



April 2021

Japan Energy Newsletter

**Japan Electric Power
Information Center, U.S.A.**

Table of Contents

1	The Recent 2050 Carbon Neutrality Policy and Strategy Trends.....	3
1.1	Green Growth Strategy Through Achieving Carbon Neutrality in 2050.....	3
1.2	Japanese Utilities' Carbon Neutral and Zero-Emissions Strategies.....	4
2	Japan Establishes a New Power Supply and Demand Adjustment Market	6

1 The Recent 2050 Carbon Neutrality Policy and Strategy Trends

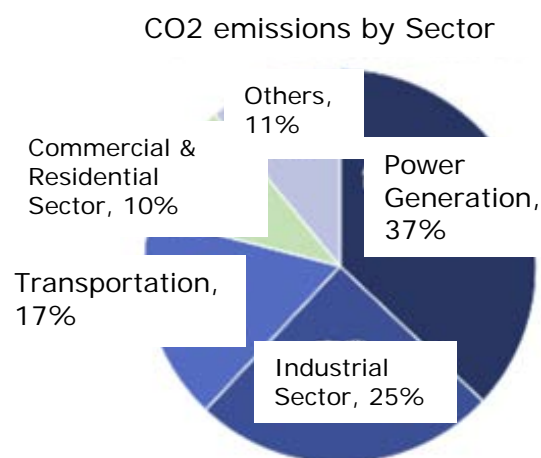
With the 2050 Carbon Neutral Declaration in October 2020¹, Japanese Prime Minister (PM) Suga has prioritized the technology development and deployment of renewable energy, hydrogen, thermal power generation with CO2 reduction technologies, and nuclear power. These technologies will help Japan achieve its decarbonization goals in the electric power generation sector, which accounts for 37% of Japan's total CO2 emissions. Therefore, Japanese utilities have announced their carbon-neutral zero-emission strategic plans since 2021 to meet Japan's 2050 carbon neutrality strategy. This report provides a general overview of the Japanese administration's 2050 Carbon Neutral Declaration and Japanese utilities' strategic plan to achieve the goal.

1.1 Green Growth Strategy Through Achieving Carbon Neutrality in 2050

In October 2020, PM Suga set the goal to realize carbon neutrality and a decarbonized society by 2050. In accordance with this goal, in December 2020, Japan's Ministry of Economy, Trade and Industry (METI), in collaboration with other related ministries and agencies, formulated and released the Green Growth Strategy Through Achieving Carbon Neutrality by 2050. The Strategy is an industrial growth strategic policy to address the challenges for achieving a carbon-free society while ensuring a virtuous cycle of economic growth and environmental protection. The Strategy has prioritized fourteen industrial and technological areas to achieve its aggressive goals and provides action plans for budget, tax agenda, regulatory reform and standardization, and international cooperation.²

In Japan, the electric power sector is the largest source of its CO2 emissions, with a share of 37%; therefore, decarbonizing the sector is the highest priority for reducing national carbon emissions. To achieve this goal, Japan aims to develop and introduce the following four technology fields:

- **Renewable Energy:** Maximize the introduction of renewable energy, with the goal of upgrading transmission systems, reducing costs, balancing renewable energy usage with the surrounding environment, and utilizing storage batteries. Also, prioritize offshore wind and battery technologies as high-growth industries.
- **Hydrogen power:** Introduce hydrogen power as an energy source option, expand its supply and demand, promote infrastructure development with reduced costs, and create a hydrogen ecosystem.



Source: METI

¹ https://www.kantei.go.jp/jp/99_suga/statement/2020/1026shoshinhyomei.html

² <https://www.meti.go.jp/press/2020/12/20201225012/20201225012.html>

- **Thermal power integrated with CO2 reduction technology:** Maximize thermal power integrated with CO2 reduction technologies as an energy option and aim to advance related technology developments and reduce the costs. Realizing that thermal power will still be used minimally in Asia, Japan aims to support its carbon recycling and ammonia fuel industries to contribute to reducing the thermal power plant CO2 emissions.
- **Nuclear Power:** Rely on well-developed nuclear power technologies. Japan aims to improve nuclear safety, restart idled nuclear reactors, and research and develop next-generation nuclear reactors. Japan will continue to make the best use of nuclear power while reducing its reliance on it.³

In addition to the carbon-free emissions goals in the electric power sector, electrification is the key focus in other sectors. Electricity demand is expected to increase by 30 to 50% from the current level (about 1.3 to 1.5 trillion kWh) due to the increasing electrification of the industrial, transportation, and residential sectors. To address increasing electricity demand, Japan has underscored the need to grow energy-saving related industries and promotes energy efficiency and energy saving in these sectors. The transportation sector will promote electrification, while the commercial and residential sectors will seek to develop all-electric buildings with storage batteries. Japan also aims to meet its carbon-neutral goals by improving the technology development and installation of storage batteries. Heating demand will be met by using hydrogen energy and reusing CO2 captured from fossil fuels.

1.2 Japanese Utilities' Carbon Neutral and Zero-Emissions Strategies

Following the Japanese government's declaration of carbon neutrality by 2050, most Japanese utilities have announced their own strategies and roadmaps to achieve this goal. In December 2020, the Federation of Electric Power Companies of Japan (FEPC), which consists of Japan Nuclear Fuel, Japan Atomic Power Company, and the Electric Power Development Company (J-Power), established the 2050 Carbon Neutral Realization Promotion Committee. In order to meet the carbon-neutral goal by 2050, the Committee will explore the following issues:

- 1) Deploy renewable energy as the main power source
- 2) Maximize the use of nuclear power energy, and decarbonize thermal power generation
- 3) Develop advanced technologies (hydrogen, ammonia, Carbon Capture Utilization and Storage (CCUS)/carbon recycling technologies, and next-generation nuclear reactors)
- 4) Promote electrification⁴

In response to this policy, Japanese utilities have launched their own carbon-neutral zero-emission strategic plans since February 2021. The carbon-neutral/carbon-free strategies of each utility and J-Power are as follows.

³ <https://www.meti.go.jp/press/2020/12/20201225012/20201225012-1.pdf>

⁴ https://www.fepec.or.jp/about_us/pr/oshirase/_icsFiles/afieldfile/2020/12/18/press_20201218.pdf

Company	Announced Month/Year	Strategy and Goal	Description
J-Power ⁵	February 2021	J-POWER Blue Mission 2050	Proposes three pillars: 1) CO2-free hydrogen energy (hydrogen power generation, CO2-free hydrogen fuel production); 2) CO2-free power generation (hydropower, wind power, geothermal renewable energy, nuclear power), and 3) stabilize and enhance the electric network to reduce 40% of CO2 emissions from the 2017-to-2019 average by 2030 and to achieve zero emissions by 2050.
Tokyo Electric Power Company (TEPCO) ⁶	October 2020	JERA Zero CO2 Emissions 2050	As of mid-April 2021, TEPCO Holdings has not yet announced its company-wide carbon-neutral strategic plan. However, JERA ⁷ , a joint venture between TEPCO and Chubu Electric Power (Chuden), has set its goal of pursuing zero emissions by 2050 by expanding the use of renewable energy and adopting zero-emissions thermal power technologies with green fuel that does not emit CO2. It aims to promote the introduction of offshore wind power, ammonia fuel for thermal power plants, liquefied natural gas (LNG), and hydrogen energy.
Kansai Electric Power Company (KEPCO) ⁸	February 2021	Zero Carbon Vision 2050	Move forward with decarbonization and address the challenges of both energy demand and supply; promote the expansion of distributed energy resources, storage battery, and e-mobility on the demand side; deploy renewable energy, maximize the use of nuclear energy, hydrogen and ammonia fuel, and the promotion of CCUS on the supply side by collaborating with the public and private sectors and related stakeholders.
Chubu Electric Power (Chuden) ⁹	March 2021	Zero Emissions Challenge 2050	Reduce 50% of CO2 emissions from FY2013 and 100% electrify the company's vehicles. The plan aims for net-zero CO2 emissions for the entire business by 2050. Promote maximum utilization of non-fossil energy, practical application of hydrogen technology, carbon recycling, and electrification.
Tohoku Electric Power (Tohoku) ¹⁰	March 2021	Carbon Neutral Challenge 2050	Maximally use renewable energy and nuclear energy, and decarbonize thermal power while meeting S+3E ¹¹ objectives. Tohoku aims to create businesses that realize a smart society through utilizing distributed energy resources and electrification.
Kyushu Electric Power (Kyuden) ¹²	March 2021	Towards Carbon Neutrality by 2050	Kyuden plans to announce its decarbonization plan and roadmap in 2021. For the energy demand side, it aims to promote electrification and enhance the regional energy system. For the energy supply side, Kyuden will expand the development of renewable energy; make use of nuclear energy; research and develop hydrogen, ammonia fuel and CCUS; and build an energy network that optimizes the use of renewable energy.
Chugoku Electric Power (EnerGia) ¹³	February 2021	Carbon Neutral 2050 Roadmap	For the power generation business, EnerGia aims to expand renewable energy, including solar, wind and hydropower; to continuously utilize nuclear power; and to develop high-efficiency coal-fired, biomass, and hydrogen and ammonia power generation technologies.

⁵ https://www.jpowers.co.jp/news_release/2021/02/news210226_4.html

https://www.jpowers.co.jp/news_release/pdf/news210226_4-2.pdf

⁶ <https://www.jera.co.jp/corporate/zeroemission/>

⁷ JERA was jointly established by TEPCO and EnerGia in April 2015.

⁸ https://www.kepco.co.jp/corporate/pr/2021/0226_3j.html

https://www.kepco.co.jp/corporate/pr/2021/pdf/0226_3j_01.pdf

⁹ <https://www.chuden.co.jp/resource/file/20210323b.pdf>

¹⁰ https://www.tohoku-epco.co.jp/news/normal/1219392_2558.html

https://www.tohoku-epco.co.jp/news/normal/_icsFiles/afieldfile/2021/03/24/b1_1219392.pdf

¹¹ S+3E emphasizes energy security, economic efficiency, and environmental protection without compromising safety.

¹² <http://www.kyuden.co.jp/var/rev0/0280/3076/r63bet2i.pdf>

¹³ <https://www.energia.co.jp/assets/p20210226-1b.pdf>

Company	Announced Month/Year	Strategy and Goal	Description
Shikoku Electric Power Company (Yonden) ¹⁴	March 2021	Yonden Group Carbon Neutral Challenge 2050	Yonden aims to maximize its utilization of nuclear energy, make renewable energy its main power source, develop low carbonization technologies for its thermal power generation, and achieve decarbonization. It sets to achieve low carbonization by 2030 and meet decarbonization by 2050.
Hokkaido Electric Power Company (Hokuden) ¹⁵	March 2021	Hokuden Group's Efforts to Realize Carbon Neutral	By 2030, Hokuden plans to reactivate the Tomari Nuclear Power Plant, promote its renewable energy power generation business, and reduce its CO2 emissions by facilitating electrification and energy saving.
Hokuriku Electric Power Company (Rikuden) ¹⁶	April 2021	Carbon Neutral Roadmap	Rikuden plans to be carbon neutral by 2050. The company will focus on the decarbonization of power sources, the electrification of residential houses, and installing next-generation power and energy systems. Rikuden will also adopt advanced digital technologies such as AI, IoT, blockchain, etc., while working to improve users' quality of life.
Okinawa Electric Power (Okiden) ¹⁷	December 2020	Efforts for Zero Emissions ¹⁸	Okiden aims to achieve zero CO2 emissions by 2050 by making renewable energy its main power source and reducing CO2 emissions from thermal power generation. It will expand the introduction and operation of renewable energy and the use of LNG and biomass.

2 Japan Establishes a New Power Supply and Demand Adjustment Market

Nine Japanese transmission and distribution operators¹⁹ jointly announced on March 17, 2021, that they will establish a new power supply and demand adjustment market, called the Electric Power Reserve Exchange (EPRX), and will begin power trading on April 1, 2021.

After the Great East Japan Earthquake occurred in March 2011, some challenges emerged for conventional power systems, such as a shortage in the power supply due to the shutdown of large-scale centralized power generators. To tackle these issues, Japan has begun to reform its existing electricity systems based on providing diverse electricity options to consumers, maximizing the use of distributed renewable energy, strengthening the power transmission and distribution networks, and ensuring the neutrality of the power transmission sector. Since then, Japan has legally divided its major utility company's transmission and distribution functions from the generation

¹⁴

https://www.yonden.co.jp/press/2020/_icsFiles/afieldfile/2021/03/31/pr010.pdf#page=14&zoom=100,0,0

¹⁵

https://www.hepco.co.jp/hepcowwwsite/info/info2020/_icsFiles/afieldfile/2021/03/19/210319a_1.pdf

¹⁶ <http://www.rikuden.co.jp/press/attach/21042803.pdf>

¹⁷ https://www.okiden.co.jp/shared/pdf/news_release/2020/201208.pdf

¹⁸ https://www.okiden.co.jp/shared/pdf/news_release/2020/201208.pdf

¹⁹ These operators are Hokkaido Electric Power Network, Tohoku Electric Power Network, TEPCO Power Grid, Chubu Electric Power Grid, Hokuriku Electric Power Transmission & Distribution Company, Kansai Transmission & Distribution, Chugoku Electric Power Transmission & Distribution, Shikoku Electric Power Transmission & Distribution Company, and Kyushu Electric Power Transmission & Distribution.

segment, deregulated the retail electricity market, and expanded wide-area grid operations.

Although Japan's transmission and distribution operators are responsible for power frequency adjustments, they no longer own the power generation after they were required to split off that business segment in April 2020. Since October 2016, they have solicited bids for supporting power frequency adjustments, most of which were procured from incumbent electric utility companies. Since Japan is increasingly introducing renewable energy sources, particularly solar power, the ability to adjust power frequency has become more significant. With the establishment of EPRX, operators can operate wide-area adjustment power beyond each area and will be able to procure adjustment power from the trading system. Japan aims to improve the efficiency of the procurement process and the wide-area power operation through enhancing competition and transparency, reducing the costs of power coordination, and allowing new electric businesses to enter into the trading market.²⁰

Products in the EPRX are categorized according to the requirements, such as frequency control and supply-and-demand balance adjustment, response time, and duration. There are five supply-and-demand balance adjustment products (in ascending order): 1) Synchronized Frequency Restoration Reserve (S-FRR), 2) Frequency Containment Reserve (FCR), 3) Frequency Restoration Reserve (FRR), 4) Replacement Reserve (RP), and 5) Replacement Reserve-for FIT (RR-FIT). For wide-area procurements, RR-FIT trading is scheduled to begin in 2021 and RP trading will begin in 2022.

The wide-area operation of RR-FIT and RP began in Central Japan (Chubu, Hokuriku, Kansai) prior to March 2020. It expanded to the Chugoku region (the western part of Japan's main island, Honshu) in August and to Kyushu in September. By October 2020, it was open to five regions. The wide-area operations will be active in all areas starting in April 2021.²¹

²⁰

https://www.meti.go.jp/shingikai/enecho/denryoku_gas/denryoku_gas/seido_kento/pdf/043_04_01.pdf

²¹

https://www.meti.go.jp/shingikai/enecho/denryoku_gas/denryoku_gas/seido_kento/pdf/043_04_01.pdf