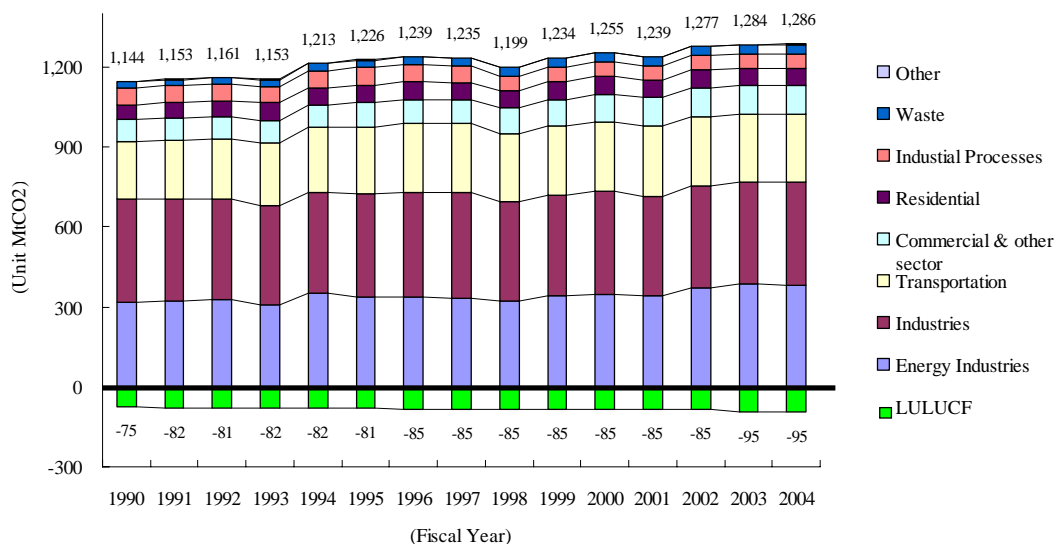


Figure 1-2 Trends in CO₂ emissions

The breakdown of CO₂ emissions in FY2004 shows that carbon dioxide emitted in association with the Fuel combustion accounted for 93.0% of the total, carbon dioxide from the Industrial processes accounted for 4.1%, and carbon dioxide from the Waste sector accounted for 2.8%. The Industries accounts for 30.2% of emissions of CO₂ from the Fuel combustion, making it the single largest source of emissions followed by the Energy industries sector at 29.7% and the Transport sector at 19.8%. Removals of CO₂³ in FY2004 were 94.9 million tons, equivalent to 7.4% of total annual CO₂ emissions. It represents an increase by 26.9% from FY1990, and a decrease by 0.1% in comparison with the previous year.

3. CH₄

Methane emissions in FY2004 were 24.5 million tons (in CO₂ eq.), comprising 1.8% of total emissions. The value represents a reduction by 27.0% from FY1990 and 1.2% in comparison with the previous year. The breakdown of methane emissions in FY2004 shows that methane emitted from enteric fermentation in livestock accounted for 29% of the total, making it the single largest source of emissions. It is followed by methane emissions from SWDS (Solid Waste Disposal Site) at 24%, and methane emissions from rice cultivation at 24%.

³ In the inventory submitted under the FCCC, removals by forest planted before 1990 are contained. Therefore, this value do not correspond to 13 Mt indicated in the annex of Decision 16/CMP.1 (Land use, land-use change and forestry) adopted in COP/MOP1.

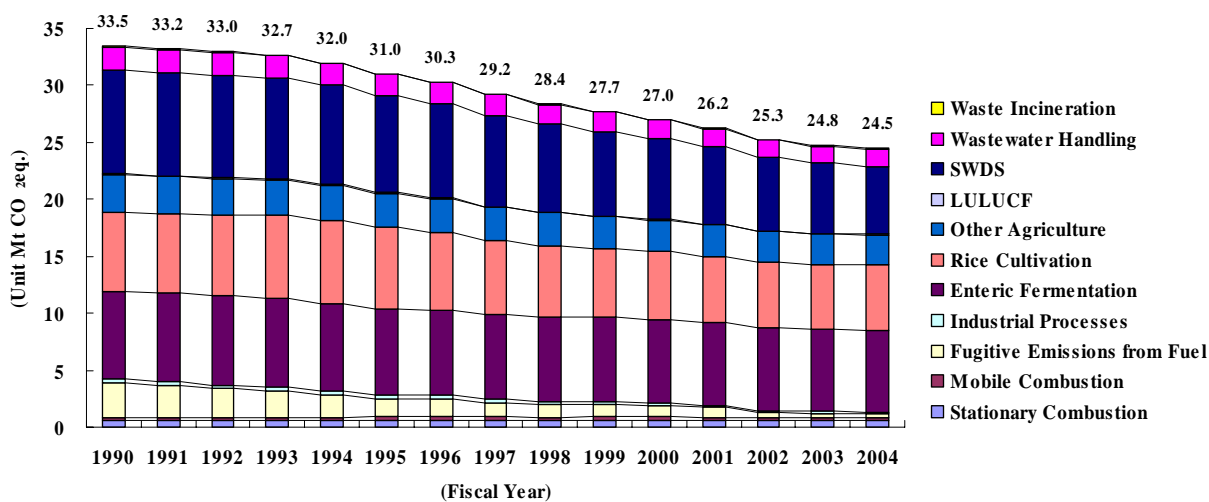


Figure 1-3 Trends in CH₄ emissions

4. N₂O

N₂O emissions in FY2004 were 25.8 million tons (in CO₂ eq.), comprising 1.9% of total emissions. The value represents a reduction by 21.4% from FY1990, and an increase by 0.1% in comparison with the previous year. In March 1999, N₂O abatement equipment came on stream in the adipic acid production plant, causing a sharp decline in emissions from the Industrial processes during the period from FY1998 to FY1999. In FY2000, N₂O emissions increased because of a decrease in operational rate of the abatement equipment. In 2001, N₂O emissions decreased with resuming the normal operation of the equipment.

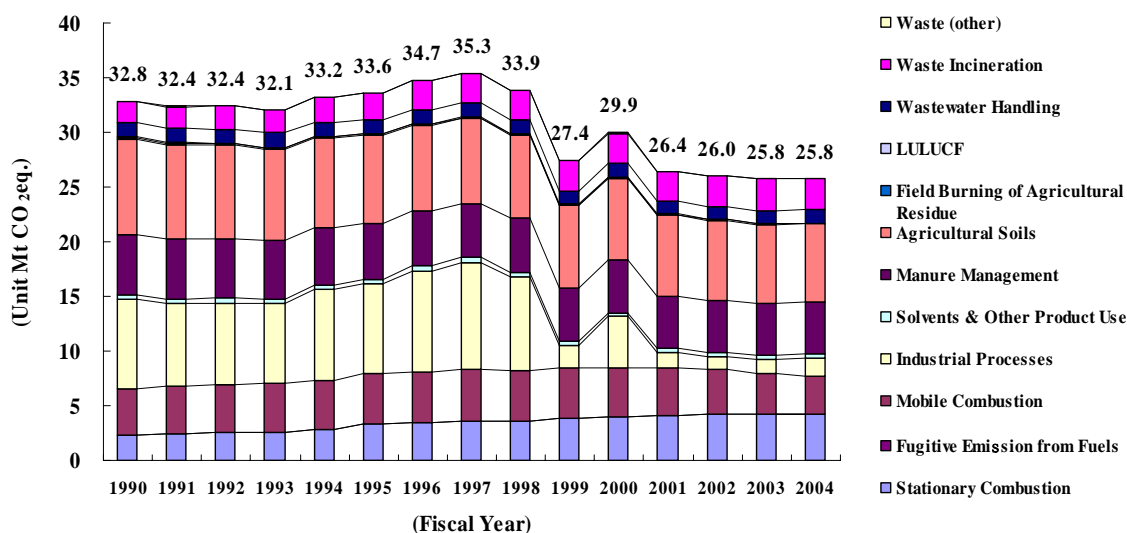


Figure 1-4 Trends in N₂O emissions

The breakdown of nitrous oxide emissions in FY2004 shows that emissions from agricultural soils for 28% of the total, making it the single largest source of emissions. It is followed by emissions from manure management at 18%, and fuel combustion of motor vehicles and other mobile sources accounted of 14%.

5. HFCs

5.1. Actual emissions

Emissions of HFCs in 2004⁴ were 8.3 million tons (in CO₂ eq.), comprising 0.6% of total emissions. The value represents a reduction by 58.7% on CY1995, and 33.3% in comparison with the previous year.

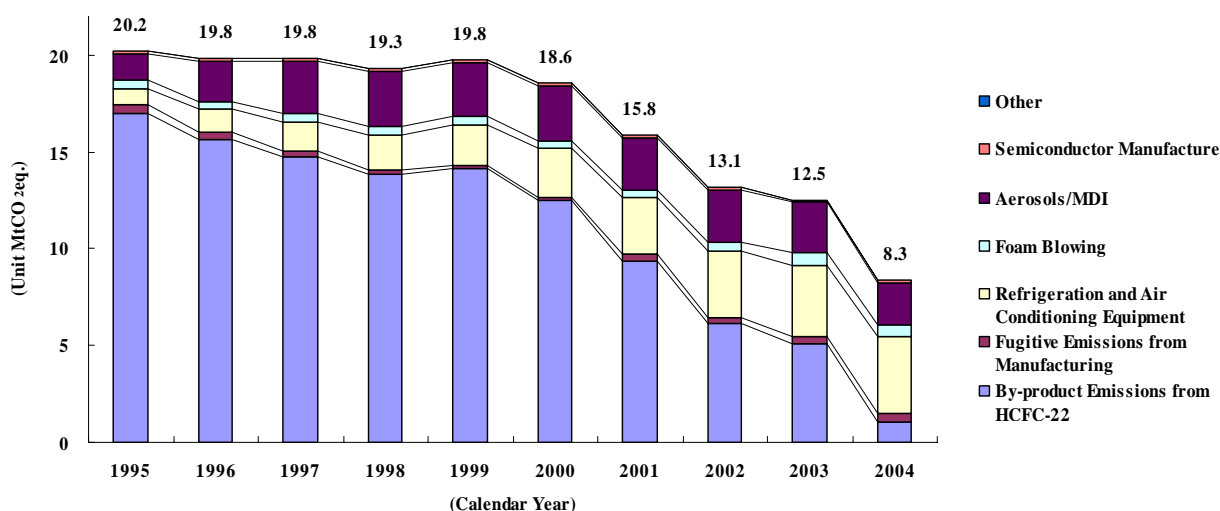


Figure 1-5 Trends in HFCs actual emissions

The breakdown of HFCs emissions in 2004 shows that emissions from refrigerants of refrigeration and air conditioning equipment accounted for 48% of the total, followed by emissions from aerosols / MDI at 26%, and by-product HFC-23 emission during production of HCFC-22 at 13%.

5.2. Potential emissions

Potential emissions of HFCs in 2004 were 65.0 million tons (in CO₂ eq.), the value represents an increase by 260% from 1990, and 18% in comparison with the previous year.

⁴ Emissions of calendar year basis are adopted for HFCs, PFCs and SF₆.

Table 1-1 Trends in HFCs potential emissions

		[Gg CO ₂ eq.]									
		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
HFCs		17,930	18,070	19,750	21,310	28,840	31,160	33,535	36,341	31,554	38,722
	HFC-23	17,550	17,550	17,550	15,210	17,550	17,550	18,977	19,644	18,100	18,065
	HFC-134a	0	520	1,820	5,720	10,530	12,090	12,852	15,176	12,500	18,399
	other HFCs	380	0	380	380	760	1,520	1,706	1,520	954	2,259

Table 1-1 Trends in HFCs potential emissions (cont.)

		[Gg CO ₂ eq.]				
		2000	2001	2002	2003	2004
HFCs		42,662	45,308	44,981	55,061	65,053
	HFC-23	18,919	14,378	13,152	14,942	14,036
	HFC-134a	17,560	20,199	18,722	20,565	19,963
	other HFCs	6,183	10,731	13,107	19,554	31,053

6. PFCs

6.1. Actual emissions

PFCs emissions in 2004⁴ were 6.3 million tons (in CO₂ eq.), comprising 0.5% of total emissions. The value represents a reduction by 55.0% from CY1995, and an increase by 2.0% in comparison with the previous year.

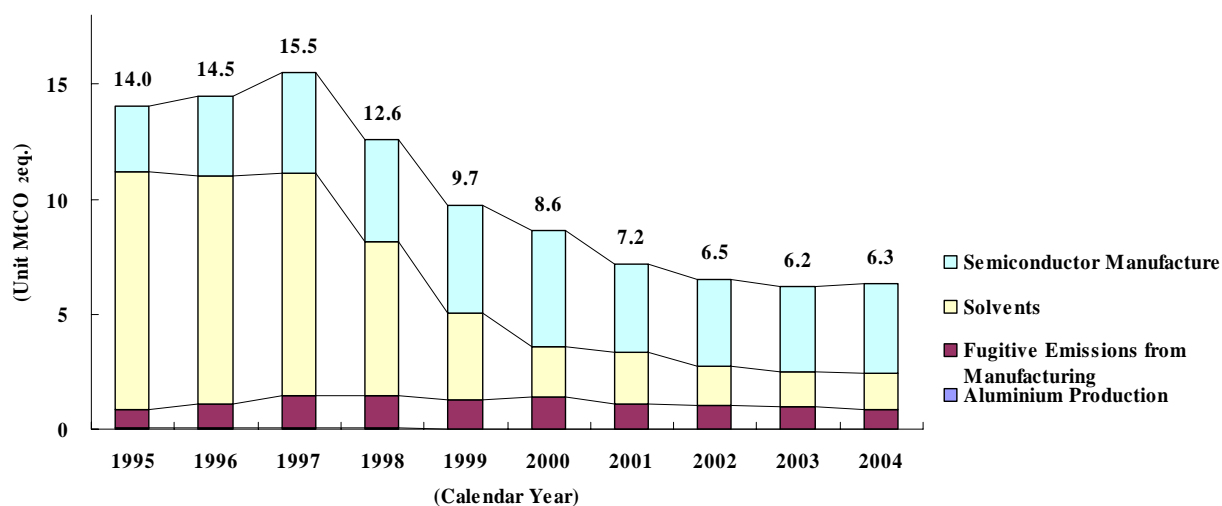


Figure 1-6 Trends in PFCs emissions

The breakdown of PFCs emissions in 2004 shows that emission from semiconductor manufacture accounted for 62% of the total, followed by emissions from solvents in washing metals etc. at 24%, and fugitive emissions from manufacturing at 14%.

6.2. Potential emissions

Potential emissions of PFCs in 2004 were 20.9 million tons (in CO₂ eq.), the value represents an increase by 270% from 1990, and 26% in comparison with the previous year.

Table 1-2 Trends in PFCs potential emissions

	[Gg CO ₂ eq.]										
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	
PFCs	5,670	6,370	6,370	8,860	12,274	16,601	18,622	19,650	17,786	17,397	
CF ₄	1,950	1,950	1,950	2,340	3,250	4,225	4,810	4,550	1,287	2,711	
other PFCs	3,720	4,420	4,420	6,520	9,024	12,376	13,812	15,100	16,499	14,686	

Table 1-2 Trends in PFCs potential emissions (cont.)

	[Gg CO ₂ eq.]				
	2000	2001	2002	2003	2004
PFCs	19,299	17,279	15,884	18,029	20,854
CF ₄	3,354	2,997	2,867	3,062	3,400
other PFCs	15,945	14,283	13,018	14,968	17,454

7. SF₆

7.1. Actual emissions

Emissions of SF₆ in 2004⁴ were 4.5 million tons (in CO₂ eq.), comprising 0.3% of total emissions. The value represents a reduction by 73.6% on CY1995, and 5.7% in comparison with the previous year.

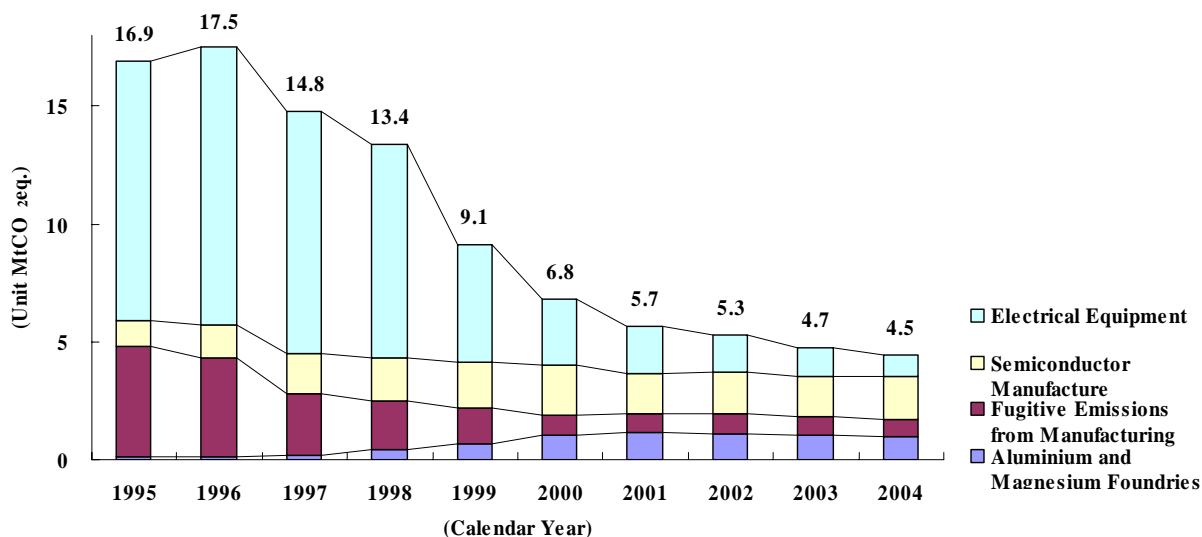


Figure 1-7 Trends in SF₆ emissions

The breakdown of SF₆ emissions in 2004 shows that emissions from semiconductor manufacture accounted for 40%, followed by emissions from the electrical equipment at 22%, and emissions from Magnesium Foundries at 21%.

7.2. Potential emissions

Potential emissions of SF₆ in 2004 were 30.1 million tons (in CO₂ eq.), the value represents a reduction by 21.3% from 1990, and an increase by 16.5% in comparison with the previous year.

Table 1-3 Trends in SF₆ potential emissions

	[Gg CO ₂ eq.]									
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
SF ₆	38,240	43,498	47,800	45,410	45,410	52,580	50,190	49,712	49,999	34,058

Table 1-3 Trends in SF₆ potential emissions (cont.)

	[Gg CO ₂ eq.]				
	2000	2001	2002	2003	2004
SF ₆	28,441	25,370	25,033	25,855	30,112

II. Selected base year for HFCs, PFCs and SF₆ in accordance with Article 3, paragraph 8 of the Kyoto Protocol

The government of Japan selects 1995 as its base year for HFCs, PFCs and SF₆ in accordance with Article 3, paragraph 8 of the Kyoto Protocol.

III. The agreement under Article 4 of the Kyoto Protocol

(Not applicable for Japan)

IV. Calculation of assigned amount pursuant to Article 3, paragraph 7 and 8 of the Kyoto Protocol

The government of Japan calculated assigned amount pursuant to Article 3, paragraph 7 and 8 of the Kyoto Protocol, as described below.

GHGs	Emissions [t CO ₂ eq.]	Base Year
CO ₂	1,144,129,508.80	1990
CH ₄	33,382,334.77	1990
N ₂ O	32,743,565.82	1990
HFCs	20,211,802.79	1995
PFCs	14,045,930.48	1995
SF ₆	16,928,791.42	1995
Total GHG emissions in the base year of the Kyoto Protocol	1,261,441,934.08	

$$1,261,441,934.08 \times 0.94 \times 5 = 5,928,777,090.16 \text{ [t CO}_2 \text{ equivalent]}$$

rounded off to the nearest whole number,

5,928,777,090 [tCO₂ equivalent]

5,928,777,090 [tCO₂ equivalent], Japan's assigned amount, was determined from calculations described above.

Part Two

I. Calculation of its commitment period reserve in accordance with decision 11/CMP.1 (Article 17 of the Kyoto Protocol)

According to the Decision 11/CMP.1 Annex paragraph 6, Japan calculates and reports Japan's commitment period reserve as described below.

The values of assigned amount and emissions used for commitment period reserve calculation here are rounded the values reported in CRF table to unit of ton CO₂ equivalent.

1. 90 per cent of the Party's assigned amount calculated pursuant to Article 3, paragraphs 7 and 8, of the Kyoto Protocol

Assigned Amount

5,928,777,090 ton CO₂ equivalent

Equivalent of commitment period reserve

$5,928,777,090 \times 0.9 = 5,335,899,381.0$ ton CO₂ equivalent

rounded off to the nearest whole number

5,335,899,381 ton CO₂ equivalent

2. 100 per cent of five times its most recently reviewed inventory

Greenhouse gas emissions in 2003 reported in the inventory submitted in 2005

1,339,129,945 [ton CO₂ equivalent] – (A) (rounded to the nearest whole number)

Equivalent of commitment period reserve (A × 5)

6,695,649,725 [ton CO₂ equivalent]

The lower value between “1” and “2” above, the 90% of the Japan's assigned amount is the commitment period reserve of Japan.

Commitment period reserve	5,335,899,381 ton CO ₂ equivalent
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II. Activities under Article 3, paragraph 3 and 4 of the Kyoto Protocol

1. Definitions relating to land use, land-use change and forestry activities under the Kyoto Protocol

(in accordance with Decision 13/CMP.1 Annex paragraph 8(b))

1.1. Definitions of forest for activities under Article 3, paragraph 3 and 4

The Japan's definitions of forest are identified as the following, in accordance with decision 16/CMP.1 adopted by the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol.

- **Definitions of forest**

- Minimum value for forest area: 0.3ha
- Minimum value for tree crown cover: 30%
- Minimum value for tree height: 5m
- Minimum value for forest width: 20m

1.2. Consistency of the definitions

In the Global Forest Resources Assessment 2005 (FRA2005) coordinated by Food and Agriculture Organization of the United Nation (FAO) in 2005, countries are requested to use the uniform forest definitions listed below (Table 2-1).

Table 2-1 FAO Forest definition

Category	Definition
Forest	<p>Land spanning more than 0.5 hectares with trees higher than 5 metres and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use.</p> <p>Forest is determined both by the presence of trees and the absence of other predominant land uses. The trees should be able to reach a minimum height of 5 metres (m) in situ.</p> <p>Areas under reforestation that have not yet reached but are expected to reach a canopy cover of 10 percent and a tree height of 5 m are included, as are temporarily unstocked areas, resulting from human intervention or natural causes, which are expected to regenerate.</p> <p>Includes: areas with bamboo and palms provided that height and canopy cover criteria are met; forest roads, firebreaks and other small open areas; forest in national parks, nature reserves and other protected areas such as those of specific scientific, historical, cultural or spiritual interest; windbreaks, shelterbelts and corridors of trees with an area of more than 0.5 ha and width of more than 20 m; plantations primarily used for forestry or protective purposes, such as rubber-wood plantations and cork oak stands.</p> <p>Excludes: tree stands in agricultural production systems, for example in fruit plantations and agroforestry systems. The term also excludes trees in urban parks and gardens.</p>

Source : Global Forest Resources Assesment 2005

However, Japan does not have statistics which are able to extract the forest met the definition above. Therefore, Japan reported forest data to FAO in accordance with the category and definition shown in Table 2-2.

Table 2-2 Forest category and definition for reporting of Japan

Category	Definition
Forest	Land on which trees and/or bamboo grow collectively, together with those trees and bamboo, or any other land that are provided for collective growth of trees and/or bamboo. Lands that are utilized mainly for agriculture, residential use, or other similar purposes, are not included Forests are classified into the following two categories: (1) National forest: Forest where land is owned by the national government, or where land is owned by other party but the national government implements silviculture under a contract which defines the share of profit between the national government and landowner(s). (2) Private forest: Forest other than national forest, including forests that are owned publicly such as by local/prefectural governments but not by the national government. Lands with trees and/or bamboo are not included in forests if: a) Owned and managed by national government agencies other than the Forestry Agency (since the land is not provided mainly for growing trees and/or bamboo) b) Spanning not more than 0.3 hectares and isolated from adjacent forests
Forest with standing trees	Forest that have canopy cover of 30 percent or higher. Young stands with the degree of stocking of 0.3 or higher are included.
Bamboo forest	Forest that does not fall under "forest with standing tree" and is dominated by bamboo (excluding bamboo grass).
Forest without standing trees	Forest that does not fall under "forest with standing tree" or "bamboo forest". This category includes areas that are temporarily understocked and are expected to regenerate.
Cut-over land	Forest without standing trees that has gone through final harvest.
Under-stocked land	Forest without standing trees that does not fall under "Cut-over land".

Source : Global Forest Resources Assessment 2005 Japan Country Report, 1.2.2 Classification and definitions

The definition shown in Table 2-2 is correspondent to the definition of forest in area and crown cover crude density (crown cover rate) that are to be reported under the Kyoto Protocol in years to come.

2. Information on election of activities under Article 3, paragraph 4 of the Kyoto Protocol (in accordance with Decision 13/CMP.1 Annex paragraph 8(c))

2.1. Election of activities under Article 3, paragraph 4 of the Kyoto Protocol

Japan elects Forest Management and Revegetation defined by decision 16/CMP.1 annex paragraph 6, as “additional human activities related to changes in greenhouse gas by source and removals by sinks in the agricultural soils and the land-use change and forestry categories” (hereafter “additional removal activities”) defined by Article 3, paragraph 4 of the Kyoto Protocol.

2.2. Interpretation of elected activities under Article 3, paragraph 4 of the Kyoto Protocol

2.2.1. Forest Management

Forest Management is defined by decision 16/CMP.1 ANNEX paragraph 1(f) as “a system of practices for stewardship and use of forest land aimed at fulfilling relevant ecological (including biological diversity), economic and social functions of the forest in a sustainable manner”.

Japan interprets the definition of “Forest Management” as the following with recalling the LULUCF-GPG that is requested to use for the party in accordance with the decision 16/CMP.1 paragraph 2

- In “Ikusei-rin forest”^{*1}, activities for “Forest Management” are appropriate forest practices including regeneration (land preparation, soil scarification, planting and etc.), tending (weeding, pre-commercial cutting and etc.), thinning and harvesting which have been carried out since 1990.
- In “Tennensei-rin forest”^{*2} activities for “Forest Management” are practices for protection or conservation of forests including controlling logging activities and land-use change which have been carried out by laws.

*1 “Ikusei-rin forest” is the forest where practices for establishment and maintenance of single-storied forests (“Ikusei-tansou-rin” practices) have been carried out after clear cutting ,or where forest practices for establishment and maintenance of multi-storied forests (“Ikusei-fukusou-rin” practices) have been carried out after selection cutting.(including temporally single-storied forest in practice)

*2 “Tennensei-rin forest” is the forest where practices which establishment and maintenance of forests mainly depending on natural power are carried out. These practices include logging prohibition for land and natural environment conservation and preservation of the species.

2.2.2. Revegetation

Revegetation is defined by decision 16/CMP.1 ANNEX paragraph 1(e) as “a direct human-induced activity to increase carbon stocks on sites through the establishment of vegetation that covers a minimum area of 0.05 hectares and does not meet the definitions of afforestation and reforestation”.

Japan interprets the definition of “Revegetation” as the following with recalling the LULUCF-GPG.

- Practices for creation of “park and green space”, “public green space”, and “private green space guaranteed by administration” have been carried out in settlements since 1990.

2.3. Lands identification method under the Japan's national system in accordance with Article 5, paragraph 1 of Kyoto Protocol

LULUCF-GPG, page4.24, Section 4.2.2.2 shows the two methods for identifying and reporting lands subject to Article 3.4 activities. Reporting Method 1 entails delineating areas that include multiple land units subject to Article 3.4 activities by using legal, administrative, or ecosystem boundaries. Reporting Method 2 is based on the spatially explicit and complete geographical identification of all lands subject to Article 3.4 activities.

Japan elects Reporting Method 1 in accordance with the decision tree indicated in Figure 4.2.4 in chapter 4 of LULUCF-GPG, which means that the entire national land is stratified by using the geographic boundary between prefectures and/or between local blocks, and total area of each “lands” subject to properly each Article 3.4 activity will be reported within each boundary.

2.4. Hierarchy among the elected activities under Article 3, paragraph 4 of the Kyoto Protocol

Forest category and settlements category are clearly divided under the land use classification. Since both elected activities are identified under the each land use category, overlapping is nonexistent between forest management and revegetation.

3. Information on accounting of credits

(in accordance with Decision 13/CMP.1 Annex paragraph 8(d))

Credits issued by activities under Article 3, paragraph 3 and 4 of the Kyoto Protocol will be accounted for the entire commitment period.

III. State of Development of a National System Based on Article 5, paragraph 1 of the Kyoto Protocol

1. Introduction

This Chapter describes Japan's national system in accordance with national system guidelines under Article 5.1 of the Kyoto Protocol (Decision 19/CMP.1)

The following are the changes made to Japan's national system that are required to be reported in accordance with reporting guidelines under Article 7 of the Kyoto Protocol.

Changes made to the national system since the Japan's Fourth National Communication are as follows:

- Implementing agencies and activity description on Japan's QA and QC activities were reviewed (refer to Chapter 2.6.1.1.).
- Assessment including Tier 2 level assessment, Tier 2 trend assessment, and an analysis on LULUCF sector was newly conducted for key categories analysis (refer to Chapter 2.4.).
- QA and QC procedures on inventory preparation process were updated (refer to Chapter 2.6.2 and Figure 2-2).

2. Japan's National System Based on Article 5, paragraph 1 of the Kyoto Protocol

2.1. The Government Institution Responsible for Japan's Greenhouse Gas Emissions and Removals Inventory

The government institution responsible for creating Japan's greenhouse gas emissions and removals inventory and its contact information are as follows.

- Name of state institution: Ministry of the Environment
- Contact: (Department) Climate Change Policy Division, Global Environment Bureau
(Address) 1-2-2 Kasumigaseki, Chiyoda-ku, Tokyo-to
(Telephone, FAX) +81-3-5521-8339, +81-3-3580-1382
(E-mail) chikyu-ondanka@env.go.jp
- Responsible person: Head of the Climate Change Policy Division, Global Environment Bureau, Ministry of the Environment

2.2. Institutional Arrangement and Process for the Creation of Japan's Greenhouse Gas Emissions and Removals Inventory

2.2.1. Institutional Arrangement for the Creation of the Greenhouse Gas Emissions and Removals Inventory

In Japan the Law Concerning the Promotion of Measures to Cope with Global Warming stipulates that the government must create an emissions and removals inventory. Specifically, the Ministry of the Environment (MOE) has annually compiled and submitted the national greenhouse gas inventory to the UNFCCC secretariat under the UNFCCC in cooperation with relevant ministries, governmental agencies and organizations (Figure 2-1).

The MOE has overall responsibility for the emissions and removals inventory. In order to respond to the international requirements and to reflect the latest scientific knowledge in the emissions and removals inventory, the MOE has convened the Committee for the Greenhouse Gas Emissions Estimation Methods to study improvements to the emissions and removals inventory. Based on the results of the committee's deliberations, the MOE calculates greenhouse gas emissions and removals, analyzes key categories, and performs uncertainty assessments. The actual work involved in calculating emissions and removals, preparation of the Common Reporting Format (CRF) and National Inventory Report (NIR) is carried out by the Greenhouse Gas Inventory Office of Japan (GIO)¹ of the Center for Global Environmental Research of the National Institute for Environmental Studies.

The relevant ministries, governmental agencies and organizations provide activity data and emission factors, etc., through methods such as the publication of relevant statistics. They also offer cooperation in the preparation of the emissions and removals inventory, for example, by providing information necessary for the assessment of uncertainty.

Japan's national system for the reductions of greenhouse gases is regulated in the *Enforcement Ordinance for the Law Concerning the Promotion of Measures to Cope with Global Warming*.

¹ GIO has consigned a part of task to private consultants.

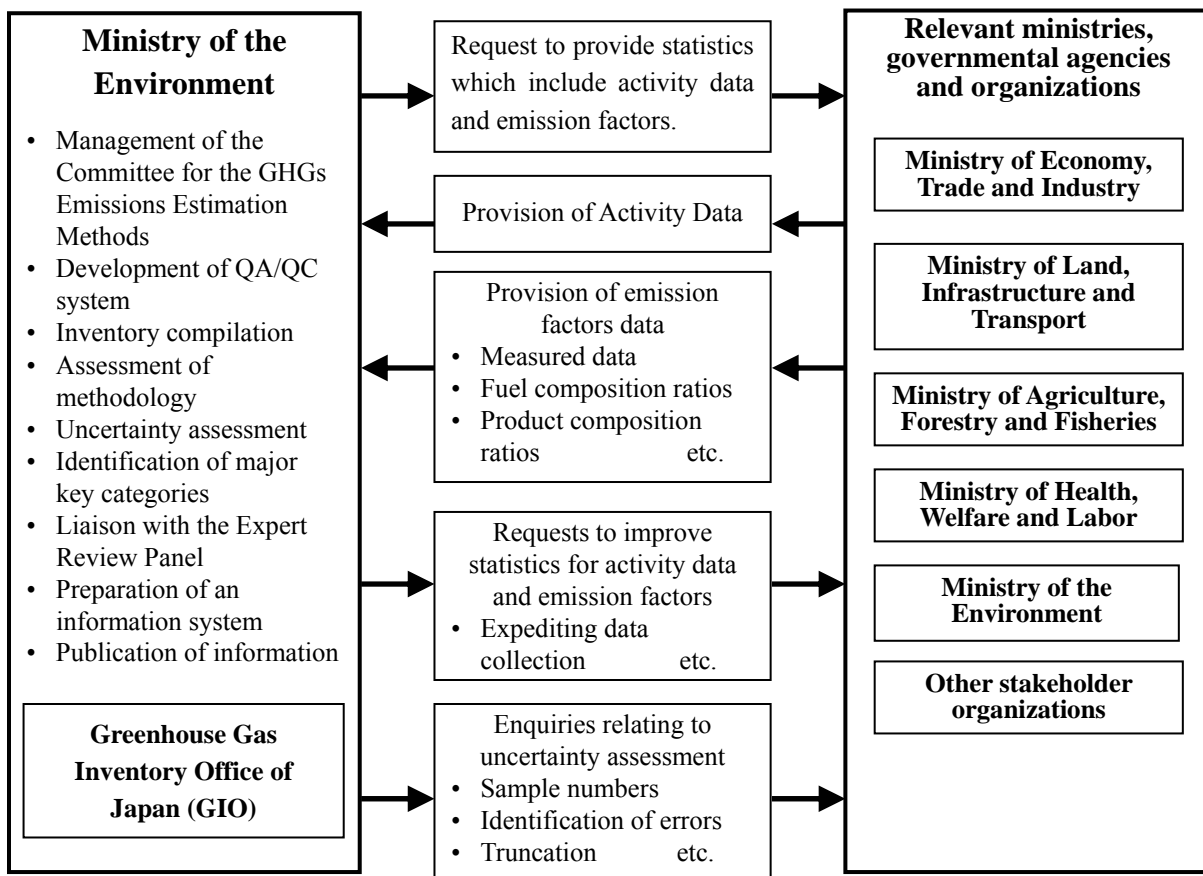


Figure 2-1 Institutional arrangement for the inventory preparation in Japan

2.2.2. Process for the Creation of the Greenhouse Gas Emissions and Removals Inventory

Japan has compiled an emissions and removals inventory by following the steps shown in Figure 2-2, in order to ensure and improve quality control regarding the completeness, accuracy and consistency of the inventory.

As shown in Figure 2-2, Japan has implemented QC activities, such as checking estimation accuracy and archiving documents, in each step of the inventory compilation process in accordance with GPG (2000) to manage the quality of the inventory. Japan has implemented Step 2 [Expert review of previous inventories (Committee for the Greenhouse Gas Emissions Estimation Methods)] as QA activities, and in that step, it reviews data quality taking into account scientific knowledge and data availability.

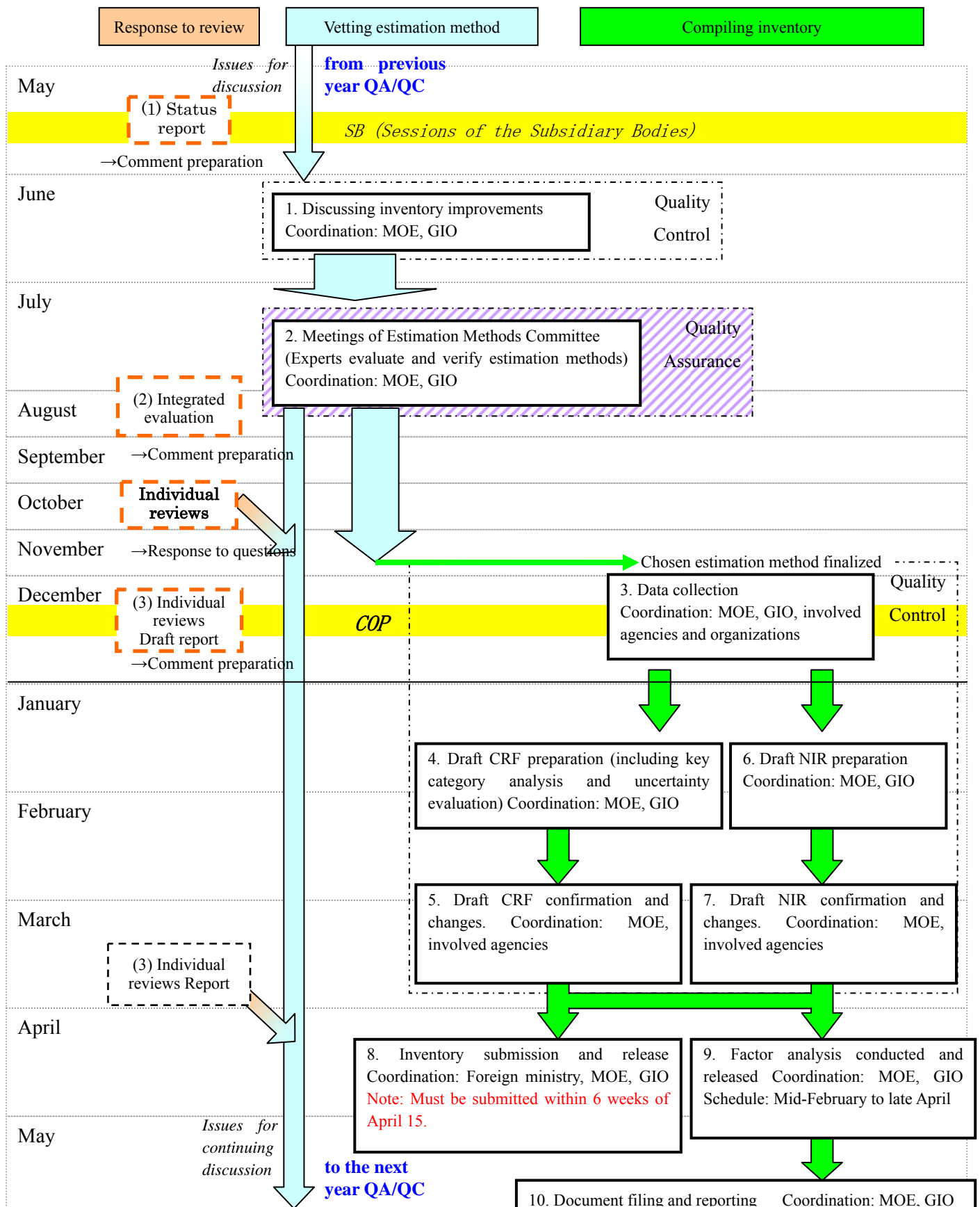


Figure 2-2 Process for Compilation of the Emissions and Removals Inventory

2.3. Collection of Activity Data, Selection of Emission Factors and the Calculation Method, the Emission Estimation Improvement Process

2.3.1. The Activity Data Collection Process

The activity data necessary for the calculation is gathered as necessary from published materials if it can be obtained from them. Data that has not been released as published materials is requested by the Ministry of the Environment from the government ministries and agencies with jurisdiction over it and the ministry gathers the activity data after receiving the provision of the said information.

2.3.2. The Selection Process for Emission Factors and the Calculation Method

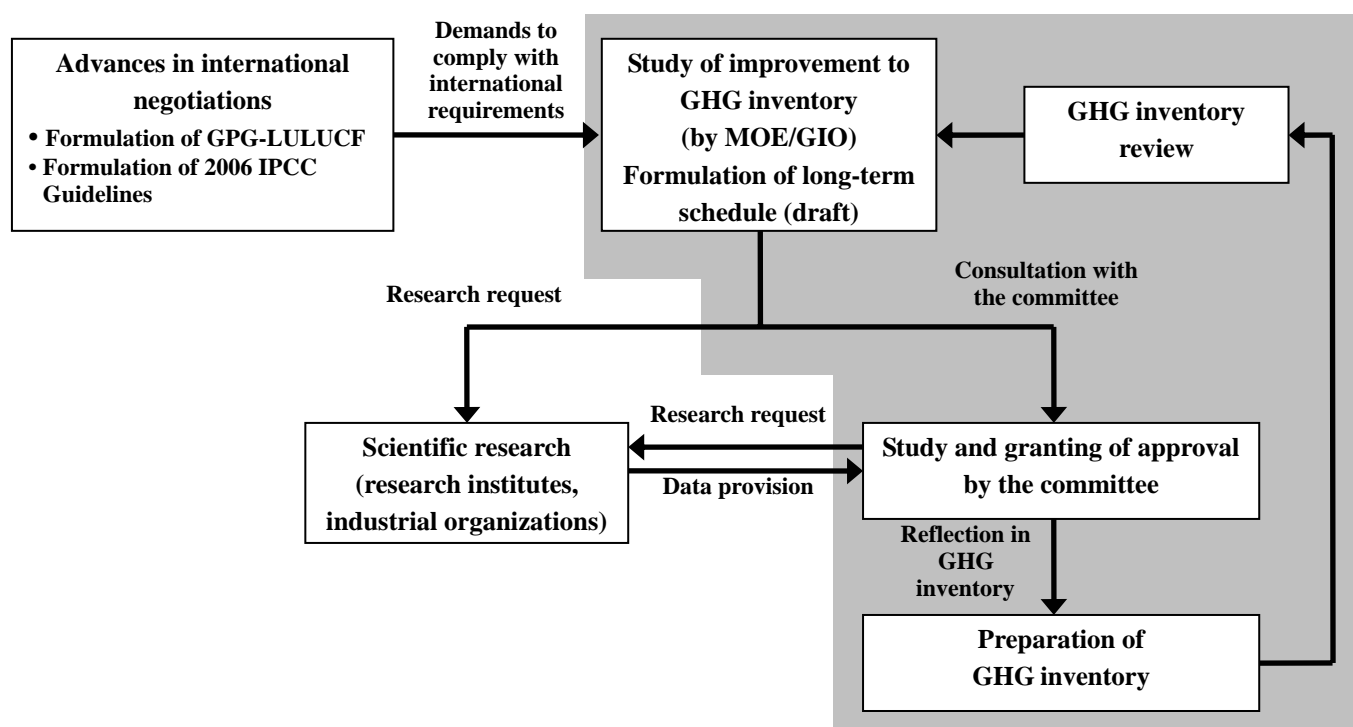
Concerning Japan's emissions and removals calculation method, the Revised 1996 IPCC Guidelines, GPG (2000) and GPG-LUCF stipulate the study of calculation methods tailored to actual conditions in Japan in all of the activity categories necessary for calculation of Japan's greenhouse gas emissions and removals.

There are two methods for obtaining emission factors: using the default values from the Revised 1996 IPCC Guidelines, the GPG (2000) and the GPG-LUCF, and obtaining Japan's country-specific emission factor based on the results of measurements taken within Japan. In cases where there is measured data in Japan and the result of that data is thought to appropriately reflect the actual state of emissions in Japan, the country-specific emission factor is obtained. On the other hand, in cases where there is no measured data or there is measured data, but it is thought that a more detailed study is necessary, the aforementioned default values are used.

After the calculation methods and emission factors have been debated and studied in the Committee for the Greenhouse Gas Emissions Estimation Methods, they are officially selected methods or values to be used in the emissions and removals inventory.

2.3.3. The Emission Estimation Improvement Process

If improvements of the emissions and removals inventory are specified based on advances in international negotiations, emissions and removals inventory reviews, and experiences of preparation of emissions and removals inventories, Japan conducts studies of progressive emissions improvements as necessary. Studies of emission estimation improvement plans are conducted through scientific research and the Committee for the Greenhouse Gas Emissions Estimation Methods, and the results of those studies are reflected in the emissions and removals inventory. The emissions and removals inventory improvement process is shown in the concept diagram below.



* The area shaded in grey shows the emissions and removals inventory preparation process.

Figure 2-3 Concept Diagram of the Emissions and Removals Inventory Improvement Process

2.4. Identification of Key Categories

Annex I Parties shall identify their national key categories for the base year and the latest reported inventory year, as described in GPG (2000), using three analyses: the Tier 1 level assessment, the Tier 1 trend assessment and a qualitative assessment. The identification of the key categories with the Tier 1 level assessment and the Tier 1 trend assessment is carried out using an Excel spreadsheet for key category analysis (a ksa file). Using the ksa file, emissions in the base year and latest reported inventory year in each category for which the GPG (2000) determined that a key category analysis should be conducted are directly linked from the calculation spreadsheet (Excel) that is conducting the emissions estimate, and a list of emissions in each category is prepared.

When preparing this list of emissions in each category, a comparison is conducted of the cumulative values of total emissions by sector and emissions of each sub-category within that sector, and in the case that Japan's country-specific sub-categories and emissions categories are rearranged into categories conforming to the IPCC Guidelines, confirmation is also made that no duplications or omissions have occurred.

With the Tier 1 level assessment method, emissions for each category are summed together in descending order of magnitude, and the categories that add up to more than 95 percent of total emissions are identified as key categories. With the Tier 2 level assessment method, after multiplying emissions for each category by uncertainty for each category, the categories that total cumulative contribution exceeds 90% are identified as key categories. With the trend assessment

method, the difference between the change in emissions in a Consultation with the committee Creation of emissions/removals given category and the change in total emissions is calculated and this is multiplied by the contribution to emissions of the category in question to obtain the value of the trend assessment in that category. These values are added up beginning with the categories with the highest proportion of the total value and all the categories until the overall sum reaches 95 percent are identified as key categories. With the Tier 2 trend assessment method, after multiplying the data used for analyzing the Tier. 1 trend assessment by uncertainty for each category, the categories that total cumulative contribution exceeds 90% are identified as key categories. All of the test data for the analysis is saved as a spreadsheet within the ksa file.

Under the qualitative assessment, emissions categories for which emissions and removals have been newly estimated and categories in which estimation methods have been changed are identified as key categories.

Analysis on removals in accordance with LULUCF-GPG along with the identification of key categories was conducted. For details and analysis, refer to Appendix I of NIR.

2.5. Recalculations

Recalculations of previously reported emissions and removals are recommended in the cases of 1) application of a new methodology for estimating, 2) addition of new categories, and 3) data refinement.

The application of a new calculation method is carried out as necessary. In the emissions and removals inventory, recalculation is conducted in the category for which the calculation method had changed. The calculated method changed because of the change in the classification of the statistics used as activity data, the reflection of the actual state of emission factor changes due to technological progress, the change into a calculation method cable of reflecting efforts to reduce greenhouse gas emissions, and other reasons.

New emission source categories are also sequentially added. Particularly, recalculation was conducted for many categories because overall revisions were made to the national inventory submitted in 2006.

Concerning the refinement of activity data, in Japan generally the activity data for the most recent year at the time the emissions and removals inventory is reviewed the next year for the purpose of obtaining information that was not submitted by the time of the publication of financial year values or the survey deadline. In the emissions and removals inventory submitted in 2006, the activity data in 2003 was reviewed for many emissions categories. As a result emissions in the year in question were recalculated.

Changes in the activity data are continually-revised, and finally in the process of requesting data for the most recent year from ministries and agencies, lateral communication concerning changes in the past data is also exchanged simultaneously.

For a list of categories which were recalculated for the emissions and removals inventory submitted in 2006, the justifications of the recalculations refer to Table 8(b) Recalculation-Explanatory Information in the CRF and Chapter 10 of the NIR.

2.6. Quality Assurance/Quality Control

2.6.1. The Quality Assurance/Quality Control Plan

2.6.1.1. Basic Structure of the Quality Assurance/Quality Control Plan

The basic structure of Japan's Quality Assurance/Quality Control Plan is the institutional arrangement for emissions and removals inventory preparation in Japan shown in Figure 2-1 and the process for compilation of the emissions and removals inventory shown in Figure 2-2.

In Japan, when preparing the emissions and removals inventory, in line with the provisions of the GPG(2000), in each process QC (quality control) activities (accuracy check of calculation, storage of documents, etc.) are implemented, and the quality of the emissions and removals inventory is managed. Furthermore, Step 2 (convening of the Committee for the Greenhouse Gas Emissions Estimation Methods [assessment and study of the calculation method by experts]) is positioned as a QA (quality assurance) activity, and the data quality is verified and assessed in terms of scientific knowledge and data availability. Japan's QA and QC procedures can be summarized as follows:

- ***QC procedure***

In Japan, inventory preparation procedures conducted by the MOE (including GIO and private-sector companies commissioned for the job), which is the agency involved in inventory preparation, as well as by other related agencies and organizations, are considered to be QC procedures.

- ***QA procedure***

Greenhouse gas emission estimation methods, establishment of emission factors, assessment and examination on calculating activity data and other data in view of scientific findings and data availability conducted by Japanese experts within the Committee for the Greenhouse Gases Emissions Estimation Methods are considered to be QA procedures.

Table 2-3 Outline of Japan's QA/QC Activities

	QC (Quality Control)		QA (Quality Assurance)
Implementing Agency	Global Environment Bureau, Climate Change Policy Division, Ministry of the Environment (including GIO and private-sector companies commissioned for the job)	Other divisions and bureaus of MOE, METI, MLIT, MAFF, MHLW, and other relevant agencies and organizations	Committee for the Greenhouse Gases Emissions Estimation Methods
Activity Description	<ul style="list-style-type: none"> • Preparing inventory • Internal checking • Examining estimation methods • Obtaining emission factors and activity data • Filing activity records and related documents • Analyzing uncertainty • Analyzing key categories • Responding to questions pointed out by experts review team • Managing the Committee for the Greenhouse Gases Emissions Estimation Methods • Improving information system • Coordinating QA/QC Activities 	<ul style="list-style-type: none"> • Providing technical information and support • Providing activity data and emission factors data • Confirming and assessing inventory (internal review) 	<ul style="list-style-type: none"> • Examining estimation methods, emission factors, and activity data • Analyzing, examining, and assessing estimation methods • Assessing inventory

2.6.1.2. Emissions and Removals Inventory Preparation Schedule

The process for compilation of the emissions and removals inventory shown in Figure 2.III 2 shows a general schedule established based on past emissions and removals inventory renewals because the emissions and removals inventory will be submitted on April 15. Looking at the detailed work schedule, the inventory is formulated taking into account conditions in that year such as the refinement of statistics, the progress of study of calculation methods, additional emissions and removals inventory preparation requirements resulting from advances in international negotiations, etc. and reviews are conducted as necessary based on the state of progress of the emissions and removals inventory preparation.

2.6.2. Implementation of Quality Assurance/Quality Control Activities

The quality control/quality assurance activities being implemented in each part of the process of emissions and removals inventory preparation are shown below.

2.6.2.1. Review of previous inventories (Step 1)

• Overview

Japan bases its considerations on further improvement areas identified during inventory reviews under the UNFCCC, on results of deliberations by the Committee for the Greenhouse Gases Emissions Estimation Methods, and on other needed corrections² discovered in the

² GIO keeps a corrections list and records the information to address needed corrections discovered when working on the inventory.

inventory compilation process, and incorporates these into its inventory. When this result in changes to the inventory, those changes are shown in the NIR to assure transparency (“Chapter 10 : Recalculations and Improvements”).

• **Main Processes**

Implementation process		Description	Implementing agency
1	Identify inventory problem areas for improvement	<p>Inventory problem areas for improvement are identified using information such as:</p> <ul style="list-style-type: none"> • Problem areas needing correction discovered in the inventory calculation process • Problem areas noted in Estimation Methods Committee meetings • Problem areas noted in the inventory review • Etc. 	GIO ¹⁾
2	Decide schedule for preparing inventory	<ul style="list-style-type: none"> • Decide the overall schedule for preparing that year's inventory, taking into account matters including scheduled examination of estimation methods. 	MOE ²⁾ , GIO
3	Decide policy (proposed) and meeting schedule of the Committee for the Greenhouse Gas Emissions Estimation Methods	<ul style="list-style-type: none"> • Decide policy for holding committee meetings, the agenda, and schedule. 	MOE, GIO
QC activities		<ul style="list-style-type: none"> • Preparing corrected inventory list • English-language version of inventory review report • Table of planned inventory improvements 	GIO

1) Greenhouse Gas Inventory Office of Japan

2) The Ministry of Environment

2.6.2.2. Expert review of previous inventories (Committee for the Greenhouse Gases Emissions Estimation Methods) (Step 2)

• **Overview**

The Ministry of the Environment holds meetings of the Committee for the Greenhouse Gases Emissions Estimation Methods (below, “Committee”) to deliberate on inventory estimation methods for each year and on issues requiring specialized assessment and deliberation. Japanese experts in a broad range of fields conduct the discussions (Table 2-4).

In addition to the incorporation of discussion results into the inventory, the documents used by the Committee for especially noteworthy matters are released as Annex of NIR which helps improve inventory completeness and transparency. Committee meetings have been held every year since 1999 in conjunction with advances in international negotiations and enhancement of the domestic regime through legislation.

The activities of the Committee are considered to be Tier 2 QA activities as stipulated in GPG(2000) because (1) it has the participation of experts not directly involved in preparing the inventory, and (2) it conducts detailed, objective examinations of problems in all fields by establishing working groups and breakout groups.

Table 2-4 Overview of Committee for the Greenhouse Gases Emissions Estimation Methods

Implementing body	Ministry of the Environment
Meetings held	(1) Feb-Mar 1999 (2) Nov 1999 to Sep 2000 (3) Dec 2001 to Jul 2002 (4) Aug 2003 (5) Dec 2004 to 2006
Main purposes	(1) Preparing inventory based on the IPCC <i>Good Practice Guidance</i> (2000) (analyzing key categories, assessing uncertainty, etc.) (2) Examining issues that need continuing discussion (carbon balance in the petroleum refining process, etc.) (3) Responding to problem areas pointed out by the 2003 inventory in-country review (developing quality assurance/quality control [QA/QC] plan, etc.), examining estimation methods meant to confirm baseline year emissions
Regime	Create inventory working groups to discuss crossover issues, breakout groups to consider issues by sector, and a parent committee to oversee the working groups and breakout groups (Refer to Figure 2-4)
Members	Researchers from universities, research institutes, incorporated administrative agencies, and other organizations; experts from industry organizations; and involved government ministries and agencies (about 70 experts attended meetings in FY2005)

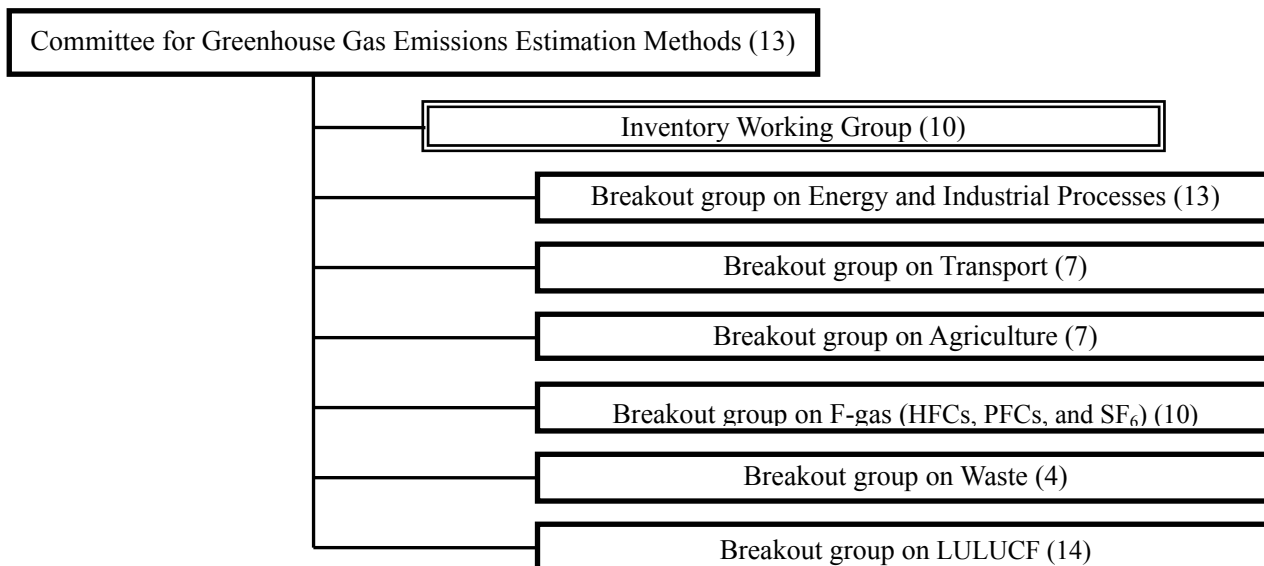


Figure 2-4 Organization of Committee for the Greenhouse Gases Emissions Estimation Methods
(Parentheses show numbers of experts in FY2005)

• **Main Processes**

Implementation process		Description	Implementing agency
1	Prepare committee meeting materials	<ul style="list-style-type: none"> Preparation of committee meeting materials 	MOE, GIO, subcontractors
2	Hold meetings of parent committee and breakout groups according to schedule	<ul style="list-style-type: none"> Holding committee meetings Feedback on problem areas 	MOE (GIO, subcontractors)
		<ul style="list-style-type: none"> Discussions of inventory quality, and specifying places that can be improved (QA activities) 	Outside experts
3	Prepare minutes after committee meetings	<ul style="list-style-type: none"> Preparation of committee meeting minutes 	GIO, subcontractors
QC activities		<ul style="list-style-type: none"> Preservation of committee meeting materials and minutes 	GIO

2.6.2.3. Data Collection (Step 3)

• **Overview**

Most statistics for preparing Japan's inventory are gathered from government sources available commercially. Data not found in these sources are obtained from government agencies and relevant organizations. Japan's data gathering process is described below.

• **Main Processes**

Implementation process		Description	Implementing agency
1	Confirm data that must be collected	<ul style="list-style-type: none"> Confirming data needed to update inventory. Confirm collection processes for categories whose estimation methods changed, and for newly estimated categories. 	GIO, subcontractors
2	Collect data using government statistics	<ul style="list-style-type: none"> Obtaining government statistics needed to prepare inventory. 	GIO, subcontractors
		<ul style="list-style-type: none"> Making hard copies of pages with data used, put them in the specified binders, and file. When making hard copies, use marker pens to show data. 	GIO, subcontractors
3	Request data from relevant government agencies and private organizations	<ul style="list-style-type: none"> Preparing letters requesting data and files for entering data. 	GIO
		<ul style="list-style-type: none"> Sending request letters and data input files to relevant agencies and organizations. 	MOE, GIO
4	Provide data depending on type of request	<ul style="list-style-type: none"> Entering prescribed data into files and send to MOE or GIO. When sending files, also noting if there are changes in past data. 	Relevant agencies or organizations
QC activities		<ul style="list-style-type: none"> Preparing list of assembled data. Managing data collection progress and prepare list. Filing commercially available government statistics and hard copies of them. Retaining electronic files into which data have been entered. Filing the data request letters 	GIO, subcontractors

2.6.2.4. Compilation of Draft CRF (Including Key Category Analysis and Uncertainty Assessment) (Step 4)

• Overview

In Japan estimation files having a linked structure based on estimation equations for emissions and removals (JNGI : Japan National Greenhouse Gas Inventory files) are used to perform data entry and estimation of emissions and removals all at the same time. And because key category analyses and uncertainty assessments are interlocked with estimation of emissions and removals, they are performed more or less simultaneously. This section therefore puts data entry and estimation of emissions and removals into step 4 with key category analysis and uncertainty assessment, and explains each activity.

• Main Processes

Implementation process		Description	Implementing agency
1	Prepare estimation files for years concerned	<ul style="list-style-type: none"> Preparing estimation files for years concerned based on factors including results of considering inventory improvements. 	GIO, subcontractors
2	Update files for entering activity data and emission factors	<ul style="list-style-type: none"> Entering data collected in step 3. 	GIO, subcontractors
3	Update background data files	<ul style="list-style-type: none"> Updating activity data and emission factors automatically updates background data files. 	GIO, subcontractors
4	Transfer to CRF Reporter	<ul style="list-style-type: none"> Transferring estimation results into CRF reporter. 	GIO, subcontractors
5	Prepare verification files	<ul style="list-style-type: none"> Making verification files and compare with estimation results. 	GIO, subcontractors
6	Prepare CRF	<ul style="list-style-type: none"> Preparing CRF using CRF Reporter. 	MOE, GIO, subcontractors
QC activities		<ul style="list-style-type: none"> Checking for errors in transferring entered data. Making sure emission estimation was properly done. Making sure parameters and emission factors were properly used. Checking completeness of database files. Checking to see if consistent data were used in multiple emission source categories. Making sure data are correctly linked. Estimating uncertainty and checking it. Making sure citations are properly shown. Checking completeness. Managing processes. Filing related documents. 	GIO, subcontractors

• Individual Tasks

-Data Entry and Estimation of Emissions and Removals

In Japan the JNGI files, which comprise activity data input files, emission factor input files, and estimation files, are used to estimate GHG emissions and removals (see Figure 2-5 and Figure 2-6). The activity data input files and emission factor input files are linked to the estimation files, which are in turn linked to the CRF Reporter transfer file. The CRF Reporter transfer file has the

same structure as the CRF Reporter input sheet, so that entering data into the activity data input files and the emission factor input files automatically updates the emissions and removals estimates, and the CRF Reporter transfer file. After the CRF Reporter transfer file data are entered into the CRF Reporter input sheet, the CRF Reporter is compiled to prepare the CRF.

Because the estimation files basically have the same structure every year, the files of any one year are made using copies of the previous year's files. However, in situations such as when estimation methods or the like change, or when the inventory submission method changes, it may be necessary to join or eliminate files, change the link structure, or make other changes.

In addition to the estimation files, CRF link file, and CRF, Japan prepares files that refer to the estimation files (verification files) for estimating emissions and removals. Verification files are used to calculate total emissions using a system and integration method that are different from those of the estimation files and CRF Reporter transfer file. Therefore, if the total emission amounts of the CRF and verification files match, it means there are no problems with data entry or inter-file links, or no calculation errors such as double counting emissions or removals.

燃料の漏出		Fugitive Emissions From Fuels														
石炭採掘時の漏出		Solid Fuels														
Summary																
Unit	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003		
合計 Total	Gg-CH4	133.61	120.87	107.98	98.85	81.57	64.03	61.77	47.95	41.55	41.22	36.63	27.16	5.64	4.47	
坑内産 Underground	Gg-CH4	132.63	119.91	107.27	98.16	80.91	63.45	61.23	47.39	41.07	40.73	36.11	26.54	5.17	3.95	
採掘時 Mining Act	Gg-CH4	121.51	108.78	96.18	87.67	71.13	54.22	52.17	41.95	35.93	35.64	32.23	23.12	3.97	2.74	
採掘後行程 Post-minin	Gg-CH4	11.12	11.13	11.10	10.49	9.78	9.23	9.06	5.44	5.14	5.09	3.88	3.41	1.20	1.21	
露天産 Surface Mi	Gg-CH4	1.01	0.96	0.70	0.68	0.66	0.58	0.54	0.55	0.48	0.49	0.51	0.62	0.46	0.52	
採掘時 Mining Act	Gg-CH4	0.93	0.89	0.65	0.63	0.60	0.54	0.50	0.51	0.44	0.45	0.47	0.57	0.42	0.47	
採掘後行程 Post-minin	Gg-CH4	0.08	0.08	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.05	0.04	0.04	

(1)坑内掘	(1) Underground Mines	
1)採掘時	1) Mining Activities	
Ech4=A*EF		
Ech4	メタン排出量	CH4 emissions
A	石炭生産量	coal production
EF	排出係数	emission factor

年度	FY	Unit	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	参照・出典・備考	References
A	A	t	6,774,618	6,781,348	6,760,095	6,391,667	5,957,707	5,621,869	5,520,805	3,312,048	3,130,501	3,102,063	2,964,049	2,079,626	734,037	738,390	「エネルギー生産・供給統計年報」(経済産業省)「Coal産出データ」	MEIT Yearbook of Production, Supply and Demand of Petroleum, Coal and Coke
EF	EF	kg-CH4/t	17.9	16.0	14.2	13.7	11.9	9.6	9.4	12.7	11.5	11.5	13.6	11.1	5.4	3.7	産業効果測定方法検討委員会報告(平成13年)「Coal産出データ」	Data provided by Icofol GHGs Estimation Methods Committee Report 2000
Ech4	Ech4	Gg-CH4	121.51	108.78	96.18	87.67	71.13	54.22	52.17	41.95	35.93	35.64	32.23	23.12	3.97	2.74		Data provided by Icofol

Figure 2-5 Estimation file (emission/removal estimation sheet) (“Coal” in 1B1-2005.xls)

6.A.1 Managed Waste Disposal on Land																
Information type	Unit	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Annual MSW at the S	Gg	3,510.21	3,673.51	3,261.20	3,248.73	2,818.22	2,652.77	2,382.37	2,124.79	1,964.85	1,752.87	1,740.53	1,616.20	1,527.32	1,485.43	1,450.86
Methane conversion factor		0.97	0.96	0.96	0.96	0.95	0.95	0.95	0.94	0.94	0.94	0.94	0.93	0.93	0.93	0.92
DOC (Degradable Org)	%	40.48	41.40	41.13	41.36	41.13	40.93	40.79	40.54	40.87	40.50	39.83	40.04	40.50	41.09	40.97
Emissions																
CO2	Gg	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Method		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
EF Used		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
CH4	Gg	430.75	427.67	426.37	419.58	413.83	402.45	391.87	379.86	365.15	350.62	334.46	319.49	304.61	292.10	281.32
Recovery	Gg	1.29	0.84	0.58	1.03	0.51	0.87	0.91	0.99	0.90	1.07	0.74	0.65	0.60	0.47	0.47
Method		T3	T3	T3	T3	T3	T3	T3	T3	T3	T3	T3	T3	T3	T3	T3
EF Used		CS	CS	CS	CS	CS	CS	CS	CS	CS	CS	CS	CS	CS	CS	CS
NOx	Gg	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
CO	Gg	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
NMVOG	Gg	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Implied emission factor																
CO2	t/t MSW															
CH4	t/t MSW															
(cell comment for MCF anaerobic condition 1.0, semiaerobic condition 0.5)																

Figure 2-6 Estimation file (CRF link sheet) (Category 6.A.)

- CRF Preparation Using the CRF Reporter

The CRF Reporter is software developed by the UNFCCC secretariat at the request of the COP. Its purpose is to facilitate the submission of each country's inventory, and inter-country comparisons when conducting reviews. Annex I countries are required to use the CRF Reporter for CRF preparation and inventory submission starting with the 2006 inventory.

The inventory to be submitted in FY2006 is the first opportunity to use the CRF Reporter software, making it necessary to watch out for bugs and other problems. Further, it has poor compatibility with the estimation system that has been used in Japan, thereby necessitating the manual entry of data into the CRF Reporter. In view of these factors, in preparing the 2006 inventory we are reviewing the preparation process, moving up the schedule, and otherwise dealing with the situation.

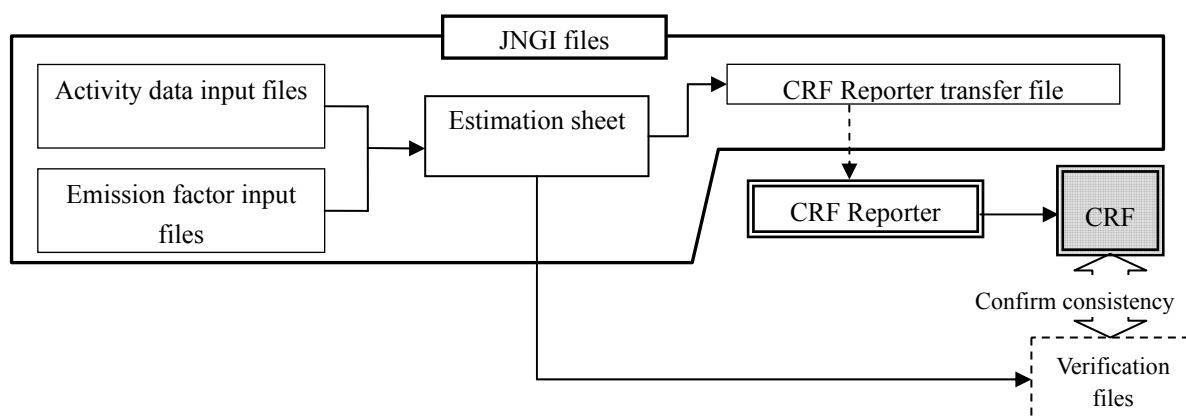


Figure 2-7 Link structure of estimation files, CRF Reporter, CRF, and verification files

- Key Category Analysis

In Japan, GIO performs key category analyses every year, and results are shown in NIR submitted every year to the UNFCCC secretariat (the results are found in “1.5 Brief Description of Key Categories” and “Annex 1: Key categories”).

Because the finalization of analysis results comes after that of emissions and removals, note that in actuality, key category analysis is also conducted after Step 5. If emission sources for which the Tier 1 calculation method is used are put among the key categories as a result of key category analysis performed after Step 5, the procedure calls for examining the estimation method for those emission sources when coming around to Step 1 again.

- Uncertainty Assessment

In Japan, GIO performs an uncertainty assessment every year using the method shown in *GPG (2000)* (Tier 1). The assessment method and results are shown in the NIR submitted to the UNFCCC secretariat every year (the assessment method is in “Annex 7 Uncertainty Assessment Method” and the results are in “1.7 : General Uncertainty Evaluation, including Data on the Overall Uncertainty for the Inventory Totals” and “Annex 7 Uncertainty Assessment Method”).

Because finalization of assessment results comes after that of emission and removals, note that in actuality, uncertainty assessment also occurs after Step 5.

2.6.2.5. Check the accuracy of Draft CRF (Step 5)

• Overview

As a QC activity, after completion of Step 4, CRF electronic files (estimation files, CRF link files, CRF files) and the in-country documents that give calculated values for CRF emissions/removals are sent to the relevant government agencies to have them check the content. When data are secret, they are sent for checking only to the government agencies which submitted them.

• Main Processes

Implementation process		Description	Implementing agency
1	Send JNGI first draft	<ul style="list-style-type: none"> Submitting JNGI first draft file to MOE and other involved agencies. 	MOE, GIO, subcontractors
2	Involved government agencies confirm JNGI first draft	<ul style="list-style-type: none"> Checking of JNGI first draft by involved agencies and if necessary sending correction requests to MOE. 	MOE, other relevant government agencies
3	Prepare JNGI second draft	<ul style="list-style-type: none"> Making appropriate responses to correction requests from other agencies; preparing JNGI second draft file. 	GIO, subcontractors
QC activities		<ul style="list-style-type: none"> Making sure provided data are correctly entered Making sure emissions are correctly estimated Making sure parameters and emission factors are correctly used Checking completeness of database file Making sure that consistent data are used in multiple emission source categories Making sure data are correctly linked Estimating uncertainty and checking it Making sure citations are properly shown Checking completeness. 	MOE, other relevant government agencies
		<ul style="list-style-type: none"> Managing processes Filing related documents 	MOE, GIO

2.6.2.6. Compilation of Draft NIR (Step 6)

• Overview

Japan has prepared an NIR every year since 2003. Since 2004, the structure set forth in Annex I of the UNFCCC reporting guidelines on the annual inventories (FCCC/SBSTA/2004/8) has been followed.

There are two stages of NIR preparation: (1) deciding the preparation policy and (2) writing the NIR. Specifically, in (1), the Ministry of the Environment and GIO decide on corrections to the text and additional documents after performing Step 1. In (2), because the report structure is the same every year, GIO starts with the previous year's NIR and prepares the new report by updating it with the latest data and making textual changes and additions.

• **Main Processes**

Implementation process		Description	Implementing agency
1	Determine NIR structure	<ul style="list-style-type: none"> Determining NIR structure in response to factors including results of inventory improvement discussions. 	MOE, GIO
2	Update NIR	<ul style="list-style-type: none"> Writing explanatory text for estimation methods. Updating information on trends, key category analyses, uncertainty assessment, etc. 	MOE, GIO
QC activities		<ul style="list-style-type: none"> Managing processes Filing related documents 	GIO

2.6.2.7. Check the accuracy of Draft NIR (Step 7)

• **Overview**

As a QC activity, after completion of Step 6 the computer NIR files are sent to the relevant government agencies to have them confirm and correct the text.

• **Main Processes**

Implementation process		Description	Implementing agency
1	Send NIR first draft	<ul style="list-style-type: none"> Submitting NIR first draft file to MOE and other involved agencies. 	MOE, GIO
2	Involved government agencies confirm NIR first draft	<ul style="list-style-type: none"> Checking of NIR first draft by involved agencies and if necessary sending correction requests to MOE 	MOE, other relevant government agencies
3	Prepare NIR second draft	<ul style="list-style-type: none"> Making appropriate response to correction requests from other agencies; preparing NIR second draft file. 	GIO
QC activities		<ul style="list-style-type: none"> Confirming accuracy of text. 	MOE, other relevant government agencies
		<ul style="list-style-type: none"> Managing processes Filing related documents 	GIO

2.6.2.8. Submitting and Releasing the Inventory (Step 8)

• **Overview**

Upon completion of the CRF and NIR, the inventory is submitted to the UNFCCC secretariat, and the electronic files (CRF files, estimation files, and NIR files, excluding secret data) are posted on the GIO website (<http://www-gio.nies.go.jp/index-j.html>).

• **Main Processes**

Implementation process		Description	Implementing agency
1	Prepare documents for public release	<ul style="list-style-type: none"> Preparing documents and Excel files showing emissions 	MOE, GIO, subcontractors
2	Submit inventory to convention secretariat	<ul style="list-style-type: none"> Submitting inventory to convention secretariat 	MOE, MOFA, GIO
3	Release inventory	<ul style="list-style-type: none"> Releasing estimates of GHG emissions and removals for most recent year. Releasing NIR 	MOE, GIO

2.6.2.9. Factor Analysis (Step 9)

GIO analyzes the factor of greenhouse gas emission changes for each sector (factor analysis), and prepares documents (factor analysis documents) on the results. These documents are posted on the Ministry of the Environment's website along with information on emission and removals.

Table 2-5 Factors used in Factor Analysis

Sector	Cause	Explanation
Industry	CO ₂ emission intensity	Expressed as CO ₂ emissions per unit energy consumed. An indicator of energy conservation measures in the energy conversion sector, such as power production, emission factor improvement in fuel conversion, etc.
	Energy consumption intensity	Expressed as energy consumed per production index. An indicator of the extent to which energy-saving equipment has been installed in factories.
	Industrial structure	Expressed as production mix of manufacturing industries. It indicates changes in the industrial structure.
	Production index	Indicates changes in activity amount of industrial sector.
	Other	Includes correction for overlap between manufacturing and non-manufacturing industries.
Transport (passengers, freight)	CO ₂ emission intensity	Expressed as CO ₂ emissions per unit energy consumed. An indicator of energy conservation measures in the energy conversion sector, such as power production, etc.
	Energy consumption intensity	Expressed as energy consumed per amount of transport. Indicates improvements in fuel economy, transport efficiency, etc.
	Modal share	Expressed as the proportions of transport means in the passenger and freight sectors. Indicates changes in energy consumption structure such as modal shifts.
	Total passenger and freight transport amount	Indicates changes in activity amount of the transport sector.
Service, etc.	CO ₂ emission intensity	Expressed as CO ₂ emissions per unit energy consumed. An indicator of energy conservation measures in the energy conversion sector, such as power production, emission factor improvement in fuel conversion, etc.
	Energy consumption intensity	Expressed as energy consumption per unit commercial floor space. Indicates efficiency improvements in energy-consuming equipment, energy-saving activities by business, etc.
	Commercial floor space	Indicates changes in activity amount of services, etc.
Residential	CO ₂ emission intensity	Expressed as CO ₂ emissions per unit energy consumed. An indicator of energy conservation measures in the energy conversion sector, such as power production, etc.
	Energy consumption intensity	Expressed as energy consumption per number of households. Indicates efficiency improvements in energy-consuming appliances, energy-saving activities by citizens, etc.
	Number of households	Indicates changes in activity amount of residential sector.
	Winter climate	Indicates changes in kerosene consumption due to winter climate change.

2.6.2.10. Documentation, Archiving and Reporting

• **Overview**

Japan documents the information needed to prepare its inventory, and as a rule keeps the documents in the GIO. Information considered especially important is released by appending it to the NIR. The following documents are archived.

- Inventory correction lists (electronic files)
- Committee documents and minutes (electronic files and hard copies)
- Commercially available government statistics (hard copies)
- Data input files used when collecting data (electronic files)
- Verification files (electronic files)
- Requested corrections to CRT and NIR drafts (electronic files, emails, etc.)

• **Main Processes**

Implementation process		Description	Implementing agency
1	Send related documents	<ul style="list-style-type: none"> • Mailing by post to GIO the related documents that subcontractors have provisionally held 	Subcontractors
2	File related documents	<ul style="list-style-type: none"> • Filing in prescribed folders 	GIO

2.6.3. Review Response

Respond appropriately each time reviews are conducted. GIO holds documents on the state of responses.

2.7. The Official Study and Approval Process for the Greenhouse Gas Emissions and Removals Inventory

As noted above, study of the preparation of the greenhouse gas emissions and removals inventory is being advanced through sharing of information among related ministries and agencies. In the case that changes in the estimate are made, study is carried out in the Committee for the Greenhouse Gas Emissions Estimation Methods.

The prepared greenhouse gas emissions and removals inventory, including the sheets containing the estimate, are circulated among the related ministries and after they have all confirmed and approved the inventory, the figures for emissions and removals are determined to be official values. The above process is Japan's official study and approval process, and when necessary, a report is also made to the Global Warming Prevention Headquarters.

Appendix 1

Table 2-6 Implementing of Tier.1 QC procedure

QC activity*	Procedure*	Inventory development step												
		1	2	3	4	5	6	7	8	9	10			
1	Check that assumptions and criteria for the selection of activity data and emission factors are documented.				*	*	*	*						
2	Check for transcription errors in data input and reference				*	*	*	*						
					*	*	*	*						
3	Check that emissions are calculated correctly.				*									
					*									
4	Check that parameter and emission units are correctly recorded and that appropriate conversion factors are used.				*	*								
					*	*								
					*	*								
					*	*								
5	Check the integrity of database files.				*	*								
					*	*								
					*	*								
							*	*				*		
6	Check for consistency in data between source categories.				*	*								
7	Check that the movement of inventory data among processing steps is correct.				*	*								
					*	*								
8	Check that uncertainties in emissions and removals are estimated or calculated correctly.	*												
					*	*	*	*						
			*											

Table 2-6 Implementing of Tier.1 QC procedure (cont.)

QC activity*		Procedure*	Inventory development step											
			1	2	3	4	5	6	7	8	9	10		
9	Undertake review of internal documentation.	Check that there is detailed internal documentation to support the estimates and enable duplication of the emission and uncertainty estimates.	*											*
		Check that inventory data, supporting data, and inventory records are archived and stored to facilitate detailed review.												*
		Check integrity of any data archiving arrangements of outside organizations involved in inventory preparation.												*
10	Check methodological and data changes resulting in recalculations.	Check for temporal consistency in time series input data for each source category.				*	*							
		Check for consistency in the algorithm/method used for calculations throughout the time series.	*	*		*	*							
11	Undertake completeness checks.	Confirm that estimates are reported for all source categories and for all years from the appropriate base year to the period of the current inventory.			*	*								
		Check that known data gaps that result in incomplete source category emissions estimates are documented.					*	*						*
12	Compare estimates to previous estimates.	For each source category, current inventory estimates should be compared to previous estimates. If there are significant changes or departures from expected trends, recheck estimates and explain any difference.	*	*	*	*								
13	Documentation and archiving	Document and archive all information required to produce the national emissions inventory estimates.	*	*	*	*	*	*	*	*	*	*	*	*

* GPG (2000)

Appendix 2: Requirements of National System Guidelines and Corresponding Chapters in the Japan's Report on Assigned Amount, Part-2

Requirements indicated in the national system guidelines and Annex under Article 5.1 of the Kyoto Protocol (Decision 19/CMP.1 Annex) and corresponding chapters in the Japan's Report on Assigned Amount, Part-2 are listed below in Table 2-7.

Table 2-7 Requirements of national system guidelines and corresponding chapters in the Japan's Report on Assigned Amount, Part-2

para	Requirements Description	Corresponding Chapters ¹⁾
10(a)	Establish and maintain the institutional, legal and procedural arrangements necessary to perform the functions defined in these guidelines for national systems, as appropriate, between the government agencies and other entities responsible for the performance of all functions defined in these guidelines;	2.2.1
10(b)	Ensure sufficient capacity for timely performance of the functions defined in these guidelines for national systems, including data collection for estimating anthropogenic GHG emissions by sources and removals by sinks and arrangements for technical competence of the staff involved in the inventory development process;	Throughout the chapters
10(c)	Designate a single national entity with overall responsibility for the national inventory;	2.1
10(d)	Prepare national annual inventories and supplementary information in a timely manner in accordance with Article 5 and Article 7, paragraphs 1 and 2, and relevant decisions of the COP and/or COP/MOP;	Throughout the chapters
10(e)	Provide information necessary to meet the reporting requirements defined in the guidelines under Article 7 in accordance with the relevant decisions of the COP and/or COP/MOP.	Throughout the chapters
12(a)	Designate a single national entity with overall responsibility for the national inventory;	2.1
12(b)	Make available the postal and electronic addresses of the national entity responsible for the inventory;	2.1
12(c)	Define and allocate specific responsibilities in the inventory development process, including those relating to choice of methods, data collection, particularly activity data and emission factors from statistical services and other entities, processing and archiving, and QC and QA. This definition shall specify the roles of, and cooperation between, government agencies and other entities involved in the preparation of the inventory, as well as the institutional, legal and procedural arrangements made to prepare the inventory;	2.6.1.1, 2.2 2.3
12(d)	Elaborate an inventory QA/QC plan which describes specific QC procedures to be implemented during the inventory development process, facilitate the overall QA procedures to be conducted, to the extent possible, on the entire inventory and establish quality objectives;	2.6
12(e)	Establish processes for the official consideration and approval of the inventory, including any recalculations, prior to its submission and to respond to any issues raised by the inventory review process under Article 8.	2.7
13	As part of its inventory planning, each Party included in Annex I should consider ways to improve the quality of activity data, emission factors, methods and other relevant technical elements of inventories. Information obtained from the implementation of the QA/QC programme, the review process under Article 8 and other reviews should be considered in the development and/or revision of the QA/QC plan and the quality objectives.	2.2.2, 2.3.3
14(a)	Identify key source categories following the methods described in the IPCC good practice guidance (chapter 7, section 7.2);	2.4
14(b)	Prepare estimates in accordance with the methods described in the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, as elaborated by the IPCC good practice guidance, and ensure that appropriate methods are used to estimate emissions from key source categories;	2.6.2
14(c)	Collect sufficient activity data, process information and emission factors as are necessary to support the methods selected for estimating anthropogenic GHG emissions by sources and removals by sinks;	2.3.1, 2.3.2, 2.2.1

Table 2-7 Requirements of national system guidelines and corresponding chapters in the Japan's Report on Assigned Amount, Part-2 (cont.)

para	Requirements Description	Corresponding Chapters ¹⁾
14(d)	Make a quantitative estimate of inventory uncertainty for each source category and for the inventory in total, following the IPCC good practice guidance;	2.6.2.4, 2.4
14(e)	Ensure that any recalculations of previously submitted estimates of anthropogenic GHG emissions by sources and removals by sinks are prepared in accordance with the IPCC good practice guidance and relevant decisions of the COP and/or COP/MOP;	2.5
14(f)	Compile the national inventory in accordance with Article 7, paragraph 1, and relevant decisions of the COP and/or COP/MOP;	Throughout the chapters
14(g)	Implement general inventory QC procedures (tier 1) in accordance with its QA/QC plan following the IPCC good practice guidance.	2.6
15(a)	Apply source-category-specific QC procedures (tier 2) for key source categories and for those individual source categories in which significant methodological and/or data revisions have occurred, in accordance with the IPCC good practice guidance;	2.6
15(b)	Provide for a basic review of the inventory by personnel that have not been involved in the inventory development, preferably an independent third party, before the submission of the inventory, in accordance with the planned QA procedures referred to in paragraph 12 (d) above;	2.6.1.1, 2.6.2.2
15(c)	Provide for a more extensive review of the inventory for key source categories, as well as source categories where significant changes in methods or data have been made;	2.6
15(d)	Based on the reviews described in paragraph 15 (b) and (c) above and periodic internal evaluations of the inventory preparation process, re-evaluate the inventory planning process in order to meet the established quality objectives referred to in paragraph 12 (d).	2.6.3
16(a)	Archive inventory information for each year in accordance with relevant decisions of the COP and/or COP/MOP. This information shall include all disaggregated emission factors, activity data, and documentation about how these factors and data have been generated and aggregated for the preparation of the inventory. This information shall also include internal documentation on QA/QC procedures, external and internal reviews, documentation on annual key sources and key source identification and planned inventory improvements;	2.6.2.10
16(b)	Provide review teams under Article 8 with access to all archived information used by the Party to prepare the inventory, in accordance with relevant decisions of the COP and/or COP/MOP;	2.6.2.11
16(c)	Respond to requests for clarifying inventory information resulting from the different stages of the review process of the inventory information, and information on the national system, in a timely manner in accordance with Article 8.	2.6.2.11
17	As part of its inventory management, each Party included in Annex I should make the archived information accessible by collecting and gathering it at a single location.	2.6.2.10

1) Numbers indicate corresponding chapters in the Japan's Report on Assigned Amount, Part-2.

IV. National Registry in accordance with Decision 13/CMP.1 Annex paragraph 8 (f)

A Description of Japan's national registry reported in accordance with the guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol (Table 2-8)

Table 2-8. Description of Japan's national registry

Decision	para	Report items	Content
Decision 15/CMP.1 ANNEX I, Section G	22	Information on any changes that have occurred in its national registry, compared with information reported in its last submission, including information submitted in accordance with paragraph 32 of these guidelines.	No changes after reported in the fourth national communications.
Decision 15/CMP.1 ANNEX II, Section E	11	(a) The name and contact information of the registry administrator designated by the Party to maintain the national registry	<p>[Name]</p> <ul style="list-style-type: none"> Mr. Toshihiro Nikai, Minister of Economy, Trade and Industry Ms. Yuriko Koike, Minister of the Environment <p>[Contact information]</p> <ul style="list-style-type: none"> Mr. Makoto Saito, Global Environment Affairs Office Environmental Policy Division, Industrial Science and Technology Policy and Environment Bureau, Ministry of Economy, Trade and Industry, Japan (TEL: +81-3-3501-1679, E-mail: kyomecha-tourokubo@meti.go.jp) Mr. Taiyo Hatanaka, Climate Change Policy Division, Global Environment Bureau, Ministry of the Environment, Japan (TEL: +81-3-5521-8354, E-mail: kyomecha-registry@env.go.jp)
		(b) The names of other Parties with which the Party cooperates by maintaining their national registries in a consolidated system	Japan does not cooperate with any other countries in the registry.

Decision	para	Report items	Content
		(c) Description of the database structure and capacity of the national registry	<p>[Database structure] The database incorporates ID definition table and registered user/administrator information table besides the table described in the Chapter 7 of Data Exchange Standards for Registry Systems Under the Kyoto Protocol - Technical Specifications (Version 1.0).</p> <p>[Capacity] The database possesses sufficient data capacity based on assumed workload, with expandable disk structure.</p>
		(d) A description of how the national registry conforms to the technical standards for data exchange between registry systems for the purpose of ensuring the accurate, transparent and efficient exchange of data between national registries, the clean development mechanism registry and the transaction log	<p>The government of Japan has developed a pseudo transaction log based on the Data Exchange Standards for Registry Systems Under the Kyoto Protocol - Technical Specifications (Version 1.0), and implemented the simulation test case described in the Chapter 9 Registry Initialisation Specifications of Data Exchange Standards for Registry Systems Under the Kyoto Protocol - Technical Specifications (Version 1.0). All the tests in the Registry Initialisation Specifications have been completed successfully.</p>

Decision	para	Report items	Content
		(e) A description of the procedures employed in the national registry to minimize discrepancies in the issuance, transfer, acquisition, cancellation and retirement of ERUs, CERs, tCERs, ICERs, AAUs and/or RMUs, and replacement of tCERS and ICERs, and of the steps taken to terminate transactions where a discrepancy is notified and to correct problems in the event of a failure to terminate the transactions	<p>[Means to minimize discrepancies] The registry will check items as typified below:</p> <ol style="list-style-type: none"> (1) Data type validity, especially for data which are input manually (e.g., account numbers, comprising identical numerical values and alpha-numerals) (2) Other data validity: for example, some types of the Kyoto units must be checked against specific elements as required by relevant COP/MOP decisions (e.g. whether an expiration date is set in tCERs/ICERs). (3) Transaction status validity: for example, the transaction status specified in the incoming message must be valid. (e.g., In issuing units, "checked (discrepancy)" message or "checked (no discrepancy)" message will be received only after "proposed" message is sent within the same transaction unit.) <p>[Forced termination when notified of discrepancy] Transaction will be terminated automatically when notified of discrepancy.</p> <p>[Procedures in case of failure to terminate upon discrepancy notification] All the records of failed transactions are logged. When the registry is officially in operation, the registry administrator should periodically check the log and solve the problem.</p>
		(f) An overview of security measures employed in the national registry to prevent unauthorized manipulations and to prevent operator error and of how these measures are kept up to date	<ul style="list-style-type: none"> • The SSL (Secure Socket Layer) coding and VPN (Virtual Private Network) communication are adopted based on the Data Exchange Standards for Registry Systems under the Kyoto Protocol - Technical Specifications (Version 1.0).

Decision	para	Report items	Content
			<ul style="list-style-type: none"> • The access of registry administrator is limited by the use of dedicated line connection, and only restricted number of users authenticated by fingerprint can operate the terminal. • The information security of the current national registry was audited by a third party that acquired a BS7799/ISMS certification, the security management of international standard. • The registry system is established at an internet data centre under a 24 hour surveillance system. • All PCs and servers have been installed with virus detection software, and virus pattern files are automatically updated periodically.
		(g) A list of the information publicly accessible by means of the user interface to the national registry	<ul style="list-style-type: none"> • Account information as required by para 45, ANNEX, Decision 13/CMP.1. • Article 6 project information as required by para 46, ANNEX, Decision 13/CMP.1. • Kyoto units information as required by para 47, ANNEX, Decision 13/CMP.1. • Legal entities as required by para 48, ANNEX, Decision 13/CMP.1.
		(h) The Internet address of the interface to its national registry	< http://www.registry.go.jp/ >

Decision	para	Report items	Content
		(i) A description of measures taken to safeguard, maintain and recover data in order to ensure the integrity of data storage and the recovery of registry services in the event of a disaster	<p>[Safeguarding data] The national registry is established at an internet data centre which has the following characteristics:</p> <ul style="list-style-type: none"> • The building structure, in which the internet data centre is established, is excellent in anti-seismic performance; • the centre is equipped with emergent captive power facilities that the registry can continue to be operated more than 24 hours without power supply from the grid in case of power failures; and • the centre is fire resistant and secures a gas fire-extinguishing system. <p>[Maintaining data] Data are backed up once a day and all data are replicated on separate disks simultaneously at any time.</p> <p>[Recovering data] The registry has undergone the desk-reviewing of the recovering system, including procedures that are prepared for software and hardware failure, which resulted in no problems identified.</p>
		(j) The results of any test procedures that might be available or developed with the aim of testing the performance, procedures and security measures of the national registry undertaken pursuant to the provisions of Decision 19/CP.7 relating to the technical standards for data exchange between registry systems.	Initialisation test for the national registry will be conducted once the initial report is submitted to the UNFCCC Secretariat.

