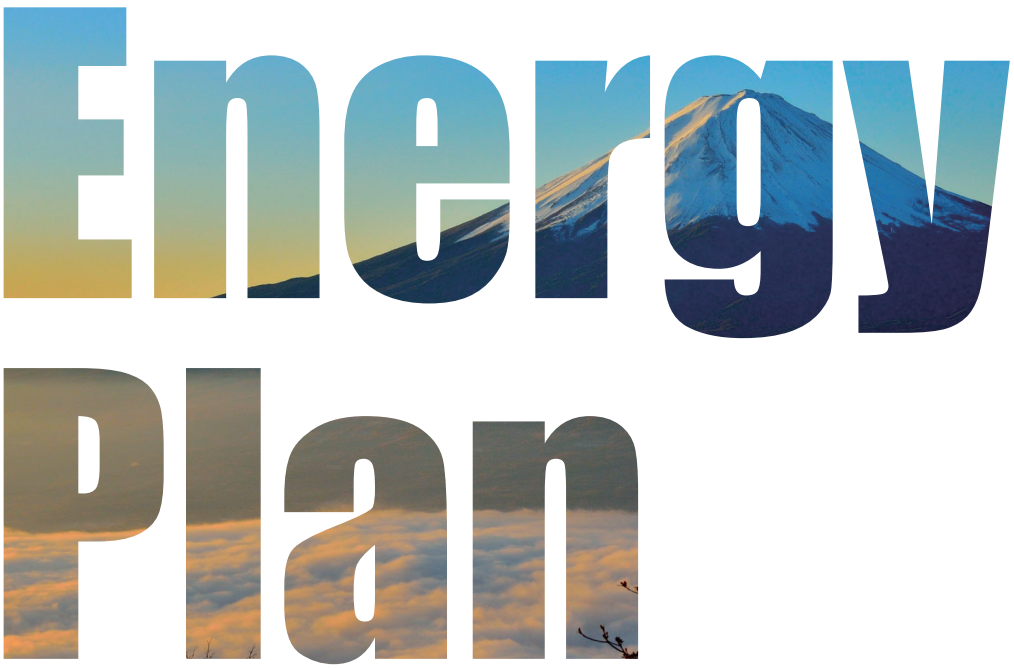
METI
Ministry of Economy, Trade and Industry

Japan's Energy Plan



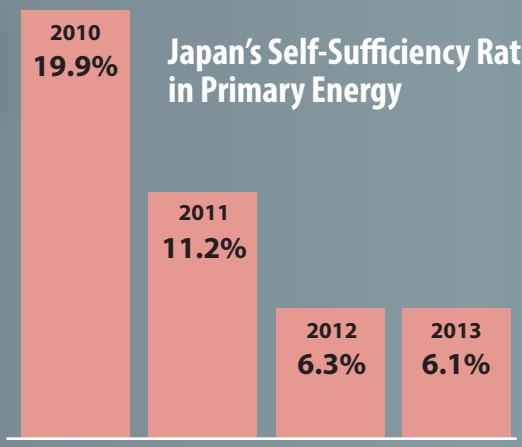
Japan's Three Energy Challenges

Japan is a nation that relies on imports for the greater part of its energy resources. After the oil crises in the 1970s, Japan secured a stable supply of energy by implementing policies to promote energy conservation and diverse supply sources. However, Japan now faces three new energy challenges following the Great East Japan Earthquake in 2011.
They are: 1) a decline in energy self-sufficiency rate, 2) higher electricity costs, and 3) rising carbon dioxide (CO_2) emissions. To overcome these challenges, Japan plans to promote far-reaching energy conservation measures and a balanced energy mix, with 2030 as the target year.

Self-Sufficiency Rate

Japan has relied on overseas imports of fossil fuels for its electricity supply since the suspension of nuclear power generation after the Great East Japan Earthquake. Japan's reliance on fossil fuels from abroad remains at the highest level ever.

Japan ranks 33rd among the 34 member states of the Organization for Economic Co-operation and Development (OECD) in 2013

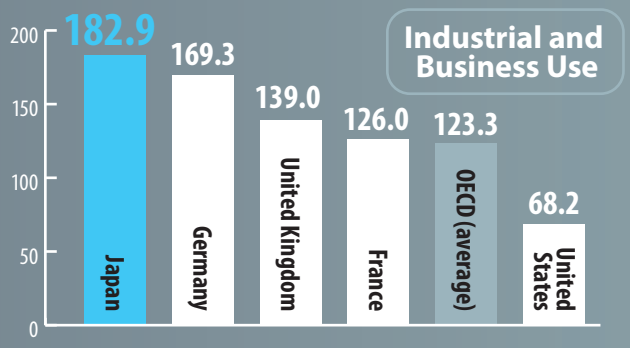


Japan's Self-Sufficiency Rate in Primary Energy

Electricity Cost

With the increasing reliance on fossil fuels, electricity prices in Japan have risen sharply. Electricity prices in Japan are high compared with other major economies. Higher electricity costs will have an adverse impact on Japan's international competitiveness, in particular, in the manufacturing sector.

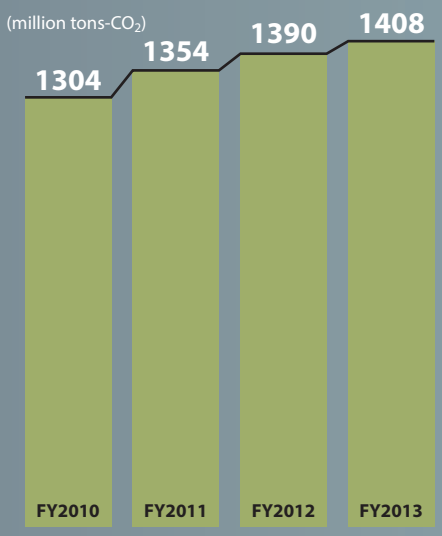
Japan's Electricity Prices Highest Among Major Economies (Figures for 2013 stated in $/MWh)
Source: Compiled from data collected by the International Energy Agency (IEA)



CO_2 Emissions

CO_2 emissions have been growing in Japan because of the greater reliance on fossil fuels for power generation following the suspension in operation of nuclear power plants.

Greenhouse Gas Emissions (FY2010–FY2013)
Source: Compiled from data collected by the Ministry of the Environment and the Federation of Electric Power Companies of Japan



Japan's Energy Targets for FY2030*

Japan has set long-term targets for self-sufficiency, electricity prices and greenhouse gas emissions for 2030. Meeting these targets will enable Japan to secure a stable energy supply, promote economic efficiency and enhance environmental compatibility while ensuring safety.

Three Energy Challenges

Self-Sufficiency Rate

Target

Raise to close to 25% - above pre-2011 levels of about 20% -

Policy Direction

- Leverage renewable and nuclear energy, which can be generated domestically

Electricity Cost

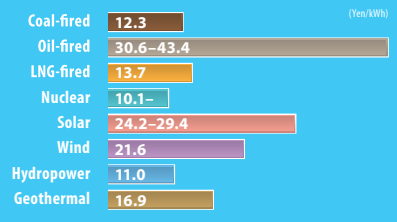
Target

Lower costs from current level

Policy Direction

- Utilize nuclear energy and coal-fired thermal power generation, both of which are inexpensive sources of electricity

Electricity generation cost by source



Source: Power Generation Cost Verification Working Group

CO_2 Emissions

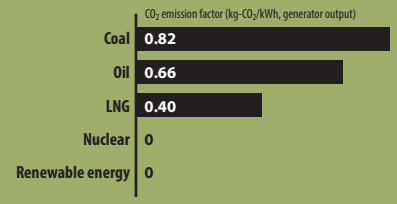
Target

Set reduction targets comparable with the EU and the US

Policy Direction

- Utilize renewable and nuclear energy, both of which have no CO_2 emissions
- Optimize efficiency of coal-fire thermal power generation, leverage LNG (liquefied natural gas)-fired thermal power generation

CO_2 emissions by electricity source



Source: Central Research Institute of the Electric Power Industry

Energy Security

Economic Efficiency

Environment

Safety

*FY2030 refers to the period from April 1, 2030 to March 31, 2031.

Japan's Strategy

Japan has identified two pillars to overcome its energy challenges and realize a stable energy mix:
(1) energy conservation promotion (2) balanced energy supply.

Pillar 1: Energy Conservation Promotion

Based on economic growth forecasts, Japan aims to aggressively promote energy conservation measures: replicating its success after the oil crises in the 1970s. These measures will enable Japan to reduce the total volume of electricity generation by 17% in FY 2030, according to projections.

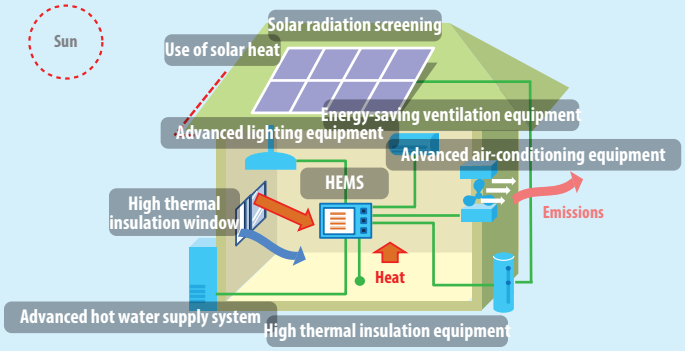
To achieve this level of energy conservation, Japan plans to improve the efficiency of infrastructure and equipment. Japan will take a smart and detail-oriented approach to energy conservation leveraging energy management systems to clearly track use and consumption for optimal utilization.

Household sector

Tangible approaches ⟷ Intangible approaches

- Build and renovate houses based on energy conservation standards
- Replace equipment with high-efficiency consumer electronics and water heaters
- Promotion of Cool-Biz and Warm-Biz campaigns
- Home Eco Diagnostics

Home Energy Management System (HEMS)



Cool-Biz: Japanese Government campaign to lower the use of air conditioning by promoting business casual dress

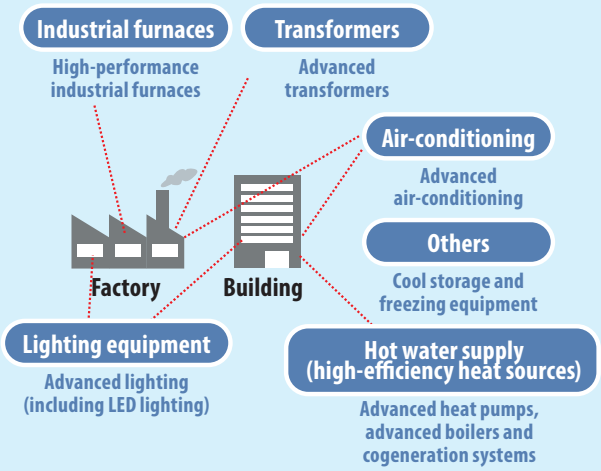
Warm-Biz: Winter campaign to encourage people to dress warmly inside homes and offices to reduce the energy consumption from heating

Industrial & business sectors

Tangible approaches ⟷ Intangible approaches

- Introduction of high-efficiency energy-saving equipment
- Development and introduction of innovative technologies
- Promotion of Cool-Biz and Warm-Biz campaigns
- Energy-Saving Diagnostics

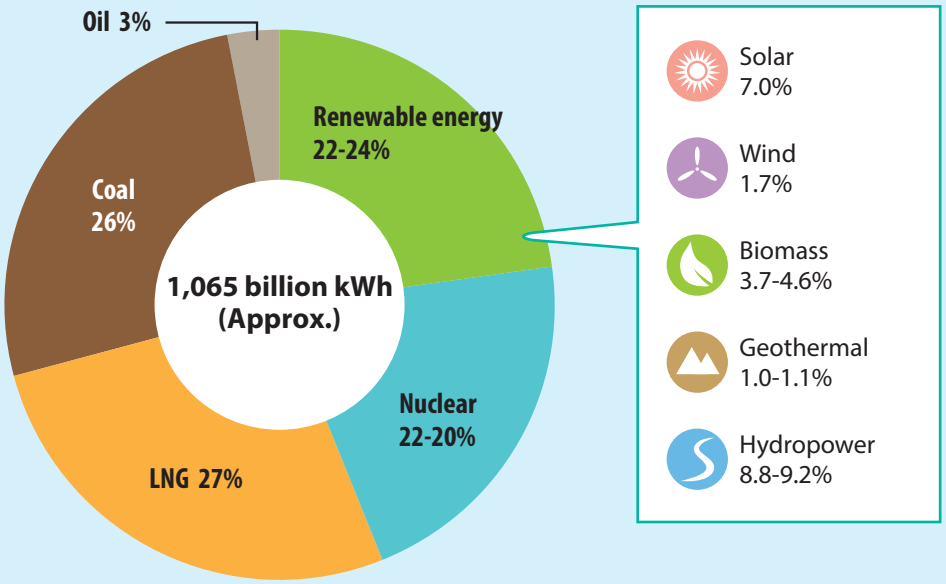
Factory Energy Management System (FEMS)
Building Energy Management System (BEMS)



Pillar 2: Balanced Energy Supply

Japan aims to realize its goal of securing a safe energy supply which is economically efficient and environmentally sustainable by implementing a policy program that promotes the wider introduction of renewable energy and more efficient thermal power generation to reduce reliance on nuclear power, in tandem with far-reaching energy conservation measures.

Power Source Composition (FY 2030)



Impact of the two pillars

Self-sufficiency rate

Japan's energy self-sufficiency rate is forecast to improve to about 24.3% in FY 2030, from 6.1% in FY2013.

Electricity costs

Electricity costs are expected to fall by 2-5% from current levels driven by reductions in fuel expenses from the expansion of renewable energy, the restart of nuclear power plants and efficiency improvements in thermal power generation. This projected reduction is expected even after factoring in the rising the costs associated with the feed-in tariff system and stabilizing systems linked to the expansion of renewable energy use.

CO_2 emissions

Japan's energy-derived CO_2 emissions are forecast to fall by 21.9% by FY 2030 versus FY 2013, to 927 million tons. Including reductions in other greenhouse gas emissions and carbon sink measures, emissions are forecast to decline 26.0% from FY 2013. These levels will be comparable with the EU and the US.

Expanding Renewable Energy

Japan aims to expand the use of a variety of renewable energy sources. Japan will take an approach that optimizes each renewable energy source's unique characteristics while making efforts to minimize the financial burden on consumers.

Hydroelectric, Geothermal, Biomass

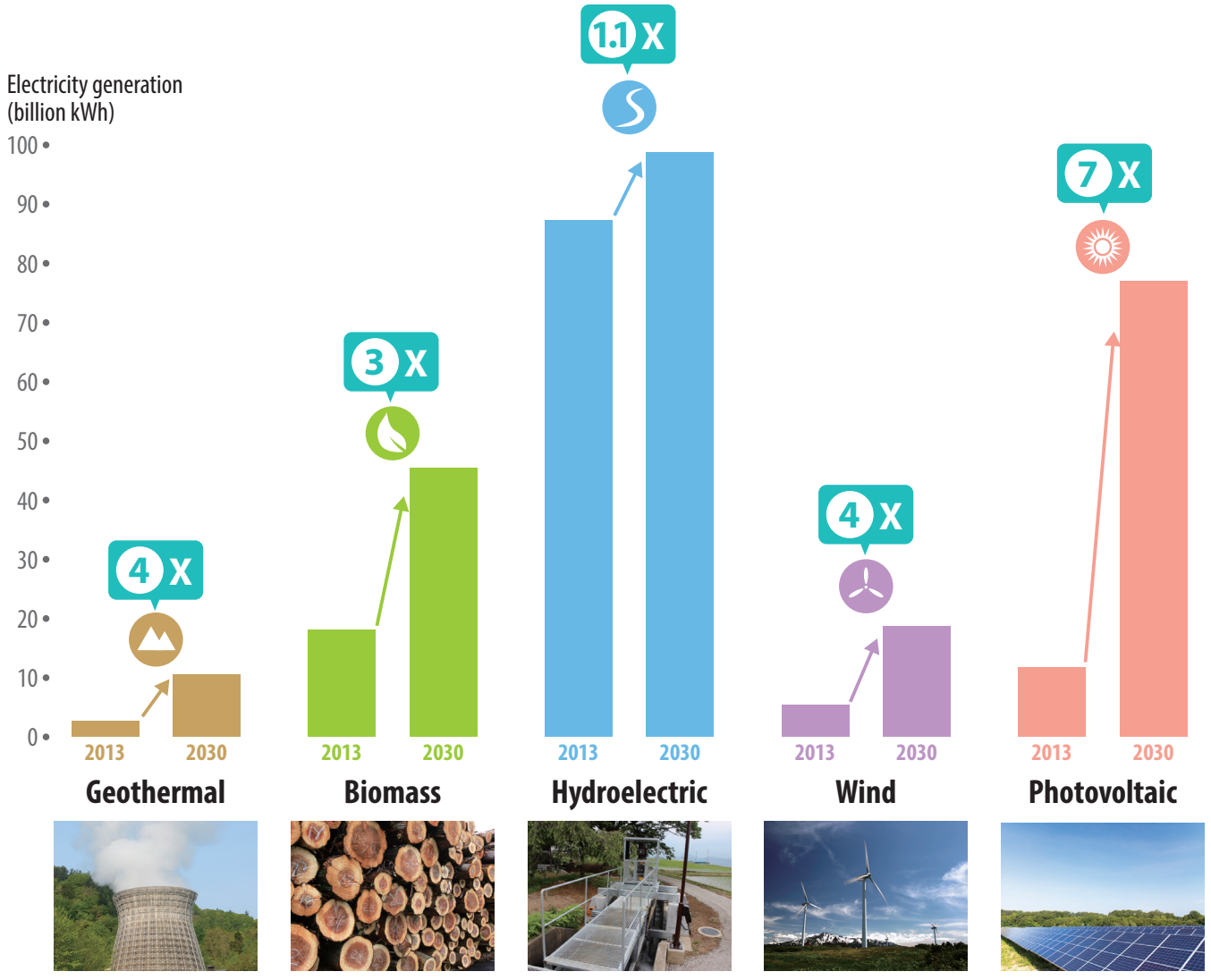
Electricity sources that can be managed stably regardless of weather conditions

Japan plans to leverage hydropower, geothermal, and biomass energy sources to reduce its reliance on nuclear power while factoring in environmental regulations and the needs of local communities.

Photovoltaic, Wind

Electricity sources whose output fluctuates depending on weather conditions

Japan plans to actively promote the expansion of solar and wind energy sources while balancing the need to reduce electricity costs.

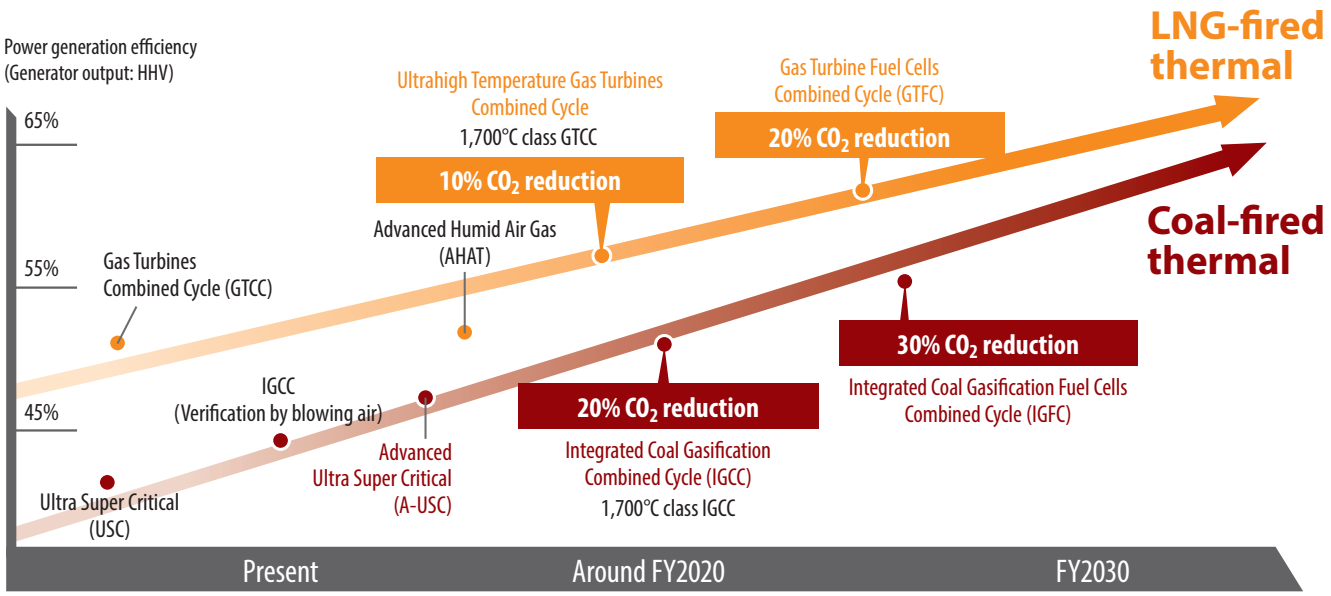


Thermal Power Generation

Japan aims to boost efficiency and promote the more effective use of coal-fired and LNG-fired thermal power while balancing cost and environmental considerations.

Prospects for highly efficient, low-carbon next-generation thermal power generation technologies

Source: Council for Promoting the Early Achievement of Next-Generation Thermal Power Generation



Spotlight

Isogo Thermal Power Plant, a state-of-the-art, high-efficiency coal-fired thermal power plant

Photo: courtesy of J-Power

Unit 1 and Unit 2 at the Isogo Thermal Power Plant in Yokohama began operations in the 1960s as power stations supplying electricity to the cities of Tokyo and Yokohama. In 2002 and 2009, they were replaced by New Unit 1 (600MW) and New Unit 2 (600MW), raising their operating output, reducing ecological impact and enhancing efficiency. As part of this upgrade, Ultra Super Critical (USC) technologies were introduced to improve efficiency. As a result, the Isogo Thermal Power Plant has achieved power generation efficiency of 45%, the highest level in the world.

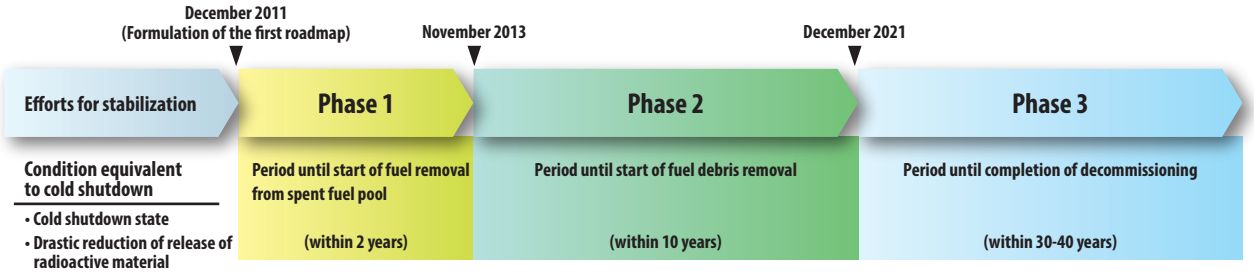
CO_2 emissions from the plant also decreased by 17%. In addition, sulfur oxide (SOx) and nitrogen oxide (NOx) emissions fell sharply from 60ppm to 10ppm and 159ppm to 13ppm, respectively.

Decommissioning TEPCO's Fukushima Daiichi Nuclear Power Station

Japan plans to restart nuclear power plants that have been identified as meeting new regulatory standards set by the Nuclear Regulation Authority, that place paramount importance on safety.
Japan is also moving forward with its Mid-and-Long-Term Roadmap to decommission TEPCO's Fukushima Daiichi Nuclear Power Station.

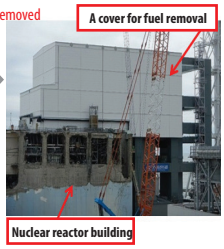
TEPCO: Tokyo Electric Power Company Holdings, Inc.

The Mid-and-Long-Term Roadmap

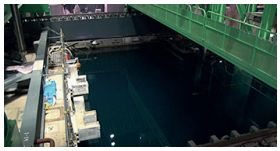


The present status of Unit 4

Unit 4 at the point of accidents



Unit 4 with a cover for fuel removal installed



The state of fuel rod recovery from Unit 4

On November 18, 2013, TEPCO began removing fuel from the spent fuel pool at Unit 4 to achieve the goal set for Phase 1. TEPCO completed this process on December 22, 2014.

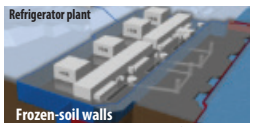
The advanced liquid processing system (ALPS)

The ALPS removes radioactive substances from contaminated water within tanks and reduces its risks.


(State of installation)

Land-side impermeable walls based on the frozen-soil method

TEPCO will build frozen soil walls around nuclear reactor buildings to control the inflow of groundwater to the buildings.



(Length: about 1,500 meters; Volume of soil to be frozen: about 70,000 m^3)

Sea-side impermeable walls

TEPCO will install impermeable walls on the sea side of Units 1 to 4 to prevent contaminated groundwater from flowing into the sea.


(State of installation)

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