

Japan's National Greenhouse Gas Emissions and Removals in Fiscal Year 2022 <Executive Summary>

1. Greenhouse Gas Emissions and Removals¹

Japan's greenhouse gas (GHG) emissions and removals in fiscal year ^{2,3} (FY) 2022:

1,085 million tonnes of carbon dioxide equivalent (Mt CO₂ eq.⁴), indicating a 2.3% (25.1 Mt CO₂ eq.) decrease compared to FY2021.

Emissions⁵ for FY2022: 1,135 Mt CO₂ eq. (a 2.5% [28.6 Mt CO₂ eq.] decrease compared to FY2021)

Removals⁶ for FY2022: 50.2 Mt CO₂ eq. (a 6.4% [3.4 Mt CO₂ eq.] decrease compared to FY2021)

➤ This represented a 22.9% (322.1 Mt CO₂ eq.) decrease compared to FY2013⁷ (1,407 Mt CO₂ eq.).

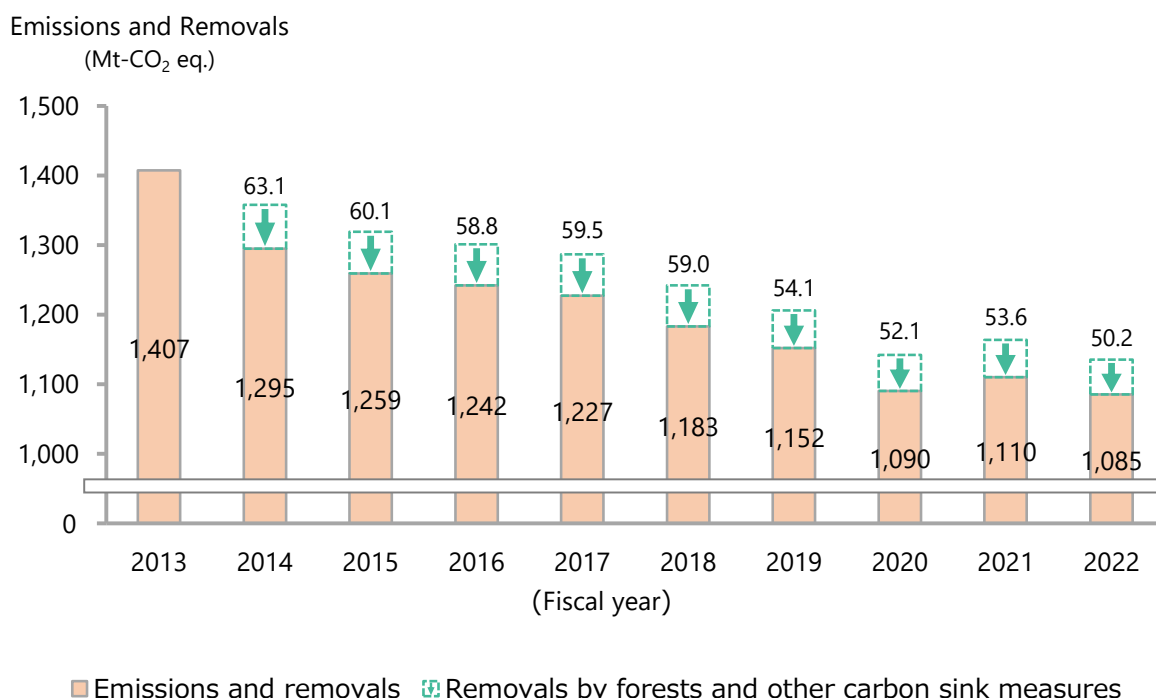


Figure 1 Trends in Japan's national GHG emissions and removals

Footnote:

1. Japan's removals by measures for forest and other carbon sinks were subtracted from the sum of emissions. The final compiled figures may be recalculated when the annual statistical data are updated and/or when estimation methods are revised.
2. Japan's fiscal year runs from April 1 to March 31.
3. Emissions of four types of GHGs (hydrofluorocarbons [HFCs], perfluorocarbons [PFCs], sulfur hexafluoride [SF₆], and nitrogen trifluoride [NF₃]) were estimated on a calendar year basis.
4. Emissions of each GHG were converted into CO₂ equivalents by multiplying the emissions of each gas with their respective global warming potential values (GWP values). GWP values are the degree to which each GHG contributes to global warming and are expressed as a ratio to the global warming effect of CO₂. Based on the Paris Agreement rules, the GWP values for a 100-year time horizon provided in the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (2013) were adopted.
5. Sum of Japan's emissions.
6. Contribution of measures for forest and other carbon sinks to GHG removals and reduction. This was accounted for based on Japan's Plan for Global Warming Countermeasures and the Nationally Determined Contribution (NDC).
7. In the updated NDC submitted to the United Nations in October 2021, Japan expressed that it "aims to reduce its greenhouse gas emissions by 46 percent in fiscal year 2030 from its fiscal year 2013 levels, setting an ambitious target which is aligned with the long-term goal of achieving net-zero by 2050. Furthermore, Japan will continue strenuous efforts in its challenge to meet the lofty goal of cutting its emission by 50 percent."

2. Greenhouse Gas Emissions⁸

GHG emissions of Japan in FY 2022: 1,135 Mt CO₂ eq.

- Emissions decreased by 2.5% (28.6 Mt CO₂ eq.) compared to emissions in FY2021 (1,164 Mt CO₂ eq.).
- Emissions decreased by 19.3% (271.9 Mt CO₂ eq.) compared to emissions in FY2013 (1,407 Mt CO₂ eq.).

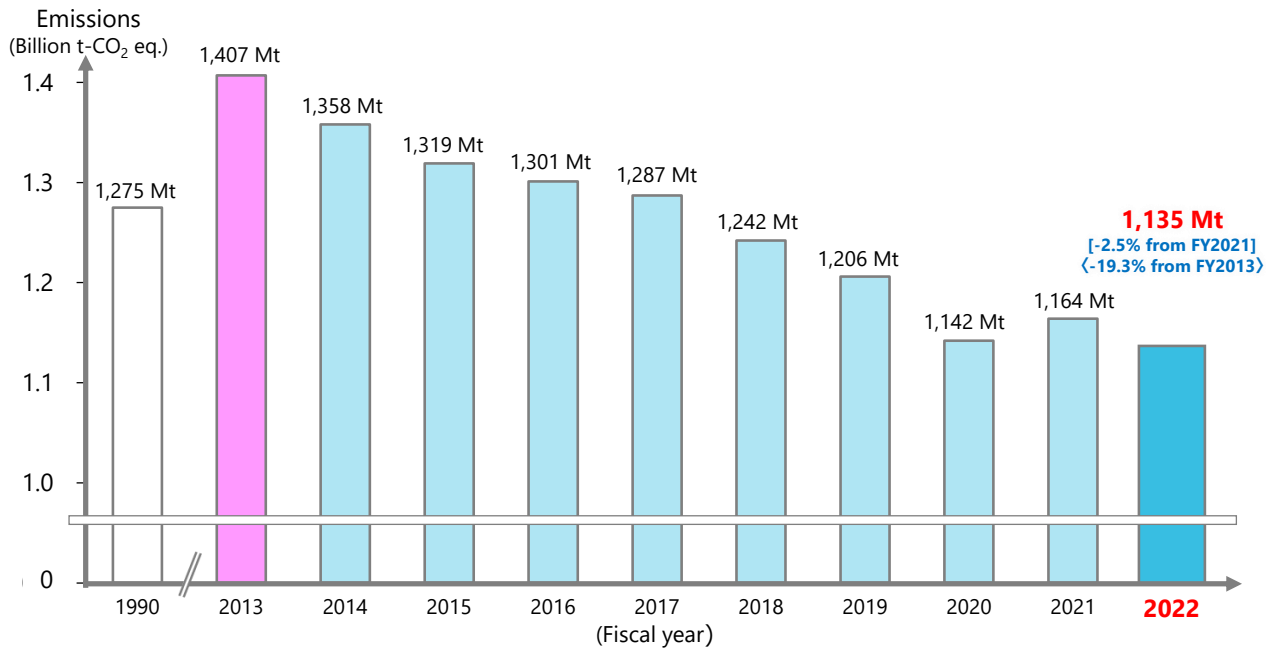


Figure 2 Japan's national GHG emissions

Note:

- The main factor for the decrease in emissions as compared to FY2021: the reduced energy consumption resulting from a decrease in electricity generation and iron and steel production.
- The two main factors for the decrease in emissions as compared to FY2013: 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 (because of wider adoption of renewable energy and resumption of nuclear power plant operations).
- The emissions of hydrofluorocarbons that had been increasing every year since 2004 turned downward.

Footnote:

8. GHG emissions for each fiscal year and rates of change from the preceding years do not include removals by measures for forest and other carbon sinks.

Table 1 Japan's national GHG emissions by gas in FY2022
(compared to FY2013 and FY2021)

	FY1990 emissions [Share]	FY2013 emissions [Share]	FY2021 emissions [Share]	Emissions [Share]	FY2022	
					Amount of change 《Rate of change》	
					Compared to FY2013	Compared to FY2021
Total	1,275 [100%]	1,407 [100%]	1,164 [100%]	1,135 [100%]	-271.9 《-19.3%》	-28.6 《-2.5%》
Carbon dioxide (CO₂)	1,163 [91.2%]	1,318 [93.6%]	1,064 [91.4%]	1,037 [91.3%]	-280.9 《-21.3%》	-27.0 《-2.5%》
Energy-related CO ₂	1,068 [83.7%]	1,235 [87.8%]	987 [84.8%]	964 [84.9%]	-271.3 《-22.0%》	-23.0 《-2.3%》
Non-energy-related CO ₂	95.3 [7.5%]	82.2 [5.8%]	76.6 [6.6%]	72.6 [6.4%]	-9.6 《-11.7%》	-4.0 《-5.2%》
Methane (CH₄)	49.8 [3.9%]	32.7 [2.3%]	30.4 [2.6%]	29.9 [2.6%]	-2.8 《-8.6%》	-0.51 《-1.7%》
Nitrous oxide (N₂O)	28.9 [2.3%]	19.9 [1.4%]	17.6 [1.5%]	17.3 [1.5%]	-2.6 《-13.3%》	-0.34 《-1.9%》
F-gases	33.4 [2.6%]	37.2 [2.6%]	52.4 [4.5%]	51.7 [4.5%]	14.5 《+39.0%》	-0.71 《-1.4%》
Hydrofluorocarbons (HFCs)	13.4 [1.1%]	30.3 [2.2%]	46.9 [4.0%]	46.1 [4.1%]	15.8 《+52.1%》	-0.76 《-1.6%》
Perfluorocarbons (PFCs)	6.2 [0.5%]	3.0 [0.2%]	2.9 [0.2%]	3.0 [0.3%]	0.06 《+2.1%》	0.14 《+4.9%》
Sulfur hexafluoride (SF ₆)	13.8 [1.1%]	2.3 [0.2%]	2.2 [0.2%]	2.1 [0.2%]	-0.21 《-8.9%》	-0.10 《-4.6%》
Nitrogen trifluoride (NF ₃)	0.0 [0.0%]	1.5 [0.1%]	0.3 [0.0%]	0.3 [0.0%]	-1.2 《-77.6%》	0.00 《+1.4%》

Note: "0.0" are values less than 0.05.

(Unit: Mt-CO₂ eq.)

Table 2 Energy-related CO₂ emissions from each sector
(after allocation of power and heat)

	FY1990 emissions [Share]	FY2013 emissions [Share]	FY2021 emissions [Share]	Emissions [Share]	FY2022	
					Amount of change 《Rate of change》	
					Compared to FY2013	Compared to FY2021
Total	1,068 [100%]	1,235 [100%]	987 [100%]	964 [100%]	-271.3 《-22.0%》	-23.0 《-2.3%》
Industry (factories, etc.)	505 [47.3%]	463 [37.5%]	372 [37.7%]	352 [36.5%]	-111.0 《-24.0%》	-19.7 《-5.3%》
Transport (cars, etc.)	208 [19.5%]	224 [18.2%]	185 [18.7%]	192 [19.9%]	-32.4 《-14.5%》	+7.2 《+3.9%》
Commercial and other (commerce, service, office, etc.)	131 [12.3%]	235 [19.0%]	187 [19.0%]	179 [18.6%]	-55.3 《-23.6%》	-7.9 《-4.2%》
Residential	126 [11.8%]	209 [17.0%]	160 [16.2%]	158 [16.4%]	-51.4 《-24.5%》	-2.2 《-1.4%》
Energy transformation	96.6 [9.0%]	104 [8.4%]	82.9 [8.4%]	82.4 [8.5%]	-	-
Power plants, oil refineries, etc.	96.2 [9.0%]	106 [8.6%]	87.6 [8.9%]	84.9 [8.8%]	-21.3 《-20.1%》	-2.8 《-3.2%》
Statistical discrepancy from power and heat allocation	+0.4 [0.0%]	-2.6 [-0.2%]	-4.7 [-0.5%]	-2.5 [-0.3%]	-	-

Note: "0.0" are values less than 0.05.

(Unit: Mt)

"After allocation of power and heat" refers to the allocation of energy-related CO₂ emissions from power and heat generation to each sector based on the consumption of power and heat.

Details of main increases/decreases as compared to emissions in FY2021

1) Energy-related CO₂ emissions (after allocation of power and heat)

- Industry sector (factories, etc.): 19.7 Mt (5.3%) decrease
 - Energy consumption decreased owing to the reduced production of iron and steel.
- Transport sector (cars, etc.): 7.2 Mt (3.9%) increase
 - The amount of passenger traffic increased.
- Commercial and other sector (commerce, services, office, etc.): 7.9 Mt (4.2%) decrease
 - Consumption of oil products and electricity decreased.
- Residential sector: 2.2 Mt (1.4%) decrease
 - Energy consumption decreased owing to a warmer winter with lower demands for heating.
- Energy transformation sector (power plants, oil refineries, etc.) (excluding statistical discrepancy from power and heat allocation): 2.8 Mt (3.2%) decrease
 - Emissions from commercial power generation decreased.

2) Emissions other than energy-related CO₂ (CO₂ eq.)

- CO₂ emissions not related to energy: 4.0 Mt (5.2%) decrease
 - Emissions from the Industrial Processes and Product Use sector decreased owing to reduced cement production.
- Methane (CH₄) emissions: 0.51 Mt (1.7%) decrease
 - Emissions from the Agriculture sector (rice cultivation, etc.) decreased.
- Nitrous oxide (N₂O) emissions: 0.34 Mt (1.9%) decrease
 - Emissions from the Energy sector decreased.
- Hydrofluorocarbon (HFC) emissions: 0.8 Mt (1.6%) decrease
 - Emissions from refrigerants decreased owing to the transition to refrigerants with lower GWPs and an increase in HFC recovery during the disposal of commercial refrigeration and air conditioning.
- Perfluorocarbon (PFC) emissions: 0.14 Mt (4.9%) increase
 - Emissions from solvents increased.
- Sulfur hexafluoride (SF₆) emissions: 0.1 Mt (4.6%) decrease
 - Emissions from metal production decreased.
- Nitrogen trifluoride (NF₃) emissions: no significant change