Affiliated Offices and Activities

Preparation of Japan's National Greenhouse Gas Inventory and Emissions Trend

Objectives

In order to effectively promote prevention of global warming, the United Nations Framework Convention on Climate Change (UNFCCC) requires every country to prepare and submit a Greenhouse Gas Inventory, indicating greenhouse gas (GHG) emissions and removals from anthropogenic activities.

The Kyoto Protocol set mandatory GHG emissions reduction targets for developed countries and Eastern European countries including Russia (Annex I countries). At present, it is the first commitment period of the Kyoto Protocol (2008–2012), during which Japan must reduce its emissions by, on average, 6% from the base year (which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6 emissions).

Outline

1. Preparation and submission of the GHG Inventory to the UNFCCC

GIO collects activity data such as fuel consumption, emission factors and other related data from national statistics and related ministries and agencies, and compiles a GHG Inventory together with private consultant companies (**Figure 1**).

This inventory is then submitted through the Ministry of the Environment and the Japanese Government to the UNFCCC in Bonn, Germany, where it is reviewed by the UNFCCC Secretariat and expert review team. GIO responds also to questions with regard to Japan's national inventory arising during the review process.

2. Trend in GHG emissions indicated by the Japanese GHG Inventory

The total emission change from 1990 to 2010 of the 6 greenhouse gases which are the target for emission reduction according to the Kyoto Protocol is shown in **Figure 2**. The total emission in fiscal year 2010 was 1,258 Mt, which was a 0.3% decrease compared with the base year. Looking at the GHGs separately, CO_2 emissions have increased, but CH_4, N_2O, HFs, PFCs and SF_6 emissions have decreased. The increase in CO_2 emissions in 2010 compared to the preceding fiscal year is thought to be the result of the growing production mainly in the manufacturing sector due to the economic recovery after the recession in FY 2008, and the increased electric power consumption due to the extreme heat in summer and severe cold in winter that year.

As to sector specific CO_2 emissions, the commercial, residential and transportation sectors show an increase from the base year (**Figure 3**). In the commercial sector, the increase in emissions can be attributed to the increase in office floor area, and as a consequence, the growing use of air conditioning, lighting, and electricity consumption by office appliances, while in the residential sector, it is thought to be due to the increase in power consumption and the increase of the number of households. With regard to the transportation sector, GHG emissions from cars had increased until 2001, but this trend seems to have taken a turn and GHG emissions since then are decreasing. The annual variation of GHG emissions is also influenced by the operation rate of nuclear power plants, hot or cold summers/winters and economic conditions.

In 2007, Japan's total GHG emission in the base year was determined to be 1,261 Mt (CO2 equivalent), and the assigned amount (quota) to be achieved after the 6% emissions reduction per one year was determined to be 1,186 Mt.

In order to meet the requirements under the UNFCCC and the Kyoto Protocol, the Greenhouse Gas Inventory Office of the Center for Global Environmental Research (CGER/GIO) prepares Japan's National Greenhouse Gas Inventory, and conducts research to further improve the accuracy of the GHG Inventory.

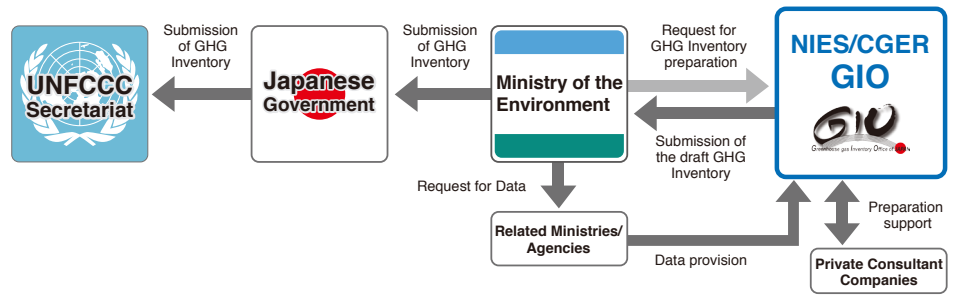

Figure 1. Japan's institutional arrangement for the national inventory preparation

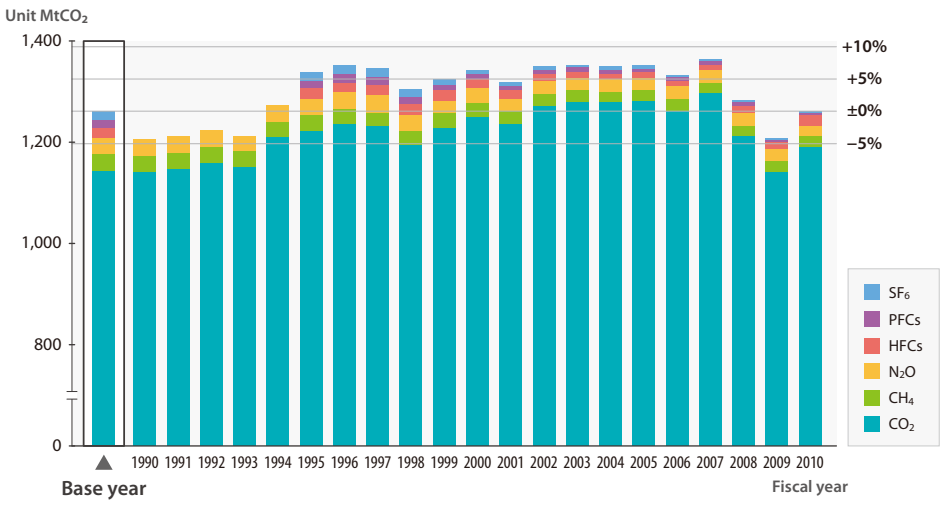

Figure 2. Total GHG emissions trend

- The amount of total emission is calculated by multiplying the emission of each GHG by the global warming potential.
- The figure of base year under the Kyoto Protocol is the figure indicated in "Report on Japan's Assigned Amount", which is emissions of CO_2, CH_4 and N_2O in 1990 and emissions of HFCs, PFCs and SF_6 in 1995. HFCs, PFCs and SF_6 emissions between 1990 and 1994 are not included. Under the Kyoto Protocol, Japan is required to reduce emissions by 6% from the base year emissions, including emission trading and removals by forest carbon sink.

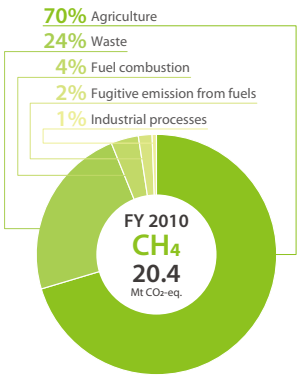

Figure 4. Breakdown of CH_4 emissions

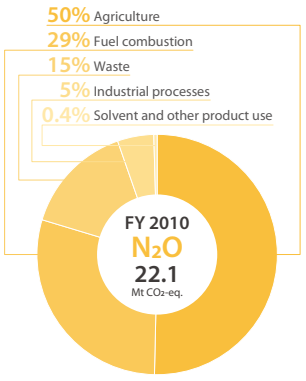

Figure 5. Breakdown of N_2O emissions

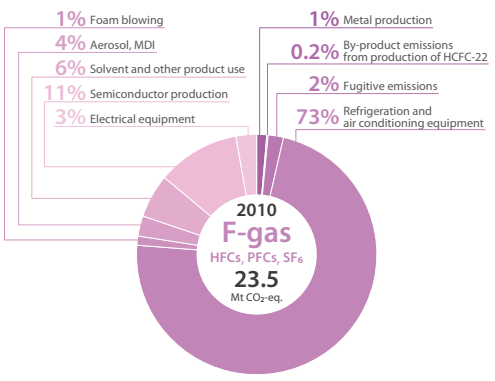

Figure 6. Breakdown of HFCs, PFCs and SF_6 emissions

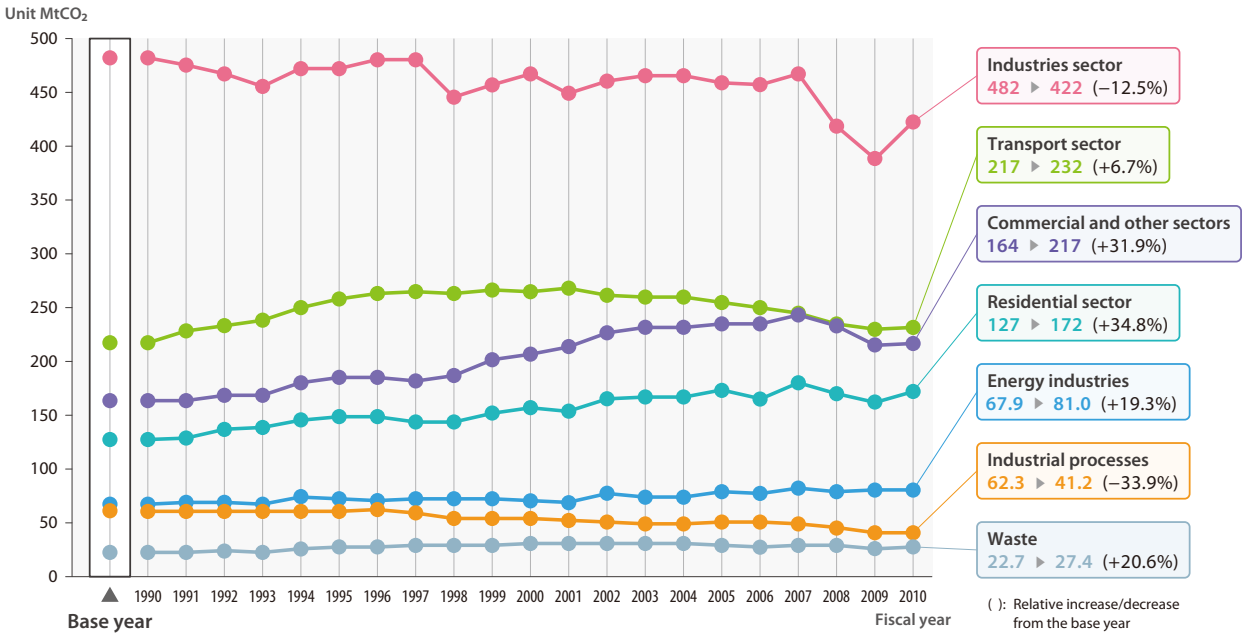

Figure 3. Sector specific trends in CO_2 emissions (Indirect emissions)
Indirect emissions: emissions from power and steam generation are allocated to the sector in which the final demand occurs

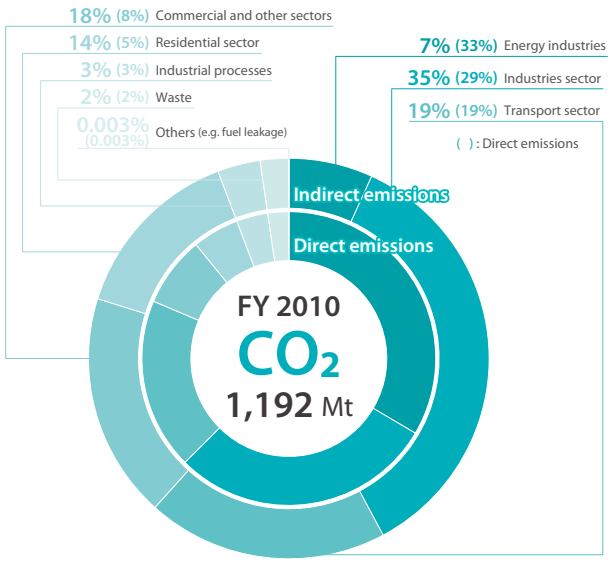

Figure 7. Breakdown of CO_2 emissions

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