

CLIMATE CHANGE COUNTERMEASURES BUILDING UPON THE PARIS AGREEMENT

The Paris Agreement that took effect in November 2016 represents a turning point in the global climate change countermeasures that have developed out of the United Nations Framework Convention on Climate Change and the Kyoto Protocol. It can be considered a fresh start to the effort to establish decarbonized societies all over the world in the second half of this century.

Here we introduce the main initiatives that Japan has taken based on the Paris Agreement.

2

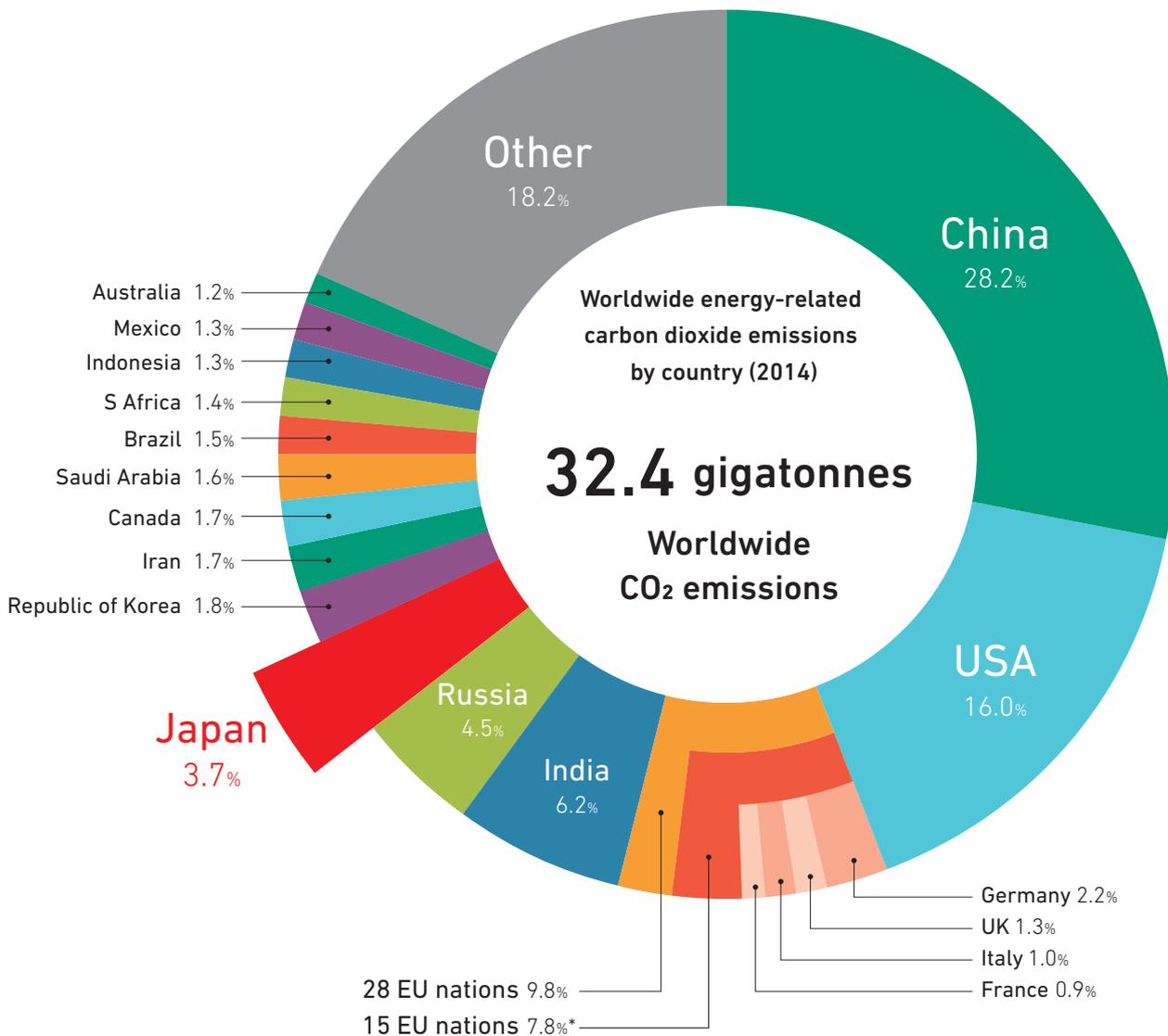
1

JAPAN'S FORMAL ACCEPTANCE OF THE PARIS AGREEMENT

The Paris agreement took effect on November 4, 2016. Japan formally accepted the agreement on November 8 of the same year after obtaining the approval of the national Diet.

In order to achieve the Paris Agreement's 2°C target, we need to keep the cumulative emission amount below a certain level based on the concept of "carbon budgeting." In order to avert potentially

dangerous effects of climate change and to preserve the environment that provides the foundation for human survival, a range of measures aimed at preventing damage to the environment has to be implemented, based on the latest scientific findings. Japan needs to decrease the cumulative emission amount by keeping on making rapid emission cuts based on the best available science.



*15 EU countries: the number of EU countries that participated in COP3 (Kyoto conference) from the beginning
Source: IEA "CO₂ Emissions from Fuel Combustion - 2016 Edition"

2

2. Climate change countermeasures building upon the Paris Agreement

JAPAN'S CONTRIBUTION TO COP22

The Government of Japan's main goals at COP22 were (1) to ensure inclusiveness in the decision-making process, (2) to further discussions on the modalities, procedures and guidelines of the Paris Agreement, and (3) to promote Japan's contribution on international cooperation in the field of climate change.

At the ministerial level meeting, Minister of the Environment Koichi Yamamoto welcomed the early entry into force of the Paris Agreement, expressed great respect for the efforts and passion of all countries, and stated that Japan continues to actively contribute to the rule-making process under the Paris Agreement. In addition to reporting the Cabinet's approval of Japan's Plan for Global Warming Countermeasures, he described Japan's stance toward the long-term low-greenhouse gas emission development strategy and initiatives that support developing countries, and emphasized the importance of political leadership in advancing climate change countermeasures.

Furthermore, he announced Japan's Assistance Initiatives to Address Climate Change, a form of international cooperation in the area of climate change.



Statement by Minister Yamamoto at COP22

Japan's Assistance Initiatives to Address Climate Change

1. Diffusion of advanced low-carbon technologies, including diffusion through JCM, etc.

Japan provides technological support based on the needs of developing countries by utilizing the Joint Crediting Mechanisms (JCM), etc.

2. Enhancement of adaptive capacity through sharing knowledge and experience

- We use Japanese knowledge and technology to support policy development and promote understanding of adaptation in developing countries.
- In particular, we aim to create an Asia-Pacific Adaptation Information Platform by 2020, to help developing countries formulate and implement adaptation plans based on scientific knowledge.

3. Improvement of MRV capabilities through human resource development that will lead to a transparency framework

We will enhance initiatives aimed at improving monitoring, reporting and verification (MRV) capabilities in developing countries, for example by holding workshops.

4. Promotion of building of a system for comprehensive measures for controlling emission of fluorocarbons

Japan supports the development of capabilities, including fluorocarbon recovery, destruction and recycling, that make it possible to reduce emissions throughout the lifecycle of fluorocarbons.

5. Support for sustainable societies in conjunction with measures addressing climate change

Japan will evaluate and promote environmental projects based on multiple environmental aspects addressed by SDGs, and will help developing countries with the transition to decarbonized society and the establishment of sustainable societies.

3

JAPAN'S GLOBAL WARMING COUNTERMEASURES BASED ON THE PARIS AGREEMENT

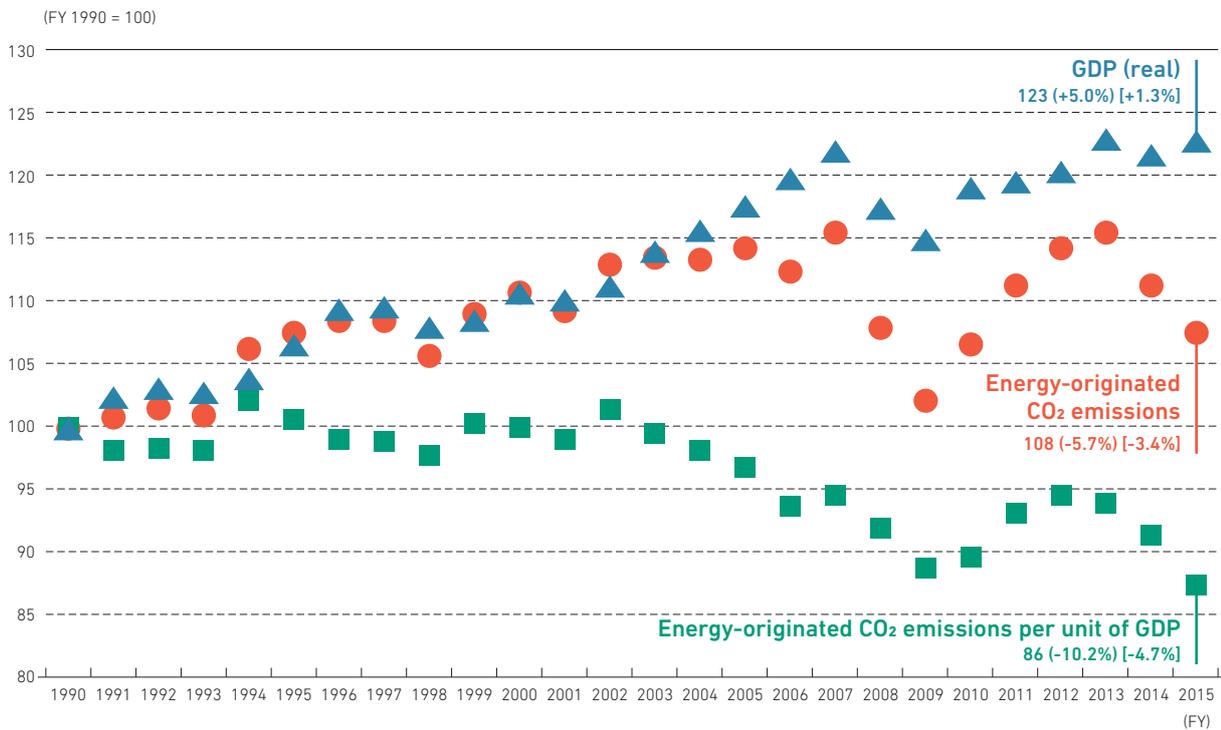
Greenhouse gas emissions

Japan's total greenhouse gas emissions in FY 2015 declined for the second consecutive year, to 1,325 million tonnes CO₂ eq., representing decreases of 2.9% from the previous year, 6.0% from FY 2013, and 5.3% from FY 2005. The main reason for the decline was a drop in energy-originated CO₂ emissions associated with power generation resulting from the decrease in electricity consumption (due to factors such as energy conservation, a cool summer and a mild winter) and the improvement in emission intensity of electric power

generation (due to factors such as accelerating growth of renewable energy and restarting of nuclear power generation).

When we look at the relationship between greenhouse gas emissions and economic growth, we see that energy-originated CO₂ emissions and real GDP displayed similar upward trends until the early 2000s, but from FY 2013 there was a decoupling whereby greenhouse gas emissions fell while GDP grew.

Japan's GDP Relative to CO₂ Emissions



Sources: Japanese Cabinet Office "Quarterly Estimates of GDP," the Institute of Energy Economics, Japan/Energy Data and Modeling Center "EDMC Handbook of Japan's & World Energy & Economic Statistics 2016," and the Ministry of the Environment "Greenhouse gas inventories."

Formulation of Japan's Plan for Global Warming Countermeasures

In May 2016, based on the Act on Promotion of Global Warming Countermeasures, the Cabinet approved Japan's Plan for Global Warming Countermeasures and the Government Action Plan. The Plan for Global Warming Countermeasures is Japan's comprehensive plan for dealing with global warming. Based on the Paris Agreement and Japan's Intended Nationally Determined Contribution submitted to the United

Nations in July 2015, it establishes a medium-term goal (to be achieved by FY 2030) of reducing greenhouse gas emissions by 26% compared to the FY 2013 level, and a long-term goal (by 2050) of reducing them by 80%. It also outlines measures to be taken by business operators, citizens, and other entities, as well as measures to be taken by national and local governments to enable achievement of the Plan's goals.

The Plan for Global Warming Countermeasures

Introduction

- Scientific findings on global warming
- Actions during the 1st commitment period of the Kyoto Protocol, Actions by 2020 under the Cancun Agreement
- Establishment of an international framework after 2020 and communication of Japan's INDC

Ch.1 Basic direction regarding the promotion of global warming countermeasures

- Directions to pursue
 1. Actions to achieve mid-term target (26% reduction by 2030)
 2. Strategic actions towards long-term goal (80% reduction by 2050)
 3. Actions toward global greenhouse gas reduction
- Basic concepts
 1. Integrated improvements of the environment, economy and society
 2. Steady implementation of measures listed in Japan's INDC
 3. Response to Paris Agreement
 4. Enhancement of R&D and contribution to global greenhouse gases emissions reduction through Japan's leading technologies
 5. Transformation in consciousness of all actors, evocation of action and enhancement of collaboration
 6. Emphasis on PDCA cycle

Ch.2 Greenhouse gas reduction target

- Japan's greenhouse gas emission reductions target
 - Reduction of 26% by FY2030 (25.4% compared to FY2005)
 - More than 3.8% reduction by FY2020 compared to FY2005
- Planning period
 - From date of cabinet decision (May 13, 2016) to FY2030

Ch.3 Policies and measures for achieving targets

- Basic roles of national government, local governments, businesses and citizens
- Measures and Policies for Greenhouse Gas Emissions Reduction and Removal
 - Energy-originated CO₂
 - Measures and Policies by Sectors (industrial, commercial and other, residential, transport, energy conversion)
 - Non-energy-originated CO₂, CH₄, N₂O
 - Four fluorinated gases: HFCs, PFCs, SF₆ and NF₃
 - Removals by Land Use, Land Use Change and Forestry (LULUCF)
 - Cross-sectional strategies
 - Foundational measures
- Basic matters regarding measures to be taken by Local Governments
- Expected Efforts of Business Operators with Large Emissions in Particular
- Promotion of nationwide campaign
- Promotion of global emission reduction, international collaboration and cooperation
 - Response to Paris Agreement
 - Global emission reduction due to Japan's contribution
 - Joint Crediting Mechanism (JCM)
 - Actions by industries
 - Support of reduction of emissions from deforestation and degradation (REDD+)
 - Cooperation with other countries and international organizations

Ch.4 Progress Management of the Plan

Yearly progress review, consideration of the plan's revision every 3 years

Appendix (Target of each measure)

- Energy-originated CO₂
- Non-energy-originated CO₂
- CH₄, N₂O
- Four fluorinated gases
- Removals by LULUCF
- Cross-sectional policies

Long-term low-emission development strategies

Like other countries, Japan has begun considering the formulation of long-term low-emission development strategies based on the Paris Agreement. In March 2017, the Ministry of the Environment formulated its Long-term Low-carbon Vision depicting what a low-carbon society might look like in 2050 and beyond. In April 2017, the Ministry of Economy, Trade and Industry formulated a report on its Long-term Global Warming Countermeasures Platform as a way of reducing greenhouse gas emissions in the

long term, i.e. in 2030 and beyond. Furthermore, in the G7 Ise-Shima Leader's Declaration adopted during the May 2016 Summit, G7 leaders committed to formulating and communicating long-term low-emission development strategies well ahead of the 2020 deadline. Going forward, the Japanese government will continue to consider the formulation of long-term low-emission development strategies based on the documents described above.

Carbon pricing

Regarding carbon pricing, Japan's Long-term Low-carbon Vision declares that the time has come to consider, specifically and in depth, "what types of carbon pricing can be suitable for Japan to accelerate domestic initiatives for generating innovations that lead to long-term, substantial emissions reductions."

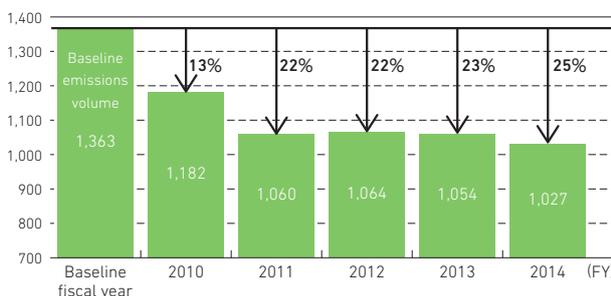
Accordingly, the Ministry of the Environment established a panel of experts to consider how

carbon pricing should work in Japan. While hearing opinions from various quarters, including knowledgeable individuals and businesspeople, the panel is considering how to use carbon pricing in Japan to achieve long-term substantial emissions reductions and simultaneously solve economic and social issues. It also deals with broadly organizing relevant issues and examining those issues from various perspectives.

The Tokyo Metropolitan emissions trading system

Reductions during First Compliance Period (FY 2010-2014)

(Unit: 10,000 tons CO₂)



In 2010, the Tokyo Metropolitan Government imposed an obligation to reduce total greenhouse gas emissions and introduced an emissions reduction trading system. It set the total reduction target at 6% for the period between FY 2010-2014, and obligated targeted business establishments to reduce emissions by 6% or 8%. During the five-year period, the city succeeded in reducing emissions by approximately 14 million tonnes, and all affected business locations complied with their obligation to reduce total emissions. In addition, the metropolis achieved reductions in final energy consumption that exceeded the national average, and also succeeded in decoupling emissions levels from total production within the Tokyo metropolitan area.

Final Energy Consumption and Gross Product in Metropolitan Tokyo



Sources: Tokyo Metropolitan Environment Bureau press releases and "Tokyo Green Building Report 2015"

Adaptation to the impact of climate change

Japan's Cabinet has approved the National Plan for Adaptation to the Impacts of Climate Change, which establishes five basic strategies: (1) Mainstreaming adaptation into government policy, (2) Enhancement of scientific findings, (3) Promotion of understanding and cooperation of each actor through efforts such as organizing and

sharing climate risk information and other information, (4) Promotion of adaptation in regions, and (5) Promotion of international cooperation and contribution. Based on this plan, the Climate Change Adaptation Platform was established in August 2016 as a basis for adaptation actions of local governments, businesses and citizens.

Climate Change Impacts and Basic Adaptation Policies and Measures

Sector		Projected Climate Change Impacts	Basic Adaptation Policies and Measures Includes measures for other purposes that also contribute to adaptation
Agriculture, Forest / Forestry, Fisheries	Agriculture	Declining ratio of first-class rice	Development and dissemination of high-temperature-resistant varieties; establish soil and water management
		Poor coloring of apples and other fruits; northward shift of locations suitable for cultivation	Switch to superior colored varieties of fruit; development of breeding materials adapted to high temperature conditions; and dissemination of cultivation management technologies
		Increasing frequency and severity of mountainous disasters	Implementation of studies on situations of occurrences of plant pests; disseminate timely and appropriate information; import /domestic quarantine
	Forest / Forestry	Increasing frequency of occurrence and intense of mountainous disasters	Ascertaining more accurately which areas are at high risk of mountain disasters occurring; development of afforestation structures and forests preparing for occurrence of debris flows or wood debris runoff
Water Environment, Water Resources	Fisheries	Changes in distributed migration range including sardine (e.g., shift northward)	Improvement in the precision of fishing ground projection; provision of real-time monitoring information
	Water Environment	Deterioration of water quality	Measures for wastewater from factories and business premises; measures for domestic wastewater
Water Environment, Water Resources	Water Resources	Increase in droughts due to an increase in the number of rainless days and a decrease in the total amount of snowfall	Optimal use of existing facilities, use of rainwater, reclaimed waste water, and creation of collaborative frameworks among stakeholders for actions including promoting the formulation of timelines (sequenced action plans) in order to mitigate damage as a drought
	Natural Ecosystems	Diverse Ecosystems	Expansion of the habitat of sika deer, decreasing area suitable for the growth of reef-building coral
Natural Disasters, Coastal Areas	Water Disasters	Increasing frequency of heavy rainfall and short-term intense rainfall; increasing frequency and intense of water disasters accompanied by increases in precipitation from heavy rainfall events	- Disaster prevention measures to address natural hazards that could occur relatively frequently e.g., steady improvements of facilities; improvements of facilities based on disaster risk assessments; design of facilities to avoid rework - Disaster-reduction measures to cope with natural hazards that exceed the capacity of facilities (1) Improving aspects such as facilities' operations, design, and maintenance/upkeep procedures (e.g., making the most use of existing facilities) (2) Integrating with urban development/local development (e.g., measures to reduce inundation in cooperation with urban development/local development; providing/sharing detailed disaster risk information) (3) Preparations for evacuation, emergency operations, business continuity (e.g., avoid catastrophic damage by preparing timelines)
		Storm Surge, High Waves	Expansion of inundation damage and coastal erosion due to increases in sea-level rise, typhoons and other events
	Sediment-related Disasters	Increased frequency of sediment-related disasters; increases in sediment movement events exceeding design scale	Locating facilities and equipment to be most effective in protecting human life; promotion of baseline surveys and designation of sediment-related disaster hazard areas; implementation of urgent surveys when large scale sediment-related disasters occur
Human Health	Heat Stress	Increasing frequency of heat waves in summer; doubling of the number of heat illness patients transported by ambulance	Information provision relating to topics such as cautionary alerts; awareness raising regarding prevention and treatment, and status of outbreaks
	Infection	Expansion of suitable habitat for arthropods that are vectors for infectious diseases	Measures targeting sources of larvae of mosquito vectors and extermination of adult insects; calling attention to mosquito-prevention measures
Industrial and Economic Activity	Finance and Insurance	Increasing insured losses	Pay attention to efforts of the General Insurance Association of Japan and other organization efforts
Life of Citizenry, Urban Life	Urban Infrastructure, Critical Services	Impacts on infrastructure and critical services due to an increase in short-term intense rainfall events and droughts	Measures to prevent inundation of places such as underground stations; formulation of Business Continuity Plan (BCP) for ports and harbors; enhancing the resilience of water supply and waste disposal facilities
	Heat Island Effect	Further increases in temperature in urban areas	Improving ground cover using vegetation and water; reducing artificial exhaust heat; improving urban design

Source: Ministry of the Environment