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G7 POWER SYSTEMS SCORECARD

COUNTRY PROFILE: JAPAN¹

May 2024

Synopsis

OVERALL COUNTRY SCORE: 131/400

Although faring relatively well on energy efficiency, Japan currently has the highest share of fossil fuel-based generation of any G7 country. It also has the highest share of coal power as well as no coal phase-out date, so has a long way to go to decarbonise its power sector. Japan's goal for renewable energy share in 2030 is also lower than that of most other G7 countries, falling short of reaching the IEA's milestones of 60% renewable energy in the power mix by 2030. As such, the power sector is not adequately contributing to Japan's emissions reduction targets. Research by Bloomberg NEF² shows that Japan's current emission reduction trajectory is not on track to meet its 2030 goal of 46% emissions reduction from 2013 levels, nor net zero by 2050.

Japan's approach to the energy transition is fundamentally distinct to that of its G7 counterparts. Japanese officials promoted the concept of "various pathways toward a common goal" at their G7 Presidency in 2023, and are promoting these narratives to developing countries in Southeast Asia, spurred on by vested industry interests. Support schemes like those in the Asia Zero Emissions Community (AZEC) include financing fossil-based technologies; these might be perceived as impeding the regional transition away from fossil fuels.

Headline message – Benchmarks 1–2 (Section 1: Infrastructure/Energy mix)

SCORE 25/120

Japan ranks poorly on most indicators, particularly around reducing fossil fuel reliance (scoring 0 for many of them). It lacks targets to phase out fossil fuels in alignment with G7 goals. In 2023, net zero power (renewables and nuclear) only constituted 31% of total electricity generated, significantly lower than in other G7 nations, placing Japan at the bottom of the rankings. Despite Japan's planned wind and solar capacity projected to surpass requirements for its current

¹ To see the whole Scorecard, including the scoring methodology, visit <https://www.e3g.org/g7-power-systems-scorecard>

² BloombergNEF, July 2023, [New Energy Outlook: Japan](#)



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national 2030 goal, it falls short of reaching the IEA's recommended 60% renewables in the power mix by 2030.

Headline message – Benchmarks 3–5 (Section 2: Policies/Targets)

SCORE: 106/280

While Japan fares well on some energy efficiency indicators, its renewable energy targets and policies lack ambition and specificity and fail to deter fossil fuel investment, despite governmental emphasis on prioritising renewables by 2030. While strategies to improve grid flexibility, deploy storage, and reduce renewables curtailment have been identified, their implementation remains unclear due to the absence of a regulatory framework.

While Japan has been involved in some international energy transition efforts, it has not joined progressive initiatives like the Glasgow Coal to Clean Power Initiative and the Powering Past Coal Alliance (PPCA). Furthermore, Japan continues to offer support schemes including financing fossil-based technologies and promoting fossil fuel-heavy technologies through the Asia Zero Emissions Community (AZEC), which may deter the international effort on clean energy transitions.

Benchmark 1: Reducing fossil fuel reliance

SCORE: 5/60

Japan's power system is still heavily reliant on fossil fuels. In 2023, fossil fuels covered 69% of the power mix, and its carbon intensity of power generation is among the highest in IEA member countries. Japan sees thermal power generation as a reliable baseload to counterbalance the variability of renewable energy sources.³

1.1 New unabated coal and gas power plants in planning or construction

SCORE: 0/15

Although in 2023 Japan has committed to ending new construction of coal power, the country has one pre-permit coal power plant under consideration, the GENESIS Matsushima, which would entail constructing a new 500 MW coal facility within an existing, over 40-year-old power plant in Nagasaki. Japan is also

³ Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, June 2023, **Annual report on energy for fiscal year 4 of Reiwa (Energy White Paper 2023)**, Part 2, Chapter 1



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currently planning and constructing 13 new gas power plants (approx. 8.6 GW capacity).⁴

1.2 Share in electricity generation: fossil fuels

SCORE: 0/15

Japan has 69% fossil fuels in its power sector energy mix (2023),⁵ eight percentage points higher than the global fossil share in electricity generation (61%).⁶ Japan also has the highest level of coal generation of any G7 country.

1.3 Share in electricity generation: non-renewable low-carbon tech

SCORE: 4/15

Nuclear accounted for 7.6% of electricity generation in 2023.⁷ Japan plans to have 20–22% nuclear in its energy mix by 2030. It also plans to have 1% ammonia/hydrogen in power generation by 2030.⁸

1.4 Carbon intensity of power index

SCORE: 1/15

In 2022, the carbon intensity of power index was 113,⁹ the highest in the G7 and among the highest in the IEA member countries.¹⁰ Japan's carbon intensity of power generation in 2023 was 485.39 gCO₂/kWh.¹¹ The carbon intensity of energy supply increased rapidly after 2011 and has only gradually reduced since.

Benchmark 2: Ramping up renewables

SCORE: 20/60

Renewables made up only 24% of the total electricity generated in Japan in 2023. Its overall renewables targets for 2030 (36–38%) remain lower than those of most peers – this already puts the country on the lower band ranking. Some studies have shown that Japan's planned wind and solar capacity could exceed

⁴ Global Energy Monitor, 2024, [Asia Gas Tracker Map](#)

⁵ Ember, May 2024, [Electricity Data Explorer](#)

⁶ Ember, May 2024, [Global Electricity Review 2024](#)

⁷ Ember, May 2024, [Electricity Data Explorer](#)

⁸ Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, October 2021, [Outline of strategic energy plan](#) (PDF), page 10

⁹ IEA, December 2023, [Energy Statistics Data Browser](#)

¹⁰ IEA, March 2021, [Japan 2021: Energy policy review](#)

¹¹ Ember, May 2024, [Electricity Data Explorer](#)



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what is required to reach its current national 2030 goal, but falls short of what is needed to reach 60% renewables in the power mix by 2030, as recommended by the IEA.

2.1 Share of variable RES in electricity generation

SCORE: 2/15

In 2023, Japan generated 0.9% of its electricity from wind, the lowest in the G7. Solar accounted for 10.8%, placing Japan ninth globally, twice the global average of 5.5%.¹² The total share for both solar and wind was 11.7%.¹³

2.2 Share of other RES in electricity generation

SCORE: 3/15

The share of other renewables (specifically hydro and bioenergy) in the power mix was 12% in 2023.¹⁴ However, we note that Japan does not have huge potential for biomass, geothermal or tidal power. On biomass, for example, Japan imports pellets for biomass power generation, where there are questions around its sustainability and environmental impacts.

2.3 Variable RES pipeline capacity vs country's announced target

SCORE: 11/15

Japan had 125.8 GW installed capacity for all renewables as of 2023, of which wind and solar made up 92.3 GW (wind: 5.2 GW, solar: 87 GW).¹⁵

Japan aims to achieve a national target of 187–201 GW of renewable energy capacity by 2030 (which puts the 2030 energy mix ratio of renewables at 36–38%), within which the wind and solar targets make up approximately 127.1–141.2 GW (wind: 23.6 GW, solar: 103.5–117.6 GW).¹⁶ According to the IEA's estimation,¹⁷ the pace of growth expected over 2022–2027 indicates that the country is roughly on track to reach its 2030 renewable generation targets. For example, research on 2030 solar capacity projection by RTS Corporation shows that even business as usual scenarios can provide 147 GW by 2030.¹⁸

¹² Ember, May 2024, [Global Electricity Review 2024](#)

¹³ Ember, May 2024, [Electricity Data Explorer](#)

¹⁴ Ember, May 2024, [Electricity Data Explorer](#)

¹⁵ Ember, May 2024, [Electricity Data Explorer](#)

¹⁶ Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, April 2022, [Future of Renewable Energy Policy](#)

¹⁷ IEA, December 2022, [“Renewable electricity”](#) in Renewables 2022

¹⁸ RTS Corporation, February 2024, [Forecasting PV Installed Capacity in Japan 2023 to 2035](#)



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However, it should be recognised that the prospective projects in the current pipeline indicate that there is a high risk of not delivering on wind power in particular:

- > Wind power: currently 25.3 GW of prospective projects in the pipeline, of which 92% at risk of not delivering (8.4 GW pre-construction, 14.8 GW announced).¹⁹
- > Solar power: currently 2.2 GW of prospective projects in the pipeline, of which 58% at risk of not delivering (0.92 GW pre-construction, 0.36 GW announced).²⁰

Additionally, OCCTO's (Organisation for Cross-regional Coordination of Transmission Operators) data compilation of ten-year electric supply plans submitted by over 1,900 electric utilities in Japan notes that even in 2033, fossil fuel share remains at almost 60%, while renewables share would have increased only slightly (33.5%).²¹ This suggests that Japan's capacity to achieve its 2030 domestic target, not to mention its role in the global aim of tripling renewable power capacity, is still at risk.

2.4 Average permitting time for VRE

SCORE: 4/15

In general, processes are tedious and lead times are long, and the government acknowledges these challenges. The time it takes for an application for business plan approval to be granted by the government fluctuates, and has been raised as a problem. Uptake of offshore wind specifically has been slow due to long lead times (average 7–8 years from project plan approval to start of operation), caused by factors including the environmental assessment (around 4–5 years), location constraints and grid constraints. It seems to be a quite ineffective process with a lot of duplication, as each tendering company is separately responsible for conducting wind and geological surveys, environmental assessments, local measures and securing the grid. However there have been measures to address this, and the government is currently developing a framework for a “centralised” model for the efficient deployment of offshore wind power with the national and local governments playing central roles.²²

¹⁹ Global Energy Monitor, December 2023, [Global Wind Power Tracker Summary Data](#)

²⁰ Global Energy Monitor, December 2023, [Global Solar Power Tracker Summary Data](#)

²¹ Japan Beyond Coal, April 2024, [OCCTO: Coal-fired power projected to account for 29% of Japan's electricity in FY2033](#)

²² Climate Integrate, April 2024, [Offshore Wind in Japan: Policy Agenda and Prospects](#)



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Solar, onshore wind (FIT) over 250 kW, and offshore wind require a tender process. The Act on Promotion of Global Warming Countermeasures amendment enables local governments to set “promotion areas” for which the administrative procedures for renewable energy project deployment can be simplified.²³

Benchmark 3: Adapting the power systems to high-RES share

SCORE: 41/120

While issues relating to grid improvement, flexibility, storage deployment, and limiting renewable energy curtailment have been identified, the measures to take remain unclear, with little to no regulatory framework set up. Some policies are in place to (somewhat) incentivise renewables uptake, and government intends to make “renewables the main source of power with top priority” in 2030. However, these policies do not actively exclude investment into fossil fuels, and have potential loopholes that would allow the life of fossil fuel-based power plants to be extended.

3.1 Policies to limit curtailment to a minimum that ensures optimal RES capacity utilisation

SCORE: 5/15

The Ministry of Economy, Trade and Industry (METI) forecasts that in mainland Japan (excluding Okinawa) there will be a new record in solar and wind curtailment in FY 2023, totalling 1.76 TWh – more than three times the previous record of 0.57 TWh in FY 2022. Regardless of economic efficiency and technical feasibility, the current electricity supply rules prioritise nuclear over solar and wind. According to this rule, in situations of power oversupply, solar and wind are curtailed first, prior to decreasing the output of nuclear reactors.²⁴

METI’s newest package of measures to curb output curtailment, compiled in December 2023, includes several measures to cover both demand and supply sides. One notable measure is to reduce the minimum output of newly built thermal power plants from “50% or less” to “30% or less”, with implementation

²³ Ministry of the Environment, October 2021, **Global Warming Countermeasures Plan**, page 106

²⁴ Renewable Energy Institute, April 2024, **Curtailment Increases Across Japan: Economic Dispatch and Negative Prices Are Key Solutions**



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from 2024.²⁵ The package also includes measures to create an environment to increase the introduction of renewables, and strengthen resilience through grid reinforcement, among others. Particular emphasis will be placed on demand side measures over the medium to long term, with a view to further expanding the introduction of renewables. The government will also take budgetary and institutional measures in the household and industrial sectors in an integrated manner, in order to create and shift demand in line with supply.²⁶

There are discussions²⁷ taking place on the introduction of large storage batteries and virtual energy supply and demand control technologies as initiatives to reduce output curtailment, however there are no concrete rate reduction targets in place yet.

3.2 Active steps by the national grid operator to plan for short spells of 100% RE power

SCORE: 0/15

As there is no 100% renewables target in Japan, there is currently no discussion on this in the Japanese government, nor any regulation in place. Japan has set a target of 36–38% renewables by 2030, and a reference target of 50–60% by 2050 is set out by OCCTO.²⁸

3.3 Effective policies to ramp up electricity storage

SCORE: 7/15

Securing grid regulation for renewables and the need for storage batteries have been addressed in the GX Basic Policy, December 2022,²⁹ as well as in the Basic Hydrogen Strategy³⁰ in June 2023. More than one-third of the GX-related

²⁵ Agency for Natural Resources and Energy; Ministry of Economy, Trade and Industry, December 2023, **Output control measures package**

²⁶ Agency for Natural Resources and Energy; Ministry of Economy, Trade and Industry, March 2024, **Efforts to control renewable energy output control etc.**

²⁷ Agency for Natural Resources and Energy; Ministry of Economy, Trade and Industry, March 2024, **On Virtual Power Plants and Demand Response**

²⁸ Organisation for Cross-regional Coordination of Transmission Operators (OCCTO), March 2023, **Development of a long-term policy for the wide-area grid (master plan for the wide-area interconnected grid)**

²⁹ Ministry of Economy, Trade and Industry, February 2023, **Basic policy for the realisation of GX - Roadmap for the next 10 years**

³⁰ Agency for Natural Resources and Energy; Ministry of Economy, Trade and Industry, June 2023, **Basic Hydrogen Strategy Outline**



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allocations in the national budget for 2024 relate to battery storage (2,300 billion yen).³¹

In the same year that the GX Basic Policy was announced, the government set forth a Storage Battery Industry Strategy³² with the following targets: 1) establish a domestic manufacturing base of 150 GWh/year of storage batteries and materials; 2) Japanese companies to have a manufacturing capacity of 600 GWh/year in the global market, and 3) full-scale commercialisation of all-solid-state batteries by around 2030, and to maintain and secure Japan's position as a technology leader after 2030.

On the other hand, there is no roadmap or concrete plan for how the technologies described in these strategies will be utilised.

3.4 Effective policies to increase end use flexibility

SCORE: 5/15

Japan has taken steps to address end use flexibility, through several measures to reduce output curtailment – such as demand response – and use of storage batteries.

Demand side response (DSR) emerged as a novel approach to grid stabilisation, focusing on adjusting “demand side resources” instead of altering the supply side of electricity. DSR will now be transitioning into the Capacity Market operated by OCCTO, as a dispatchable peaking resource from FY2024 onwards.³³ For more on electricity storage, see indicator 3.3.

3.5 Effective policies to accelerate grid development

SCORE: 5/15

No specific delivery strategy yet, but Japan takes note of these issues and mentions this in:

- > GX Basic Policy
- > 6th Strategic Energy Plan
- > Act on Promotion of Global Warming Countermeasures

³¹ Climate Integrate, March 2024, **Japan Spending Plans for Climate and Energy**, page 3

³² Ministry of Economy, Trade and Industry, August 2022, **Storage Battery Industry Strategy**

³³ European Business Council in Japan, January 2024, **Demand Response**



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- > Amendment of the Renewable Energy Special Measures Law and the Electricity Business Law under the GX Decarbonised Power law
 - > (Not governmental law) “Long-Term Policy for Wide-Area Grid – the Master Plan for Wide-Area Interconnected Grid”, OCCTO .

OCCTO’s master plan study indicated that the base scenario would connect the Hokkaido and Tokyo areas with 6–8 GW of transmission lines, with a renewable energy share of 48%. This would be the baseline on government actions towards strengthening grid capability going forward.³⁴

3.6 Effective policies to enable the required digitalisation of power systems

SCORE: 5/15

There is mention of how DX (digital transformation) should go hand in hand with GX (green transformation).³⁵ The 6th Strategic Energy Plan mentions efforts needed to upgrade grid operation using digital technology and other means to ensure grid stability from the ground up, as well as promoting efficiency and CO₂ savings in energy demand through digitalisation.³⁶ The IEA also mentions Japan has ambitious goals to use digital technologies for efficient electricity demand management and demand response.³⁷

According to REGlobal, Japan seeks to integrate digital technologies to construct a modern power grid that is stable, resilient, efficient, and cost-effective. This involves deploying sensors for the operation and maintenance of transmission and distribution (T&D) facilities, utilising distributed energy resources (DER) for enhanced system operation and congestion management in distribution networks, implementing smart meters, adopting power distribution automation systems, establishing regional microgrids through digital technology, and deploying adaptive under-frequency relays to prevent blackouts.³⁸

³⁴ Organisation for Cross-regional Coordination of Transmission Operators (OCCTO), March 2023, **Development of a long-term policy for the wide-area grid (master plan for the wide-area interconnected grid)**

³⁵ Ministry of Economy, Trade and Industry, September 2022, **Digital Governance Code 2.0**

³⁶ Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, October 2021, **Outline of strategic energy plan**

³⁷ IEA, March 2021, **Japan 2021 Energy Policy Review**

³⁸ REGlobal, December 2022, **Japan’s Electricity Sector Reforms: Transition to next generation power networks - REGlobal - Mega Trends & Analysis**



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3.7 Effective mechanisms or frameworks to prevent preferential treatment for fossil fuel-based generation over RES on the market

SCORE: 9/15

Policies are in place through the GX Basic Policy and others to incentivise renewables uptake, and the government intends to make renewables the main source of power with top priority in 2030. Under the Act on Special Measures Concerning Promotion of Utilization of Electricity from Renewable Energy Sources, the government implemented the feed-in tariff (FIT) programme in July 2012, aimed at incentivising renewable electricity producers and diversifying Japan's power sources. From April 2022, the new market-based feed-in premium (FIP) programme started, which encourages electricity generation linked to electricity market prices.³⁹

On January 2024, Japan launched its first Long-Term Decarbonisation Capacity auction, overseen by the OCCTO.⁴⁰ This subsection within the capacity market focuses on incentivising the development of new projects based on non-fossil fuels with the goal of ensuring stability and predictability in power supply. Successful bidders will win 20-year contracts that offer fixed revenue for operable power plants.

The eligible capacity sources encompass renewable energy, nuclear, power storage, and coal or gas power plants capable of co-firing with hydrogen or ammonia. The latter category can join the auctions as long as they commit to transitioning to 100% non-fossil power generation eventually. Additionally, although the auction is promoted as a “decarbonisation” initiative, LNG projects remain eligible to participate until 2025.⁴¹

Existing policies like the aforementioned GX Basic Policy do not actively exclude investment into fossil fuels, and have potential loopholes that would allow extension of fossil fuel generated power. The current approach in the GX Basic Policy emphasises the development of costly and novel technologies, while largely overlooking projects that would broadly benefit the public interest, such as the greater adoption of existing technologies like low-cost photovoltaic power

³⁹ Ministry of Economy, Trade and Industry, **Understanding the FIT and FIP Programme**

⁴⁰ Organisation for Cross-regional Coordination of Transmission Operators (OCCTO), April 2024, **Long Term Decarbonisation Power Sources Auction Outcomes**

⁴¹ Organisation for Cross-regional Coordination of Transmission Operators (OCCTO), June 2023, **On Long Term Decarbonisation Power Sources Auction**



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generation, incentives for energy efficiency, or support for a just transition through industrial transformation.

3.8 Electrification rate target and roadmap to support delivery

SCORE: 5/15

In 2020, fossil fuels consumed on the demand side accounted for over 70% of Japan's final energy consumption – electrification rates were only 27%.⁴²

In the Clean Energy Strategy, electrification is mentioned as important to accelerate decarbonisation – i.e. heat pumps for hot water and other heat sources, and electrification of power in the transport sector.⁴³

Benchmark 4: Governance / International leadership

SCORE: 9/80

Japan is involved in some international leadership efforts in support of the energy transition (Just Energy Transition Partnerships, Asia Zero Emissions Community, Asia Energy Transition Initiative, bilateral support for energy transition planning), but is not signed up to the Glasgow Coal to Clean Power Initiative, nor the Powering Past Coal Alliance among others. Some of Japan's support schemes within these initiatives still include financing of fossil-based technologies, as well as – in the case of through the Asia Zero Emissions Community – actively promoting fossil fuel heavy technologies. Japan's interpretation of the 2035 fully or predominantly decarbonised power sector commitment is also unhelpful, with the Ministry of Environment noting “predominantly” means over 50%.

4.1 2035 carbon neutral power system commitment adopted in national legislation

SCORE: 0/10

Japan agreed to the G7 commitment of achieving a fully or predominantly decarbonised power sector by 2035⁴⁴ – but there is a big interpretation gap

⁴² Tokyo Electric Power Company, August 2022, **Upgrading demand towards carbon neutrality - electrification and local production and consumption of energy**, page 8

⁴³ Ministry of Economy, Trade and Industry, May 2022, **Clean Energy Strategy Interim Report (Summary)**, page 2

⁴⁴ Ministry of Foreign Affairs, May 2023, **G7 Leaders' Communique**, page 16



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domestically: Japan views the wording “predominantly” as over 50%, as opposed to the other G7 countries (almost fully).⁴⁵

4.2 Global leadership on supporting power systems decarbonisation in developing countries

SCORE: 3/10

Japan signed up to the Global Renewables and Energy Efficiency Pledge at COP28, committing to support the achievement of tripling renewables capacity and doubling energy efficiency by 2030. On the Powering Past Coal Alliance (PPCA), only Kyoto City is signed up as a subnational member. The country itself has not signed up given its reliance on coal. Japan is also not part of international alliances or networks on fossil fuel phase-out.

4.3 International commitments on power systems decarbonisation through alliances or networks such as the PPCA, Glasgow Coal to Clean Power Initiative etc.

SCORE: 2/10

Japan is involved in some international leadership efforts in support of the energy transition including JETPs, but not signed up to Glasgow Coal to Clean Power Initiative. Japan-led support schemes like those in the Asia Zero Emission Community (AZEC)⁴⁶ include financing fossil-based technologies, which risks delaying fossil fuel phase-out. Japan’s own public international energy financing has also heavily focused on fossil fuels rather than clean energy solutions.⁴⁷

4.4 Net zero power system roadmap to drive delivery of 2035 commitment

SCORE: 0/10

Japan agreed to the G7 commitment of achieving a fully or predominantly decarbonised power sector by 2035⁴⁸ – but there is a big interpretation gap: Japan views the wording “predominantly” as over 50%, as opposed to the other G7 countries (almost fully).⁴⁹ Therefore there are no net zero power delivery roadmaps in place.

⁴⁵ Ministry of the Environment, May 2022, **Record of Minister Yamaguchi's post-cabinet press conference**

⁴⁶ Ministry of Economy, Trade and Industry, December 2023, **Prime Minister Kishida and Minister of Economy, Trade and Industry Saito attend the Asian Zero Emissions Community (AZEC) Summit**

⁴⁷ Oil Change International, 2024, **Public Finance for Energy Database**

⁴⁸ Ministry of Foreign Affairs, May 2023, **G7 Leaders' Communique**, page 16

⁴⁹ Ministry of the Environment, May 2022, **Record of Minister Yamaguchi's post-cabinet press conference**



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4.5 Critical role of renewables, interconnection, and demand side measures reflected in country's energy security framework

SCORE: 2/10

Japan has long recognised the need to improve its low energy self-sufficiency ratio, and sees renewable energy and nuclear power as ways to contribute to this. However, Japan's energy security policy also emphasises aspects such as energy source diversity, diversification of energy import sources and reduction of chokepoints. These priorities influence Japan's current strategy to keep using all possible energy sources, and its stance of increasing investment into upstream LNG production.

4.6 Unabated coal phase-out date and roadmap to support delivery

SCORE: 0/10

Japan has no coal phase-out date. Japan currently plans for its 2030 electricity mix to include 19% coal, alongside 20% LNG.⁵⁰

The government has indicated that subcritical and supercritical coal plants will be closed by 2030, however a clear trajectory to achieve this is not available. There is no explicit commitment or plan to close other types of coal plants. Additionally, Japan is actively seeking out new technologies to continue operating existing coal-fired power plants, including by co-firing with ammonia/hydrogen, and exporting this technology to Asia within the Asia Zero Emissions Community (AZEC).

4.7 Unabated gas phase-out date and roadmap to support delivery

SCORE: 0/10

Japan has no gas phase-out date. In 2030, gas is planned to cover 20% of the power mix, down from 35% in 2022. After the Fukushima Daiichi nuclear accident in 2011, Japan saw gas as an important fuel to replace nuclear, and now a "transition fuel" towards decarbonisation. Japan is currently planning and constructing 13 new gas plants (8.6 GW capacity).⁵¹ It has a gas transition finance roadmap set (mostly focussed on technological advancements towards methanation), but nothing concrete.

⁵⁰ Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, October 2021, [Outline of strategic energy plan](#) (PDF), page 12

⁵¹ Global Energy Monitor, 2024, [Asia Gas Tracker Map](#)



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4.8 2030 target for share of total RES in electricity generation

SCORE: 2/10

According to the 6th Strategic Energy Plan, Japan has set a target for 36–38% renewables in 2030 (solar 14–16%, wind 5%, geothermal 1%, hydropower 11%, biomass 5%),⁵² which is one of the lowest among the G7 countries.

Benchmark 5: Reducing energy waste

SCORE: 56/80

Japan has long been actively involved in energy conservation and has achieved some of the highest energy savings in the world. By 2030, the government aims to improve energy consumption efficiency by around 40% compared to 2012 levels. In the 2024 fiscal budget, 21% of the climate and energy budget is dedicated to energy efficiency.

5.1 Efficient policies to retrofit / renovate buildings

SCORE: 12/20

Japan revised its Building Standard Law and the revised Building Energy Conservation Law in June 2022. Compliance with energy conservation standards will become mandatory from 2025 for all new buildings, building extensions and renovations.⁵³ Japan aims to achieve on average net zero energy consumption for newly constructed buildings (ZEBs) and houses (ZEHs) by 2030,⁵⁴ and for all buildings and houses by 2050. Japan has been spending more on building retrofit support in December 2023 (noted in indicator 5.3).

5.2 National energy/power savings target

SCORE: 12/20

Japan has long been actively involved in energy conservation and has achieved some of the highest energy savings in the world.⁵⁵ In the Sixth Strategic Energy Plan formulated in 2021, it laid out plans to increase energy consumption

⁵² Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, October 2021, **Outline of strategic energy plan** (PDF), page 12

⁵³ Ministry of Land, Infrastructure, Transport and Tourism, June 2022, **Act on Partial Amendment to the Act on the Improvement of Energy Consumption Performance of Buildings to Contribute to the Realisation of a Decarbonised Society (Act No. 69 of 2022)**

⁵⁴ Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, October 2021, **Outline of strategic energy plan** (PDF), page 6

⁵⁵ Ministry of Economy, Trade and Industry, December 2023, **What has changed in the Revised Energy Saving Law, which comes into force in April 2023?**



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efficiency and increased energy savings to around 62 million kilolitres crude oil equivalent. This would require improving energy consumption efficiency by around 40%, over the period from 2012 to 2030.⁵⁶

Japan revised the “Act on the Rational Use of Energy and on the Conversion to Non-fossil Energy” in April 2023. The three main pillars in the Act are: 1) Expanded scope of “rationalisation of energy use”; 2) Transition to non-fossil energy sources; 3) Large consumers (i.e. industrial sectors), are required to optimise demand for electricity.⁵⁷

5.3 Sufficient spending on energy efficiency programmes

SCORE: 16/20

21% of the climate/energy budget in the 2024 fiscal budget is dedicated to energy efficiency.⁵⁸ In December 2023, the Cabinet agreed to support the industrial sector on energy efficiency and expanded the budget to 700 billion yen (approx. \$4.9 billion) over the next three years. There will also be support for energy efficiency in housing through the collaboration between the three ministries of Ministry for Economy, Trade and Industry (METI), Ministry of Land Infrastructure and Tourism (MLIT) and Ministry of Environment (MOE) – 461.5 billion yen (approx. \$3 billion), including new construction.⁵⁹

5.4 High-quality appliance and equipment standards and labelling

SCORE: 16/20

Japan has one of the longest running energy efficiency standards and labelling programmes and the most stringent standards worldwide, The Japanese Top Runner Programme being one good example. This programme sets the efficiency target level some four to ten years in advance based on the best available technology.⁶⁰

Japan also has set forth a Unified Energy Saving Labeling Programme, spurred by the revision of the Energy Conservation Act in 2005. The label is required for nine

⁵⁶ Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, August 2022, **2021 – Understanding the Current Energy Situation in Japan (Part 2)**

⁵⁷ Ministry of Economy, Trade and Industry, March 2023, **Ordinances and Public Notices for Enforcement of the Act on Rationalizing Energy Use and Shifting to Non-fossil Energy Promulgated Today**

⁵⁸ Climate Integrate, March 2024, **Japan Spending Plans for Climate and Energy**, page 7

⁵⁹ Agency for Natural Resources and Energy, January 2024, **Energy efficiency and conservation support package in the 2023 supplementary budget**, page 2

⁶⁰ International Energy Agency, September 2021, **Achievements of Energy Efficiency Appliance and Equipment Standards and Labelling Programmes**, page 20,27



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designated products: air conditioners, electric refrigerators and freezers, electric toilet seats, TV sets, LED lights, and water heaters using electricity, gas and oil.⁶¹

Guidelines have also been set in September 2023 on labelling for energy efficiency in housing⁶² – but these are not mandatory. This has taken effect from April 2024.

About E3G

E3G is an independent climate change think tank with a global outlook. We work on the frontier of the climate landscape, tackling the barriers and advancing the solutions to a safe climate. Our goal is to translate climate politics, economics and policies into action.

E3G builds broad-based coalitions to deliver a safe climate, working closely with like-minded partners in government, politics, civil society, science, the media, public interest foundations and elsewhere to leverage change.

More information is available at www.e3g.org

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⁶¹ International Energy Agency, October 2021, [Unified Energy Saving Labeling Program - Japan](#)

⁶² Ministry of Land, Infrastructure, Transport and Tourism, September 2023, [Energy-saving performance indication system based on the Building Energy Saving Act Outline document for business operators](#) (PDF)