

Preparation of Japan's National Greenhouse Gas Inventory and Trends in GHG Emissions

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 inventory is such an emission inventory. It reports the amount of emissions and removals of gases that cause global warming (greenhouse gases) such as carbon dioxide (CO₂), by sources and sinks.

For GHG inventories, the emissions for 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 1. 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.

Table 1: Main GHG emission sources /removals

GHG 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	
IPPU*1	Cement production, Lime production	Chemical industry	Chemical industry, Anaesthesia	Semi-conductor, refrigeration, air conditioning equipment, Solvents
Agriculture	Liming, Urea application	Enteric fermentation, Manure management, Rice cultivation (paddy fields)	Agricultural soils, Manure management	
LULUCF*2	Removals by forests	Biomass burning	Biomass burning	
Waste	Waste incineration	Solid waste disposal, Composting, Wastewater handling, Waste incineration	Wastewater handling, Composting, Waste incineration	

*1: Industrial processes and product use
*2: Land use, land-use change and forestry
*3: Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulfur hexafluoride (SF₆), Nitrogen fluoride (NF₃)



Figure 1: General calculation method

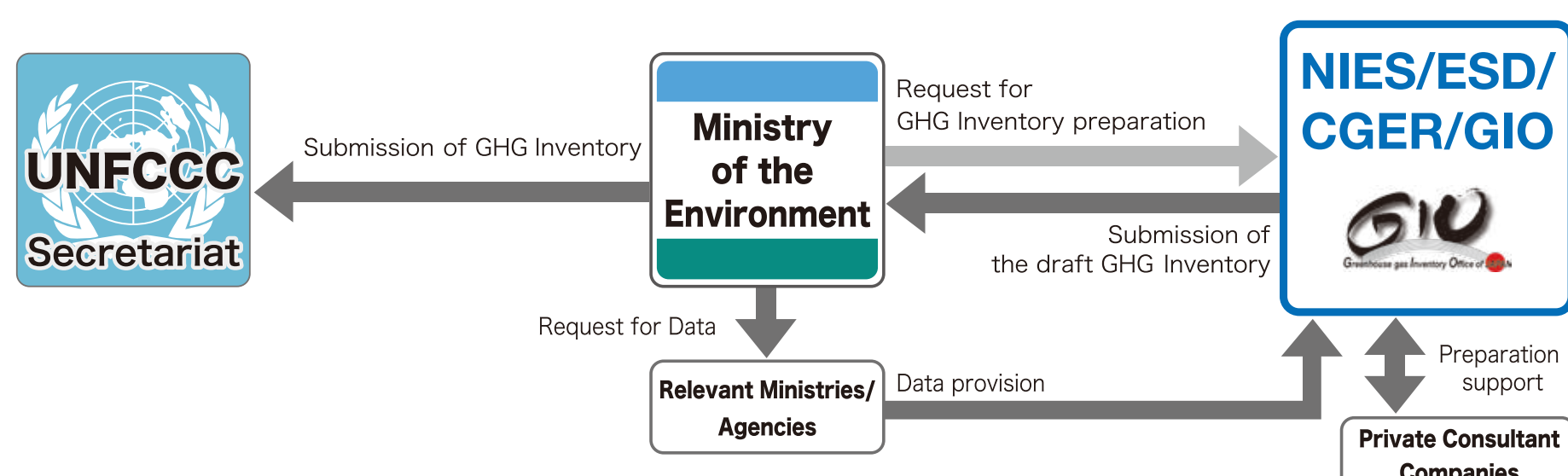


Figure 2: Japan's institutional arrangement for the national inventory preparation

Institutional arrangement for the GHG Inventory preparation

The Greenhouse Gas Inventory Office of Japan (GIO) develops the GHG inventory in cooperation with private consultant companies under a contract with the Ministry of the Environment (Figure 2). Before preparing GHG inventories, GIO collects data from relevant ministries,

agencies and organizations to estimate emissions and removals. Based on these data together with other data from different publications, GIO then compiles the GHG inventory.

This compiled inventory is annually submitted to the UNFCCC Secretariat through the Japanese Government. This inventory serves as the official data which are reported internationally.

"Japan's National Greenhouse Gas Emissions in Fiscal Year 2019" shown below is the output of GIO's GHG inventory compilation work.

Japan's National Greenhouse Gas Emissions in Fiscal Year 2019

Japan's total greenhouse gas emissions in fiscal year* (FY) 2019 were 1,212 million tonnes of carbon dioxide equivalents (Mt CO₂ eq.) (Figure 3).

This is a decrease of 14.0% (197 Mt CO₂ eq.) compared to the FY2013 emissions (1,408 Mt CO₂ eq.). The two main factors for the decrease in emissions in FY2019 as compared to FY2013 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, resumption of nuclear power plant operations).

This is also a decrease of 12.3% (170 Mt CO₂ eq.) compared to the FY2005 emissions (1,381 Mt CO₂ eq.). The main factor for the decrease in emissions in FY2019 as compared to FY2005 is the reduced energy consumption (due to improved energy conservation etc.).

In contrast, hydrofluorocarbon emissions from refrigerants that substitute for ozone-depleting substances are increasing every year.

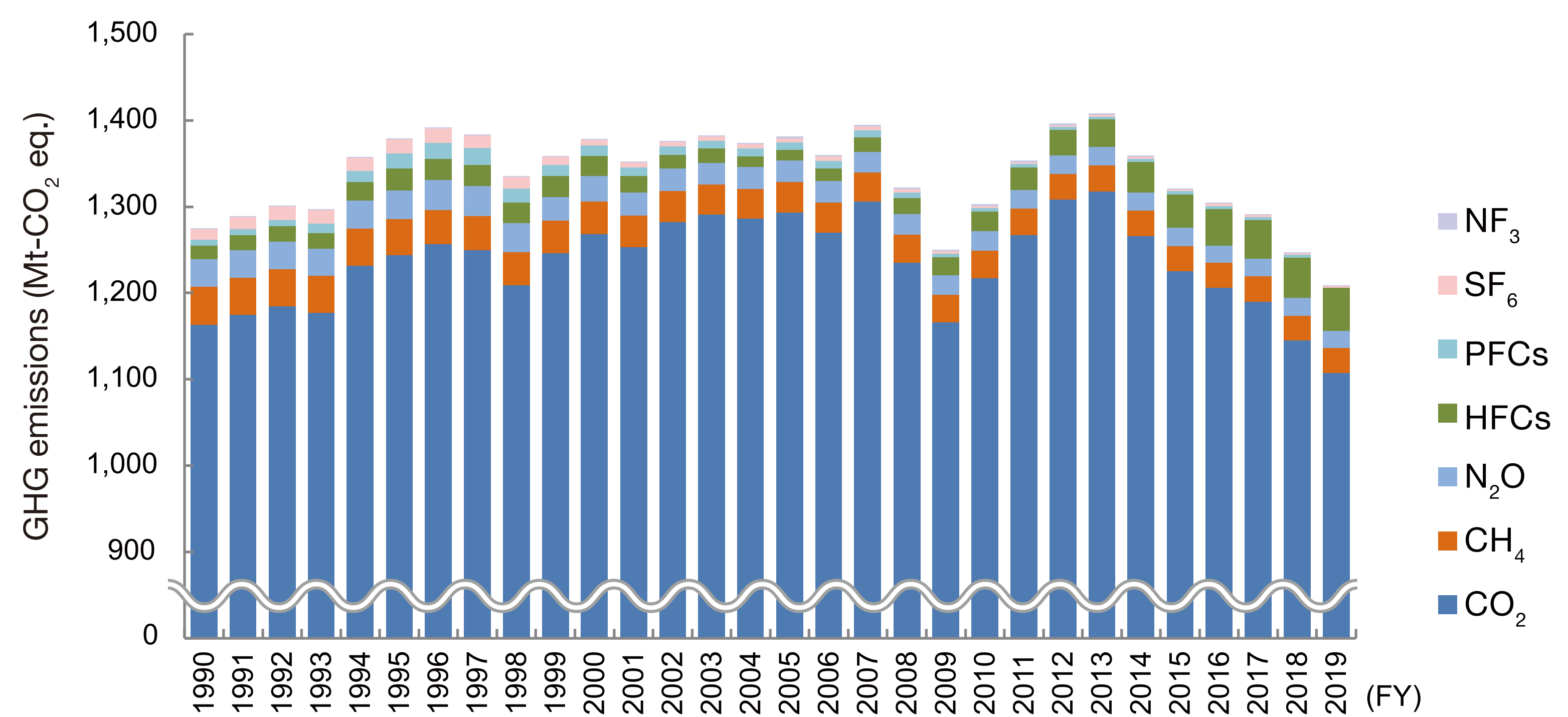


Figure 3: Trends in GHG emissions in Japan

CO₂ emissions in FY2019 were 1,108 million tonnes. This is a decrease of 15.9% (210 Mt) and 14.4% (186 Mt) compared to FY2013 and FY2005. The CO₂ emissions from the industries sector (factories, etc.) show the largest decrease compared to FY2013 and FY2005 (Figure 4).

The two main factors for the decrease in CO₂ emissions from the industries sector (factories, etc.) in FY2019 as compared to the FY2013 are the decrease in CO₂ emission intensity of electricity (CO₂ emissions per electricity consumption) and the reduced energy consumption due to the decrease in energy consumption intensity (energy consumption per Index of Industry Production) owing to improved energy conservation etc.

Similarly, the decrease in CO₂ emissions from the industries sector (factories, etc.) in FY2019 as compared to FY2005 is mainly because of the reduced energy consumption due to the decrease in energy consumption intensity owing to improved energy conservation etc.

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

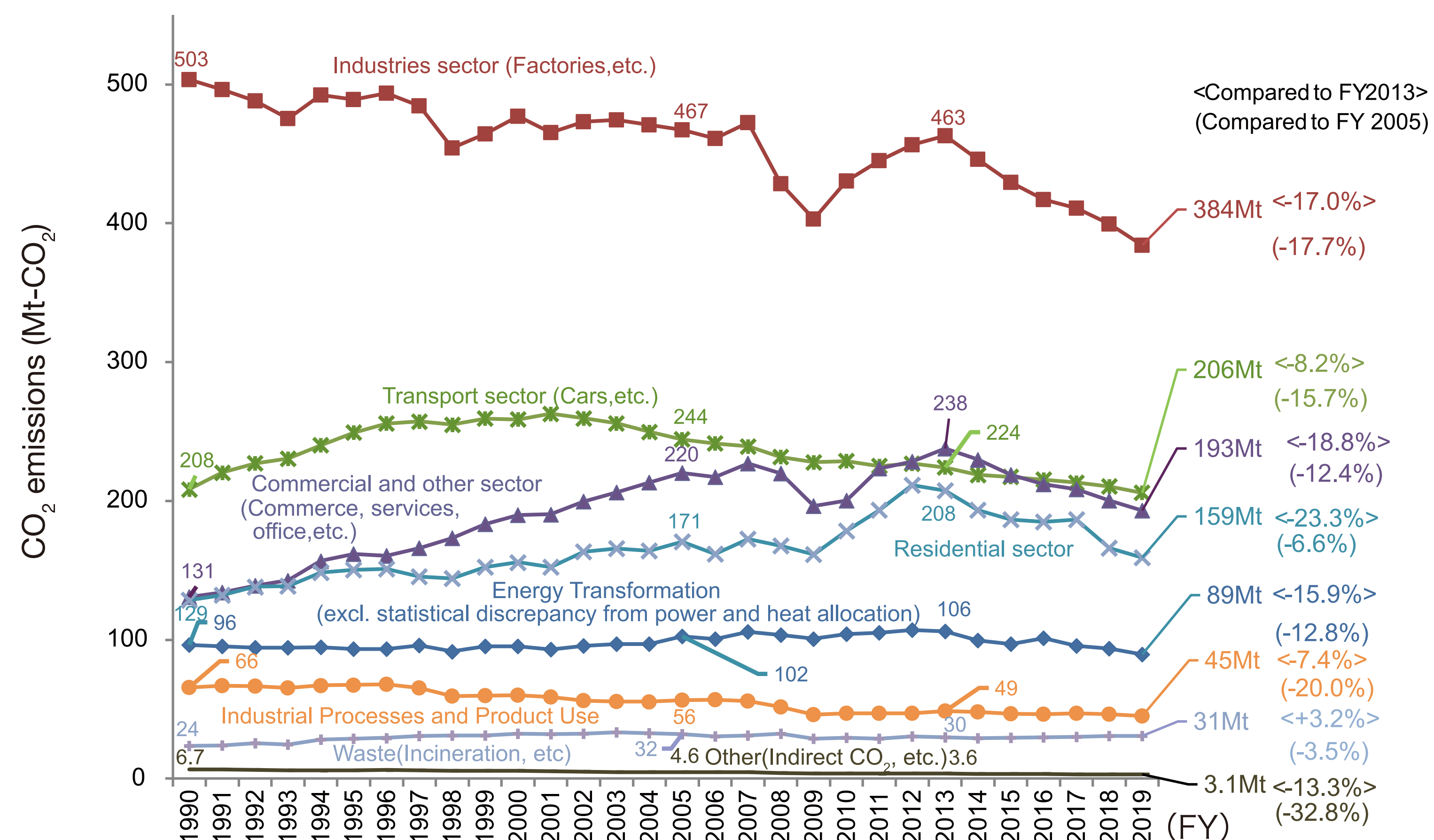


Figure 4: Trends in sector-specific CO₂ emissions