

 National Institute for Environmental Studies Earth System Division
Center for Global Environmental Research

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

- Preparing annual national GHG inventory
- activities] Providing support and assistance for the technical review of the national GHG inventory of Japan
 - Providing support and assistance for inventory related political actions such as the Committee for the GHG Emissions Estimation Methods

[International

- al Convening the Workshop on GHG Inventories in Asia (WGIA)
- activities] Contributing to the technical review of national GHG inventories of other Parties

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 greenhouse gas (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 category (see Table 1), based on statistics rather than actual measurement data, as shown in Figure 2. These estimates are summarized in the Common Reporting Tables (CRT), which, together with emission estimates and estimation methods documented in the National GHG Inventory Document (NID), will constitute the official national GHG inventory.

Under the Paris Agreement, all parties shall periodically compile and submit national GHG inventories to the United Nations (UN).



Fig. 1 Image of Greenhouse Gas Inventory

Table 1 Main GHG emission sources/ removel sinks

GHGs Sector	Carbon dioxide (CO ₂)	Methane (CH₄)	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 CO_2 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 CO_2 .



Institutional arrangement for the GHG Inventory preparation

GIO develops Japan's national GHG inventory in cooperation with private consultant companies under a contract with the Ministry of the Environment (Figure 3). Before compiling the GHG 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 GHG inventory is annually submitted to the UN from the Ministry of the Environment. This GHG inventory serves as the official data reported internationally.

"Japan's National GHG Emissions in Fiscal Year 2022" 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 2022

Japan's GHG emissions and removals in fiscal year* (FY) 2022 were 1,085 million tonnes of carbon dioxide equivalents (Mt CO_2 eq.) . (Emissions: 1,135 Mt CO_2 eq. (Figure 4), Removals: 50.2 Mt CO_2 eq.) The emissions decreased by 2.5% (28.6 Mt CO_2 eq.) compared to FY2021. The main factor for the decrease is the reduced energy consumption resulting from a decrease in electricity generation and iron and steel production. The emissions decreased by 19.3% (271.9 Mt CO_2 eq.) compared to FY2013. The two main factors for the decrease in electrose are the reduced energy consumption (due to improved energy conservation, etc.) and the decrease in

 CO_2 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).

Additionally, the emissions of hydrofluorocarbons (HFCs) that had been increasing every year since 2004 turned downward.



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



Fig. 4 Trends in GHG Emissions (FY1990-2022)



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 UN
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 UN
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 Invntory 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
June,	2023 - Convened the 20th Workshop on GHG Inventories in Asia (WGIA20), Tomakomai, Japan
April,	2024 - Submitted National GHG Inventories (FY1990 to FY2022) to the UN

Contact us • Website

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