



# Protecting the Earth from global warming

## Low-CO<sub>2</sub> electricity

### Terminology

#### Greenhouse gases (GHG)

A collective term for CO<sub>2</sub> and other gases that absorb heat radiation from the ground (in the form of infrared rays) and so prevent it from escaping outside the atmosphere. The Kyoto Protocol specifies six types: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF<sub>6</sub>).

#### Kyoto Protocol

An international agreement concluded at the Third Conference of the Parties to the United Nations Framework Convention on Climate Change (COP3) held in Kyoto in 1997.

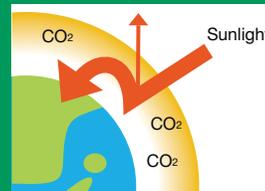
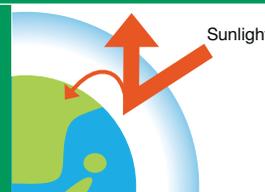
Under the Protocol, the developed countries taken together are to reduce their (average annual) emissions of greenhouse gases over the years 2008–2012 by at least 5% relative to 1990.



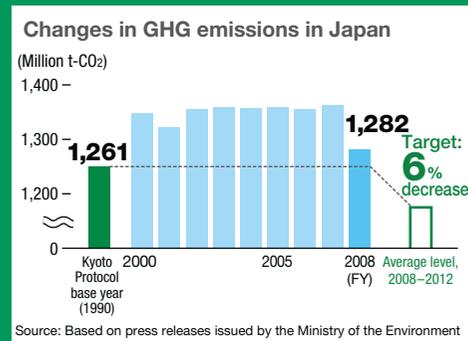
## Mechanism of global warming

### Why is global warming occurring ?

- 1 Sunlight is absorbed by the surface of the ground and turned into heat. Some of the heat that would otherwise rise from the ground and eventually go outside the atmosphere is absorbed by greenhouse gases (GHG) in the atmosphere. As a result, ground temperatures are kept within ranges conducive to habitation by wildlife.
- 2 An increase in the GHG emissions means an increase in heat retained in the atmosphere and, by extension, a rise in temperatures on the ground. The type of GHG at the focus of concern today is carbon dioxide (CO<sub>2</sub>), which results from combustion of oil, coal, and other fossil fuels.



### Current status of global warming



In the Kyoto Protocol<sup>®</sup>, which was effected in 2005, Japan pledged to reduce its GHG emissions over the years 2008–2012 by 6 percent relative to 1990. But its emissions are, on the contrary, increasing. A worsening of global warming is anticipated to have various adverse effects, including a rise in the sea level and climate change. As such, its mitigation requires urgent action by society as a whole.

# Reduction of CO<sub>2</sub> emissions both when producing and when using power

Even though it is all electricity, the level of CO<sub>2</sub> emissions differs according to different types of power generation. At TEPCO, we are pursuing the production of power with low CO<sub>2</sub> emission levels by means such as nuclear power generation, which emits no CO<sub>2</sub>; improving increase in the thermal efficiency of thermal power generation, and introduction of renewable energy.

In order to realize a low carbon society, we are also working to develop high-efficiency products and provide information linked to lower CO<sub>2</sub> emissions when our customers use power, as well as taking part in projects to reduce CO<sub>2</sub> emissions in other countries.

TEPCO is working to reduce CO<sub>2</sub> emissions at the stages of both power generation and energy use.



## TEPCO approaches

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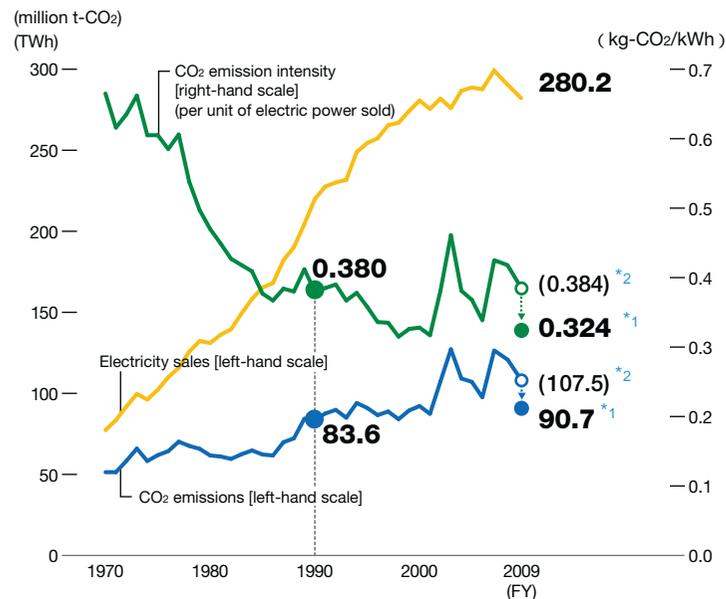
### TEPCO's voluntary target

20% reduction in average annual CO<sub>2</sub> emission intensity\* over the five-year period (FY2008–2012) relative to FY1990

# 20%

0.304 (kg-CO<sub>2</sub>/kWh)

### Changes in CO<sub>2</sub> emissions and emission intensity

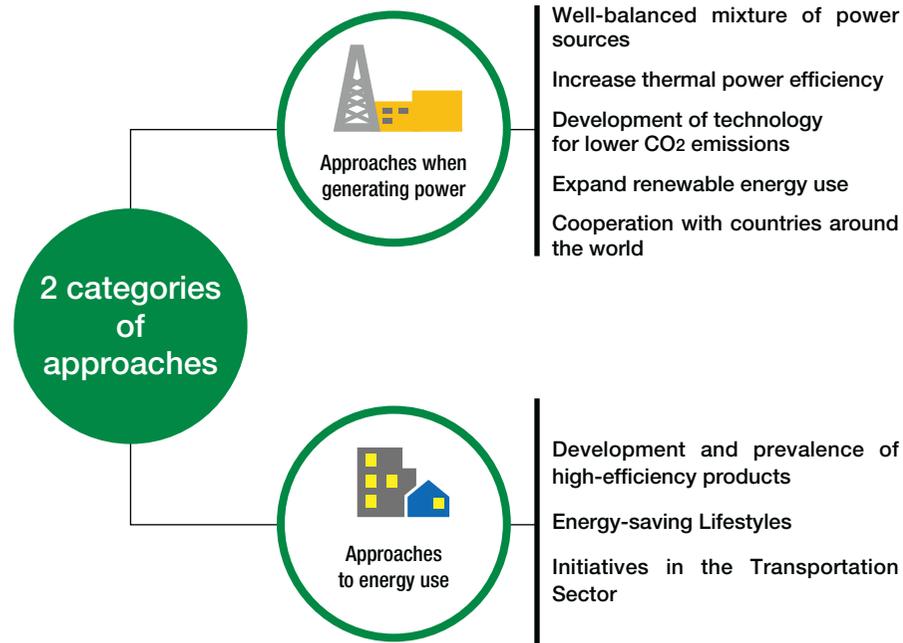


\* TEPCO's CO<sub>2</sub> emission intensity is calculated based on the "greenhouse gas emissions calculation, reporting, and disclosure system" stipulated by the Law Concerning the Promotion of Measures to Cope with Global Warming. Note that the system does not take into account CO<sub>2</sub> reduction values achieved through the Green Power Certification System or other such mechanisms.

<sup>\*1</sup> Values adjusted to reflect carbon credits.

<sup>\*2</sup> Values prior to reflecting carbon credits.

### Two categories of approaches to protect the world from warming



### Terminology

#### CO<sub>2</sub> emission intensity

The amount of CO<sub>2</sub> emissions entailed by use of 1 kWh of power

$$\text{CO}_2 \text{ emissions intensity (kg-CO}_2\text{/kWh)} = \frac{\text{Total amount of CO}_2 \text{ emissions (kg-CO}_2\text{)}}{\text{Power sales (kWh)}}$$

CO<sub>2</sub> emissions intensity after adjustment (kg-CO<sub>2</sub>/kWh)

$$= \frac{\text{Total amount of CO}_2 \text{ emissions (kg-CO}_2\text{)} - \text{Carbon credits (kg-CO}_2\text{)}}{\text{Power sales (kWh)}}$$

\* Carbon credits are CO<sub>2</sub> reduction amounts obtained from projects designed to reduce greenhouse gases.