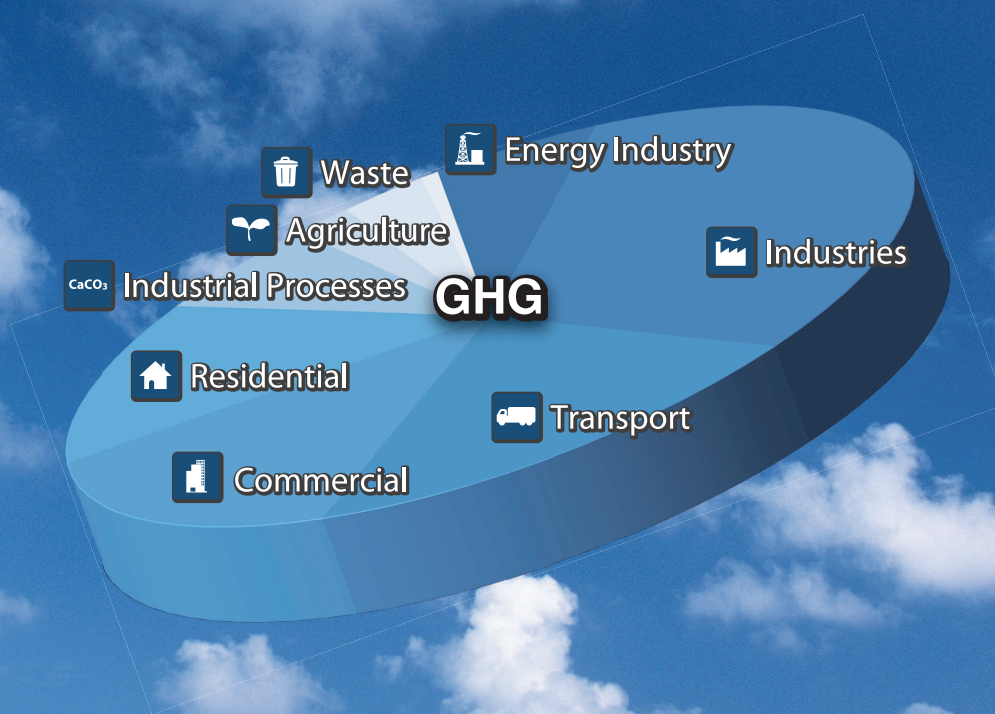


GIU

Greenhouse gas Inventory Office of JAPAN

Greenhouse Gas Inventory Office of Japan

温室効果ガスインベントリオフィス



Objective of Establishing GIO

The Greenhouse Gas Inventory Office of Japan (GIO) was established in July 2002 at the Center for Global Environmental Research (CGER), the National Institute for Environmental Studies (NIES) for the purpose of compiling annual greenhouse gas (GHG) inventories, to conduct related research, and to execute related tasks such as international correspondence.

Main tasks of GIO

- [Domestic activities] - Preparing annual national GHG inventory
- [Domestic activities] - Providing support and assistance for the technical review of the national GHG inventory of Japan
- [Domestic activities] - Providing support and assistance for inventory related political actions such as the Committee for the GHG Emissions Estimation Methods
- [International activities] - Convening the Workshop on GHG Inventories in Asia (WGIA)
- [International activities] - Contributing to the technical review of national GHG inventories of other Parties as reviewers for the UNFCCC.

What is a GHG Inventory?

An emission inventory is an accounting of the amount of emissions of specific substances (such as air polluting substances and harmful chemicals) during a certain period of time. A GHG inventory is such an emission inventory. It reports the amount of emissions and removals of GHGs that cause global warming such as carbon dioxide (CO₂), by sources and sinks.

In GHG inventories, the emissions of each gas are calculated for each sector and source category (see Table 1), based on statistics rather than actual measurement data, as shown in Figure 2. These estimates are summarized in a Common Reporting Format (CRF), which, together with emission estimates and estimation methods documented in the National Greenhouse Gas Inventory Report (NIR), will become the official national GHG inventory.

Under the UNFCCC, an international environmental treaty to address global warming issues, developed countries and Eastern European countries including Russia (Annex I parties) are required to submit annual national GHG inventories to the UNFCCC Secretariat. Some countries are also starting to report under the "Paris Agreement" adopted in 2015.

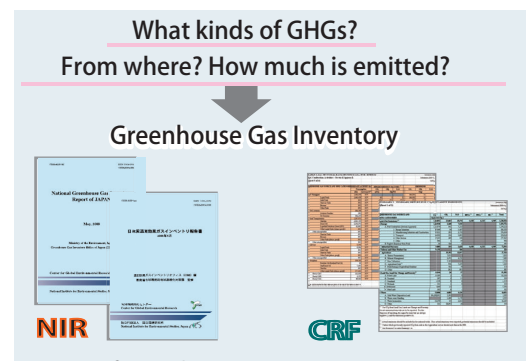


Fig. 1 Image of Greenhouse Gas Inventory

Table 1 Main GHG emission sources/ removal sinks

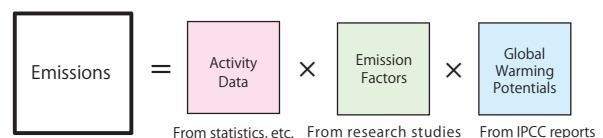
GHGs Sector	Carbon dioxide (CO ₂)	Methane (CH ₄)	Nitrous oxide (N ₂ O)	F-gases *3
Energy	Fuel combustion	Fugitive emissions from fuel, Fuel combustion	Fuel combustion, Fugitive emissions from fuel	
IPPU*1	Cement production, Lime production	Chemical industry, Metal industry	Chemical industry, Semiconductor/ Liquid crystal manufacturing	Refrigeration, Air conditioning equipment, Foam blowing, Semiconductor/ Liquid crystal manufacturing, Solvents
Agriculture	Liming, Urea application	Rice cultivation (paddy fields), Enteric fermentation of livestock, Manure management	Agricultural soils, Manure management	
LULUCF*2	Removals by biomass growth in forests	Emissions from organic soils	Emissions from N mineralization associated with loss of soil organic matter	
Waste	Waste incineration	Solid waste disposal, Wastewater treatment, Composting, Waste incineration	Wastewater treatment, Waste incineration, Composting	

*1: Industrial processes and product use

*2: Land use, land-use change and forestry

*3: Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulfur hexafluoride (SF₆), Nitrogen trifluoride (NF₃)

Fig. 2 General estimation method



The emissions of each GHG are converted to CO₂ equivalent by multiplying the emissions of each gas by their respective global warming potential values (GWP values). GWP values are the degree to which each GHG contributes to global warming expressed, as a ratio to the global warming effect of CO₂.

Institutional arrangement for the GHG Inventory preparation

GIO develops the national GHG inventory in cooperation with private consultant companies under a contract with the Ministry of the Environment (Figure 3). Before compiling the inventory, GIO collects data from relevant ministries, agencies and organizations to estimate emissions and removals. Based on these data together with other data from statistical publications, GIO then compiles the GHG inventory.

This compiled inventory is annually submitted to the UNFCCC Secretariat from the Ministry of the Environment. This inventory serves as the official data reported internationally.

"Japan's National GHG Emissions in Fiscal Year 2021" shown below is the output of GIO's GHG inventory compilation work.

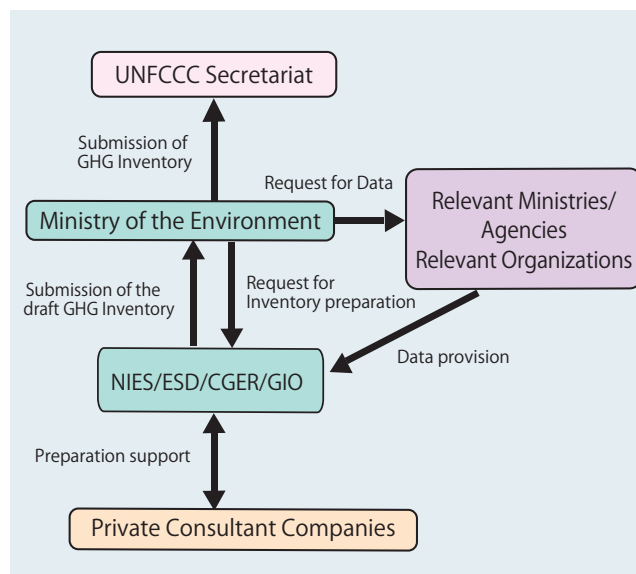


Fig. 3 Japan's institutional arrangement for the national GHG inventory preparation

Japan's National Greenhouse Gas Emissions in Fiscal Year 2021

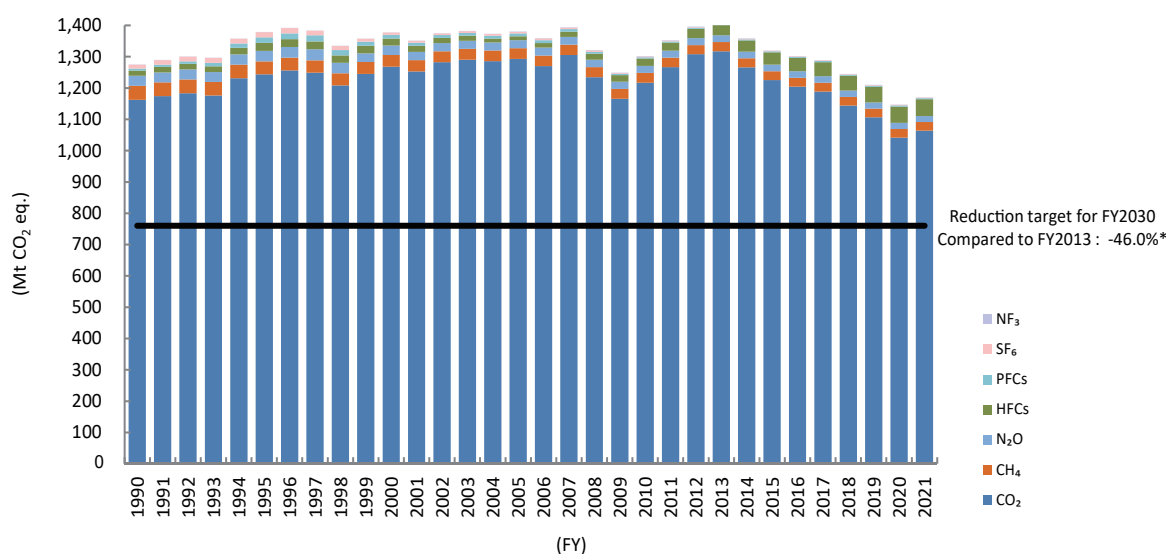
Japan's GHG emissions and removals in fiscal year* (FY) 2021 were 1,122 million tonnes of carbon dioxide equivalents (Mt CO₂ eq.) . (Emissions: 1,170 Mt CO₂ eq. (Figure 4), Removals: 47.6 Mt CO₂ eq.)

The emissions increased by 2.0% (23.2 Mt CO₂ eq.) compared to FY2020. The main factor for the increase is the increased energy consumption due to the economic recovery from the COVID-19 pandemic.

The emissions decreased by 16.9% (237.7 Mt CO₂ eq.) compared to the FY2013. The two main factors for the decrease are the reduced energy consumption (due to improved energy conservation, etc.) and the decrease in CO₂ emissions from electricity production due to the wider use of low-carbon electricity (wider adoption of renewable energy and resumption of nuclear power plant operations).

In contrast, the emissions of hydrofluorocarbons (HFCs) that substitute for ozone-depleting substances as refrigerants are increasing every year.

*Japan's fiscal year runs from April 1 to March 31.



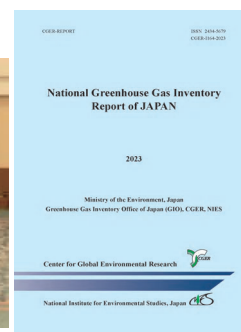
*Reference :The Plan for Global Warming Countermeasures (Cabinet approved on October 22, 2021)

Fig. 4 Trends in GHG Emissions (FY1990-2021)

International Cooperation and Supporting Activities of GIO (WGIA)

Since 2003, the Ministry of the Environment of Japan and GIO have organized the Workshop on Greenhouse Gas Inventories in Asia (WGIA) to improve GHG inventories in Asia.

Left : WGIA20 (26-29 June 2023, in Tomakomai Japan)
 Right : The Report published as a CGER-REPORT



Activity History of GIO

July,	2002 - Establishment of Greenhouse Gas Inventory Office of Japan/ CGER/ NIES
August,	2002 - Submitted National Greenhouse Gas Inventories (Submitted every year since 2002)
November,	2003 - Convened First Workshop on GHG Inventories in Asia Region (WGIA1), Phuket, Thailand
February,	2005 - Convened Second Workshop on GHG Inventories in Asia Region (WGIA2), Shanghai, China
February,	2006 - Convened the 3rd Workshop on GHG Inventories in Asia Region (WGIA3), Manila, Philippines
August,	2006 - Submitted the Initial Report under Article 7.4 of the Kyoto Protocol to the UNFCCC Secretariat
February	2007 - Contributed to the In-country Review of the Initial Report under the Kyoto Protocol and 2006 Inventory Submission of Japan Organized by the UNFCCC secretariat
February,	2007 - Convened the 4th Workshop on GHG Inventories in Asia (WGIA4), Jakarta, Indonesia
September,	2007 - Convened the 5th Workshop on GHG Inventories in Asia (WGIA5), Kuala Lumpur, Malaysia
July,	2008 - Convened the 6th Workshop on GHG Inventories in Asia (WGIA6), Tsukuba, Japan (NIES)
July,	2008 - Convened the "Open Symposium on the Estimation of the Greenhouse Gas (GHG) Emissions - How to Estimate the Emissions in the Commitment Period" Tokyo, Japan
October,	2008 - Convened the Korea and Japan Joint Workshop on GHGs Management, Seoul, Republic of Korea
July,	2009 - Convened the 7th Workshop on GHG Inventories in Asia (WGIA7), Seoul, Korea
July,	2010 - Convened the 8th Workshop on GHG Inventories in Asia (WGIA8), Vientiane, Lao P.D.R.
November,	2010 - Convened the Korea and Japan GHG Inventory Meeting, Seoul, Korea
July,	2011 - Convened the 9th Workshop on GHG Inventories in Asia (WGIA9), Phnom Penh, Cambodia
July,	2012 - Convened the 10th Workshop on GHG Inventories in Asia (WGIA10), Hanoi, Vietnam
July,	2013 - Convened the 11th Workshop on GHG Inventories in Asia (WGIA11), Tsukuba, Japan
August,	2014 - Convened the 12th Workshop on GHG Inventories in Asia (WGIA12), Bangkok, Thailand
August,	2015 - Convened the 13th Workshop on GHG Inventories in Asia (WGIA13), Bali, Indonesia
July,	2016 - Convened the 14th Workshop on GHG Inventories in Asia (WGIA14), Ulaanbaatar, Mongolia
July,	2017 - Convened the 15th Workshop on GHG Inventories in Asia (WGIA15), Nay Pyi Taw, Myanmar
July,	2018 - Convened the 16th Workshop on GHG Inventories in Asia (WGIA16), New Delhi, India
July,	2019 - Convened the 17th Workshop on GHG Inventories in Asia (WGIA17), Singapore
July,	2020 - Convened the Mutual Learning on GHG Inventories in 2020, online
July,	2021 - Convened the 18th Workshop on GHG Inventories in Asia (WGIA18), online
July,	2022 - Convened the 19th Workshop on GHG Inventories in Asia (WGIA19), online
April,	2023 - Submitted National GHG Inventories (FY1990 to FY2021) to the UNFCCC Secretariat
June,	2023 - Convened the 20th Workshop on GHG Inventories in Asia (WGIA20), Tomakomai, Japan

Contact us • Website

Greenhouse Gas Inventory Office of JAPAN (GIO)
 Center for Global Environmental Research (CGER)
 Earth System Division (ESD)
 National Institute for Environmental Studies (NIES)

16-2 Onogawa Tsukuba, Ibaraki, 305-8506 JAPAN
 E-mail: www-gio@nies.go.jp
 Website: <https://www.nies.go.jp/gio/en/index.html>

