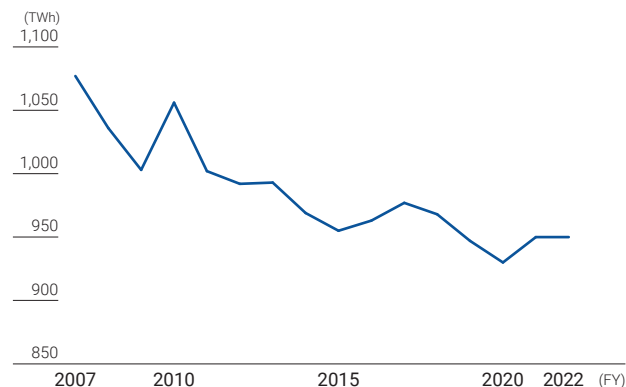


Environment Surrounding the Domestic Electric Power Business

Electric Power Demand in Japan

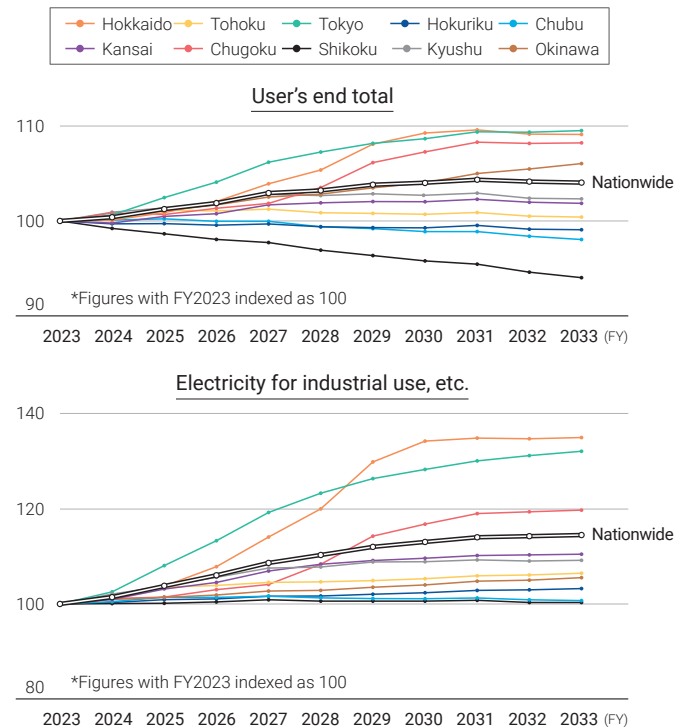
Electric power consumption continued to grow almost consistently in postwar Japan in line with the economic growth of the country. Power demand continued to grow also after the 1990s, when the country entered a period of stable growth and an information society, driven not only by increased power consumption in the industrial sector but also by the growing need for convenient and comfortable lifestyles including the advanced information technology and the widespread use of air conditioners. In recent years, the demand for electricity was expected to stagnate and decline due to power-saving efforts prompted by the Great East Japan Earthquake in 2011 and a declining population resulting from a falling birthrate and aging society. However, the outlook for electricity demand published by the Organization for Cross-regional Coordination of Transmission Operators (OCCTO) in January 2024 presented a blueprint for future growth in power demand on the back of growing consumption of industrial electricity resulting from the expansion or construction of new semiconductor plants and data centers.

Electric power demand in Japan



Source: Created by J-POWER based on the Electric Power Investigation Statistics by the Agency for Natural Resources and Energy

Trends in electric power demand by area



Source: "FY2024 Forecast on Electricity Demand Nationwide and by Regional Service-Area" by OCCTO

Power Supply in Japan

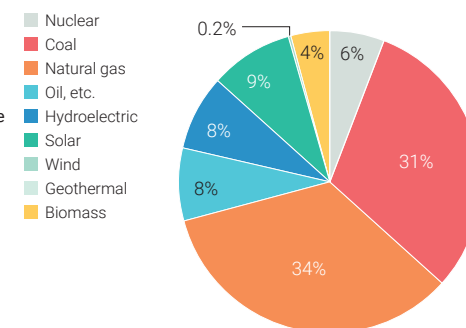
Current situation

Conventionally, among the power generation facilities supplying electricity in Japan, baseload power sources were centered on coal-fired thermal, nuclear, and general hydroelectric power generation which are capable of continuous operation at relatively low unit cost, while LNG- and oil-fired thermal and pumped storage hydroelectric power generation served as intermediate load and peak load power sources to supplement fluctuating demand. In recent years, renewable energies came to account for nearly the majority of the electricity supply, especially during daytime hours, as a result of massive sourcing of renewable energies.

However, when electricity produced from solar power generation declines due to unfavorable weather or during nighttime, thermal power sources, including coal-fired power, serve as an intermediate load power source with adjustment capability in the power supply of the country. Therefore, thermal power sources still play a major role in terms of capacity to sustain the stable power supply in Japan, even though their capacity factors have been declining. Particularly, the adjustment capability of thermal power sources is becoming increasingly important, as renewable energy sources continue to expand.

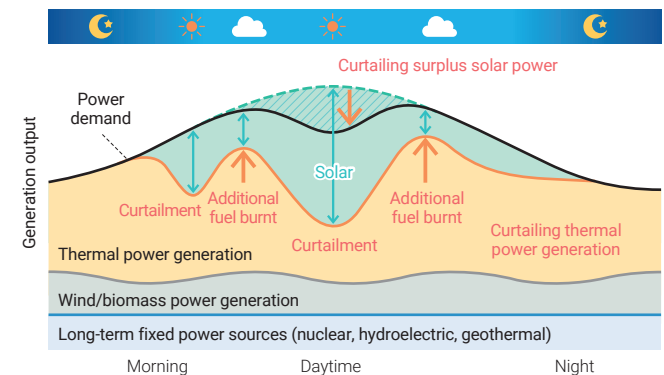
[P.50 Our initiatives to shift the role of coal-fired power to an intermediate power source \(GENESIS Matsushima\)](#)

Energy Mix in Japan (FY2022)



Note: Due to the processing of fractions, the total does not add up to 100.

Source: Created by J-POWER based on Comprehensive Energy Statistics of Japan by the Agency for Natural Resources and Energy



Environment Surrounding the Domestic Electric Power Business

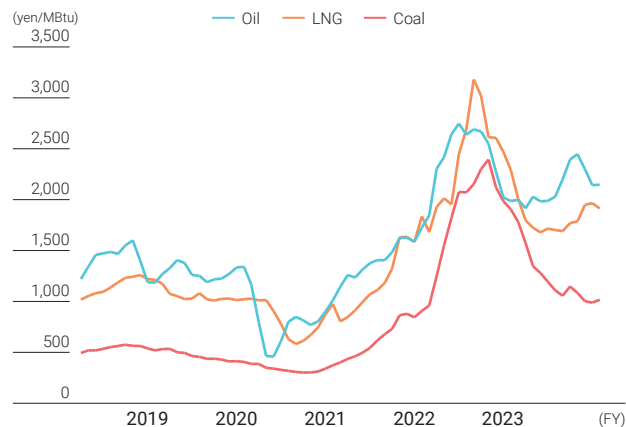
Meanwhile, to achieve a carbon-neutral society by 2050, we are requested a transition of future thermal power sources to zero CO₂-emission thermal power. The transitions currently undertaken by companies, such as the mono/mixed combustion of hydrogen and ammonia and implementation of CCS and CCUS, require large-scale capital investment including the upstream interests development, as well as continuous technological development. The government has set out a policy of phase-out of inefficient coal-fired thermal power plants with supercritical (SC) or lower conditions by 2030.

[P.49 Our initiatives for transition of thermal power source \(7 thermal sites\)](#)

[P.51 Our initiatives for production of blue/green hydrogen and ammonia](#)

In addition to the challenges above, the global disruptions in resource prices triggered by the COVID-19 pandemic and Russia's invasion of Ukraine significantly contributed to the surge in the fuel prices of thermal power sources. Soaring fuel costs and the aforementioned falling capacity factors, are undermining incentives for operators to maintain or construct new thermal power sources.

Trend in unit import prices of fuel

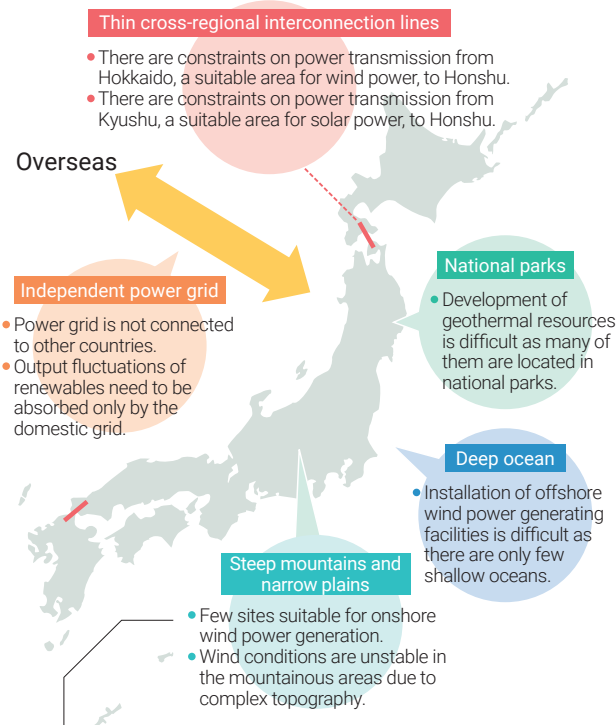


*Fuel prices are converted from CIF prices in Ministry of Finance's Trade Statistics of Japan at the rate of 1 Btu = 252 Cal.

Future expansion of renewable energy is subject to geographical constraints, as Japan is a mountainous land with few shallow oceans. The key to the future expansion of renewable energy lies in the prompt development of promising sites based on the understanding of local communities and the effective utilization of existing sites. Offshore wind power, which is expected to be a large-scale, stable renewable energy source, has limited availability for development in the next few years partly due to capacity constraints in the power grid that connects promising sites with large demand areas.

[P.45 Our initiatives for renewable energy development](#)

[P.52 J-POWER Group's initiatives for enhancing power networks](#)



Future outlook

The development of a range of systems has been progressing aiming at addressing future increases in power demand while also achieving a carbon-neutral society.

As a system designed to secure supply capacity, the bidding for the Long-Term Decarbonization Power Source Auction started in 2024. The system guarantees capacity revenues equivalent to the fixed costs of decarbonization power sources for a 20-year period as a rule, contributing to increasing the foreseeability of new investments in power sources. Qualifying decarbonization power sources include renewable energy as well as new nuclear power plants, and thermal power sources with an eye on future decarbonization.

[P.44 Long-Term Decarbonization Power Source Auction System](#)

In addition, Japan's GX Economy Transition Bonds, with future carbon pricing scheme as its redemption resource, have been issued to support the development of the framework for hydrogen and ammonia, as well as CCS and CCUS. For the use of hydrogen and ammonia, the framework plans to provide support for supply chain to compensate for the price difference with existing fossil fuels, as well as support for the development of storage facilities and other locations for use by multiple industries in Japan. As for the CCS/CCUS, generous public support will be provided for first movers to start operations by 2030.

[P.44 Trends in policies to achieve carbon neutrality](#)

For the enhancement of power grids connecting suitable areas for renewable energy sources with large demand areas, enhancement and new construction of grids, including the nationwide installation of HVDC, are being planned under the "Master Plan for Wide-Area Interconnected Grid" formulated in March 2023. As the implementation of the plan is expected to require an investment of several trillion yen, development of a funding environment, management of completion risk, and the formulation of a revenue scheme are under consideration.

[P.44 Master Plan for Wide-Area Interconnected Grid](#)