

Japan's clean power push: global capital meets local ambition:

This is the latest in a series of country analyses, where *TEI Times* looks at Japan's generation and consumption profiles, policy, emissions targets and investment attractiveness.

The clean energy revolution in Japan is gathering momentum, and both domestic giants and foreign heavyweights are driving the shift. With bold offshore wind targets and solar growth surging, investors are eyeing opportunities – despite policy hurdles and currency risks.

Decarbonisation commitments

Climate action in Japan has been slow but has improved in recent years. It pledged in 2015 to reduce greenhouse gas (GHG) emissions by 26 per cent from 2013 levels by 2030. This was raised in 2020 to 46 per cent by 2030 and net zero by 2050. A 2021 energy plan and a bill passed in 2023 aimed to raise the share of clean energy in the energy mix. They projected non-fossil fuel sources to account for 59 per cent of the total mix by 2030, up from 31 per cent in 2022. Renewables would

on imported fossil fuels, complicating its energy security – especially given the geopolitics of being a neighbour to China. Its historically fragmented electricity network also limits efficient power distribution. In terms of expanding clean energy generation, project development has been slow, constrained by lengthy approval processes and geographic limitations such as mountainous terrain. Critics have flagged Japan's controversial reliance on unproven technologies such as carbon capture and storage and ammonia co-firing.

Energy mix

Japan's electric power generation in 2023 highlights the substantial ongoing shift in its energy landscape. Electricity generation declined 2.6 per cent, with non-fossil fuel generation falling and clean energy generation

Japan's energy mix reflects a complex dynamic between historical disruptions and decarbonisation initiatives. The Fukushima Daiichi nuclear power plant disaster in 2011 prompted the shut down of all the nation's nuclear reactors, many of which are still offline. While progress has been slower than expected, clean energy generation has shifted the energy mix. The country commissioned about 20 GW in solar capacity and a little over 1 GW in wind power in 2020-2024. While net installed capacity hardly increased in recent years, additions may accelerate in the near future. This is driven by the Ministry of Economy, Trade and Industry's expectation electricity demand will rise sharply by 2050 – by 30-50 per cent – driven by electrification in transport, industry, and heating, as well as digital infrastructure such as data centres.

Investment environment

Japan offers investors a solid investment profile, with robust economic fundamentals and a strong commitment to innovation, particularly in clean energy. The country enjoys financial stability, reflected in upper-medium grade sovereign credit ratings – Moody's assigns an A1 rating with a stable outlook, and S&P an A+ rating, also with a stable outlook. Japan ranks 13th out of 133 countries on the Global Innovation Index, underscoring its technological and research strength. This extends to the renewable energy sector, where Japan ranks 10th on the EY Renewable Energy Country Attractiveness Index.

Beyond these indicators, Japan maintains a balanced institutional environment. It ranks 20th on the Global Corruption Perceptions Index and 14th on the World Justice Project Rule of Law Index, indicating a relatively transparent and lawful governance system. However, challenges remain – its 70th place on the Reporters Without Borders Press Freedom Index suggests areas for improvement in media openness.

Two other key considerations for investors are currency volatility and interest rates. The Japanese yen has fluctuated significantly in recent years, rising from just above JPY100 to the US dollar in late 2020 to over JPY160 in June 2024. As a result, foreign investors often need to hedge currency risks, increasing costs. On the other hand, borrowing in yen remains cheap: the interbank rate is around 0.8 per cent, far lower than in any major developed economy.

Policies and incentives

Japan's key net zero policies include the 'Green Growth Strategy' (2021), which identifies 14 high-growth sectors, and the 'GX Promotion Act', which introduced growth-oriented carbon pricing and climate transition bonds. The Strategy highlights critical energy-related industries such as offshore wind, solar, geothermal, and next-generation heat energy. It also promotes the development of EV and battery industries.

To support this transition, the Ministry of Economy, Trade and Industry

created a JPY2 trillion (\$14.1 billion) fund to "provide continuous support for R&D projects, demonstrations, and social implementation projects for up to 10 years to companies that commit to ambitious goals". The 'Basic Hydrogen Strategy' (2017), updated in 2023, targets 12 million tonnes of hydrogen supply by 2040. Nuclear power is being reinforced by extending reactor lifespans to 60 years. Tax incentives include deductions for energy-efficient equipment and renewable energy investments.

However, significant contradictions persist. Japan's fossil fuel subsidies totalled \$77 billion from 2022, undermining decarbonisation goals by discouraging EV adoption and renewable energy expansion. CCS and ammonia co-firing remain costly and largely unproven. Additionally, permitting and regulatory hurdles continue to delay renewable project roll-outs. Japan's climate finance contributions are rated "highly insufficient", posing further obstacles to international climate cooperation.

Investors backdrop

Japan has a robust mix of domestic and international investors in its clean energy sector, particularly in solar and wind. The market gained momentum after the 2012 introduction of the Feed-in-Tariff scheme. Leading domestic investors include trading houses such as Marubeni, Mitsubishi, Mitsu, and Sumitomo, as well as utilities like JERA (a Tepco-Chubu Electric joint venture), Kansai Electric, and Tepco, all of which are actively expanding their clean energy portfolios.

Foreign investors have also entered the market in force. Notable names include Denmark's Ørsted, Germany's RWE, and Norway's Equinor, typically in partnership with domestic firms to develop offshore wind capacity. The offshore wind sector has become particularly active. For example, in December 2024, Japan's industry and land ministries selected two consortiums to develop offshore wind blocks in the third major public auction round. One consortium – comprising JERA, Green Power Investment, and Tohoku Electric – won a 615 MW project off Aomori Prefecture. Another consortium, including Kansai Electric, Marubeni, Marutaka, Tokyo Gas, and BP, secured a 450 MW project off Yamagata Prefecture. Both projects will use Siemens Gamesa turbines and are scheduled to begin operations in June 2030.

Meanwhile, RWE and Kansai Electric are awaiting environmental approval for a proposed 600 MW offshore wind farm near Hokkaido. A growing concern for offshore investors is the rising cost base against fixed auction prices – driven in part by the weakened yen, which makes imported turbines more expensive. This is one of several policy and financial challenges that authorities must urgently address.

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Electricity generation declined 2.6 per cent in 2023, with non-fossil fuel generation falling and clean energy generation rising

Year to 31 December 2023	TWh	Change (%)
Total Generation	1,013.3	-2.6%
Clean energy Generation	354.7	10.5%
Nuclear energy	77.5	49.6%
Hydroelectric	74.5	-0.5%
Other Renewables	149.0	7.8%
Other	53.7	-4.1%
Non-Renewable Generation	658.5	-8.5%
Oil	33.4	-21.4%
Natural Gas	320.9	-8.7%
Coal	304.3	-6.6%

Source: Energy Institute (ed), 'Energy Institute Statistical Review of World Energy 2024' (2024) <<https://www.energyinst.org/statistical-review/home>> accessed 22 April 2025

increase to 36-38 per cent and nuclear to 20-22 per cent, while fossil fuels would fall to 41 per cent from 69 per cent.

The nation continues to face energy sector challenges typical of island nations with few or no natural resources. It is therefore heavily reliant

rising, according to the 'Energy Institute's Statistical Review of World Energy 2024'. Clean energy output jumped 10.5 per cent, thanks to increases of almost 50 per cent from nuclear power and 8 per cent from other renewables, including solar and wind.

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RENEWABLES INVESTMENT COUNTRY PROFILE	RANK/RATING	YEAR	SOURCE
Business & Finance			
Moody's sovereign credit long term rating (Outlook)	A1 (Stable)	2023	countryeconomy.com/ratings
S&P sovereign credit long term rating (Outlook)	A+ (Stable)	2020	countryeconomy.com/ratings
Global Innovation Index	13/133	2024	wipo.int/global_innovation_index/
EY Renewable Energy Country Attractiveness Index 40	10/60	2024	ey.com
Other			
Global Corruption Perceptions Index	20/180	2024	transparency.org/
Reporters Without Borders Press Freedom Index	70/180	2024	rsf.org/en/index
World Justice Project Rule of Law Index	14/142	2024	worldjusticeproject.org/rule-of-law-index/