

## Indicator 9.4.1

### Indicator Name, Target and Goal

**Indicator 9.4.1** CO2 emissions per unit of value added

**Target 9.4** By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities

**Goal 9** Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

### Definition and Rationale

#### ○ Definition

This indicator is defined as the ratio between CO2 emissions and the value added of associated economic activities.

#### ○ Concepts

CO2 emissions are not measured value but estimated value by some statistics.

#### ○ Rationale and Interpretation:

This indicator measures the amount of CO2 emissions from fuel consumption produced by an economic activity, per unit of economic output. Manufacturing industries are generally improving their emission intensity as countries move to higher levels of industrialization, but it should be noted that emission intensities can also be reduced through structural changes and product diversification in manufacturing. Lower values of CO2 per unit GDP could be interpreted as more efficient manufacturing structures.

### Data Sources and Collection Method

Japan estimate CO<sub>2</sub> emissions based on many statistics and on the IPCC Guidelines for Greenhouse Gas Inventories. The data listed was published in April 2025.

## Method of Computation and Other Methodological Considerations

- Computation Method

$$\text{CO}_2 \text{ emission per unit of GDP} = \frac{\text{CO}_2 \text{ emission(t)}}{\text{real GDP(JPY)}}$$

- Comments and limitations

In line with the above guidelines and other sources, after the emission amount is estimated every year, the CO<sub>2</sub> emission amount is re-estimated not only for the latest year but also retroactively to 1990. Therefore, it should be noted that the numerical value of the indicator reported in the past may change after the report.

## Data Disaggregation

N/A

## References

- National Greenhouse Gas Inventory Report of Japan  
<https://www.env.go.jp/earth/ondanka/ghg-mrv/emissions/index.html>
- Greenhouse Gas Inventory Office of Japan  
<http://www.nies.go.jp/gio/index.html>

## Custodian Ministries of Data

Ministry of Environment  
(National Institute for Environmental Studies)

## Custodian Ministries of Related Policies

Ministry of Economy, Trade and Industry  
Ministry of Environment

## International Organizations

International Energy Agency (IEA)  
United Nations Industrial Development Organization (UNIDO)