



How Japan Thinks about Energy Security

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THE ISSUE

Energy security is a significant challenge for Japan. As an import-dependent country, Japan has sought to protect itself from fossil fuel supply disruptions and shocks by cultivating strong relationships with exporting countries and investing throughout the energy value chain. More recently, both its largest utilities and its state institutions have focused on raising investment in renewable energy, aiming to decarbonize while retaining a diversity of energy sources. The country pledges ambitious but realistic emissions reductions. Transition pathways will vary in every country, and Japan naturally takes a different view on energy matters than resource-rich countries like the United States. Japan's climate targets and energy planning show that progress is possible without following exactly the same trajectory as Washington or Brussels.

Two recent events show that Japan is not always on the same page as the United States and Europe regarding energy security and energy transitions. When the Biden administration “**paused**” approvals of new U.S. liquefied natural gas (LNG) export projects, the strongest international reaction was not in Europe—the destination for most U.S. LNG cargoes since 2022—but **in Japan**. Japanese officials registered **concerns** about potential restrictions on future gas supply. And in the run-up to last year’s G7 summit in Hiroshima, the role of natural gas in the energy transition was a topic of considerable debate. The 2023 G7 **communiqué** suggested that public investment in natural gas projects “can be appropriate as a temporary response, subject to clearly defined national circumstances, if implemented in a manner consistent with our climate objectives without creating lock-in effects.” Convoluted language—partly repeated in a recent ministerial

G7 **communiqué**—suggests it was a challenge to reach this compromise.

These are small but telling examples of a different mindset in Japan regarding energy security. As an import-dependent country with limited natural resources, Japan has created a unique set of institutions and government agencies to protect its energy security. Its emissions reductions pledge is ambitious but realistic, with a note of caution about how quickly it can transition from fossil fuels.

This brief examines Japan’s energy security planning and how its priorities shape its energy investment, diplomatic engagements, and climate policy. Japan’s strategy is worth a deeper look, not just because it is a major energy consumer, but because Japan’s positions affect international climate negotiations and relations with major energy exporters. The brief summarizes Japan’s energy challenges and the institutions it has created over the years to bolster energy security, as well as how Japan’s energy security

strategies have evolved due to internal and external events. The authors assess the relevance of Japan's energy security strategy for the global energy transition.

JAPAN'S ENERGY CHALLENGES

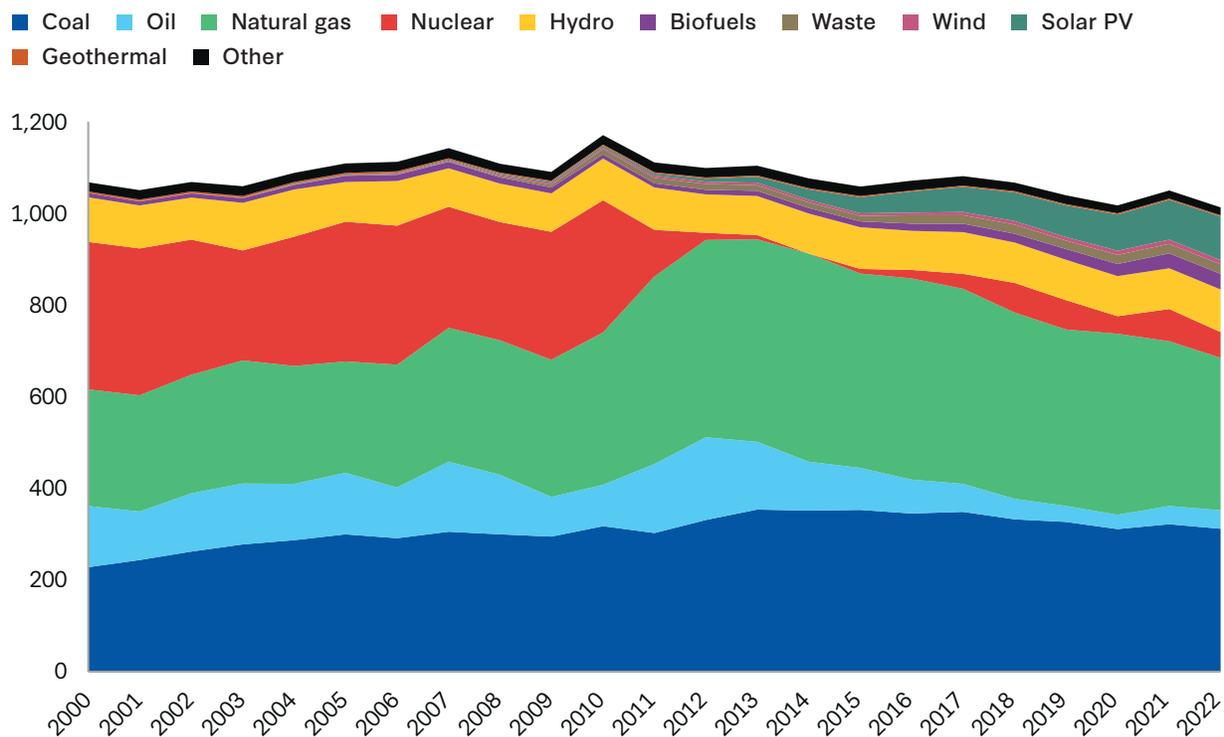
For decades, energy security has been a significant challenge for Japan. The country has negligible hydrocarbon resources and is extremely dependent on imports of oil, natural gas, and coal. In 2022, net imports accounted for **90 percent** of Japan's total energy supply (the energy required to supply end users, including through transformation into fuels or electricity). This import dependence shapes Japan's energy choices and planning.

Fossil fuels have traditionally made up a large share of Japan's energy mix (see Figure 1). Nuclear energy received strong policy **support** after the 1970s oil shocks, and it supplied **30 percent** of Japan's power generation in 2010. But the 2011 Fukushima disaster led Japan to shut down all of its 54 nuclear reactors **by 2014**. Nuclear energy restarts remain controversial, although public opinion polls show a gradual **increase** in support for nuclear power. Japan has **now restarted** 12 nuclear units, reaching operating capacity of about 11 gigawatts (GW) last year. Wind and solar energy

have meanwhile grown rapidly, despite unique obstacles to renewable energy deployment: Japan has limited land for onshore solar energy deployment due to its mountainous terrain and competition with agriculture for land use, and its steep coastal shelf limits its offshore wind potential. Still, solar generation capacity has **surged** in the past decade, since the introduction of a **feed-in tariff**. In 2022, solar energy accounted for **10 percent** of Japan's electricity generation, making Japan's installed solar capacity the third largest in the world. Renewable energy (including solar, wind, hydropower, and geothermal energy) now constitutes about 20 percent of Japan's electricity generation. Coal will continue to play a key role in the power mix well beyond 2030, but Japan is seeking to cut associated emissions by promoting new technologies such as ammonia co-firing.

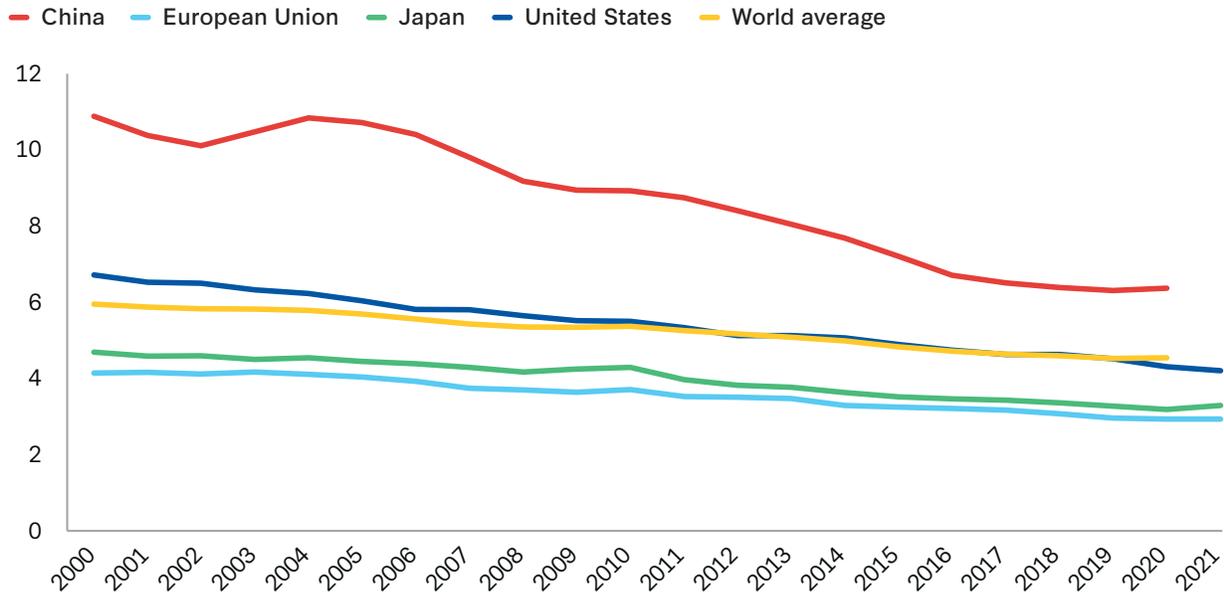
Japan has also focused for decades on **energy efficiency** measures. Mandatory corporate energy efficiency targets, research and development on new technologies to cut energy use in industry and households, energy labeling for appliances and automobiles, and better standards helped to cut Japan's energy consumption per unit of GDP. Japan's CO₂ **emissions per capita** are well below those of the United States and many industrialized economies.

Figure 1: Japan's Electricity Generation by Source, Terawatt Hours



Source: "Japan: Energy Mix," International Energy Agency, n.d., <https://www.iea.org/countries/japan/energy-mix>.

Figure 2: Energy Intensity Comparison, Megajoules of Energy per \$ 2017 GDP, Purchasing Power Parity Basis



Source: "Energy intensity level of primary energy (MJ/\$2017 PPP GDP) - Japan, United States, China, European Union," World Bank Open Data, 2023, <https://data.worldbank.org/indicator/EG.EGY.PRIM.PPKD?locations=JP-US-CN-EU>.

EVOLUTION OF ENERGY SECURITY GOALS

Japan's thinking on energy security has evolved over time, punctuated by major internal and external events. The organizing principle underpinning the country's energy security in the post-World War II period was **affordability**, as the economic boom accelerated energy demand for various industrial activities and grew automobile ownership. Major oilfield discoveries in the Middle East and North Africa led to a shift from coal to oil under Japan's pursuit of "**low and stable energy supply**" in the 1960s, reducing its energy self-sufficiency from **58 percent to 15 percent**. Import dependence deepened with the start of LNG imports in 1969, as the Japanese government began promoting natural gas use in earnest to counter the growing air pollution from oil and coal combustion.

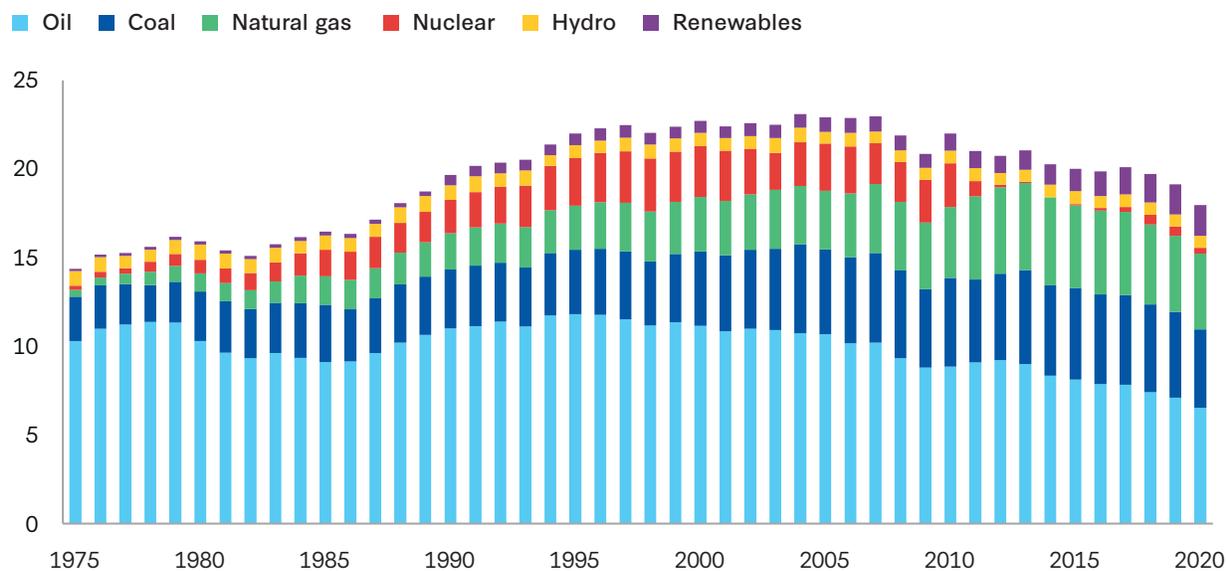
Resource access and resource diversification became critical goals after the oil shocks of the 1970s, which exposed Japan's high **reliance** not only on crude oil imports (77 percent of primary energy supply) but also on Middle Eastern sources (about 80 percent of oil import sources). Lasting effects of the oil shocks included the establishment of oil stockpiles and Japan's strong promotion of nuclear power generation. As of late 2022, Japan held sufficient strategic stocks and commercial inventories of crude oil and

petroleum products to meet **217 days** of its net imports, far exceeding the International Energy Agency (IEA) **requirement** of 90 days of net import cover. And to underpin the fast economic growth of the 1980s and 1990s, Japan accelerated the use of nuclear power generation, starting **new reactor** construction every year in the 1980s.

Japan also sought to strengthen access to overseas oil and gas projects through investments by government institutions such as the Japan National Oil Corporation (JNOC) as well as private companies. It emphasized strong diplomatic engagement with countries that have a wealth of resources, including hydrocarbons and non-ferrous metals and minerals. Japan has also been active in forging cooperation and consultation among **oil-consuming countries**, especially through the IEA.

During the high oil price period of the early 2000s, the notion of **resilience** became prominent in Japan's energy policies, highlighting the importance of oil stockpiling and consultations with oil and gas trading partner countries. The Japanese government doubled down on energy diversification, including significant promotion of nuclear power use and the pursuit of a spent fuel reprocessing project. The 3rd Strategic Energy Plan issued in 2010 targeted a **50 percent share** for nuclear energy in Japan's power supply by 2030. This objective was dashed by the Great Eastern

Figure 3: Japan's Primary Energy Consumption by Source, Exajoules



Source: "Energy White Paper 2023 (FY 2022 Annual Report on Energy)," Japanese Agency for Natural Resources and Energy, June 2023, <https://www.enecho.meti.go.jp/about/whitepaper/2022/html/2-1-1.html>.

Japan Earthquake of March 2011, which led to a massive overhaul of the national energy strategy. Post-earthquake nuclear safety regulations and anti-nuclear public sentiment brought much of the nuclear power fleet to a halt for the few subsequent years.

The U.S. shale oil and gas revolution supported Japan's emphasis on **import diversification** to boost energy security while the government worked toward gradually restarting nuclear power reactors. Common features of U.S. LNG contracts, such as destination flexibility and price indexation to low U.S. domestic gas prices, appealed to Japanese policymakers and business leaders seeking alternatives to the rigidity of traditional LNG contracts. A 2017 **investigation** by Japan's Fair Trade Commission concluded that new free-on-board LNG contracts with restrictions such as destination clauses could be construed as a breach of Japanese antitrust regulations, bolstering the preference for flexibility within portfolios of contracted supplies for Japanese companies.

While LNG supply growth and diversification bolstered Japan's quest for **economic efficiency**, Russia's war on Ukraine raised acute energy security concerns. European economies rushed to secure non-Russian sources of oil and gas, and Western sanctions on Russian energy projects complicated Japan's ties to one of its few major suppliers outside the Middle East. The Russian invasion

placed a premium on **physical access** in Japan's energy security strategy. For example, the **strategic buffer** LNG system launched in December 2023 requires companies to secure a minimum of one extra LNG cargo per month during peak winter demand to protect against potential supply disruptions.

RESOURCE DIPLOMACY AND STRATEGIC INVESTMENTS

As an island nation with almost no domestic hydrocarbon resources, Japan has spent decades focusing on ways to secure its energy supplies and protect itself against external shocks. Traditionally, it has depended on Middle Eastern countries for crude oil imports, including Saudi Arabia, the United Arab Emirates (UAE), and Kuwait. Its LNG imports are more diversified, with legacy supply deals from Indonesia, Malaysia, and Brunei more recently overshadowed by LNG supplies from Australia. Qatar and Oman remain among Japan's largest Middle Eastern LNG suppliers.

Extreme dependence on fossil fuel imports has required Japan to protect itself from supply disruptions, cultivate strong relationships with energy exporting countries, and invest throughout the energy value chain to shore up its energy supplies. These strategic investments can be seen across regions and in particular industries, such as Japan's energy ties in the Middle East and its role in supporting LNG projects.

MIDDLE EAST ENERGY INVESTMENTS

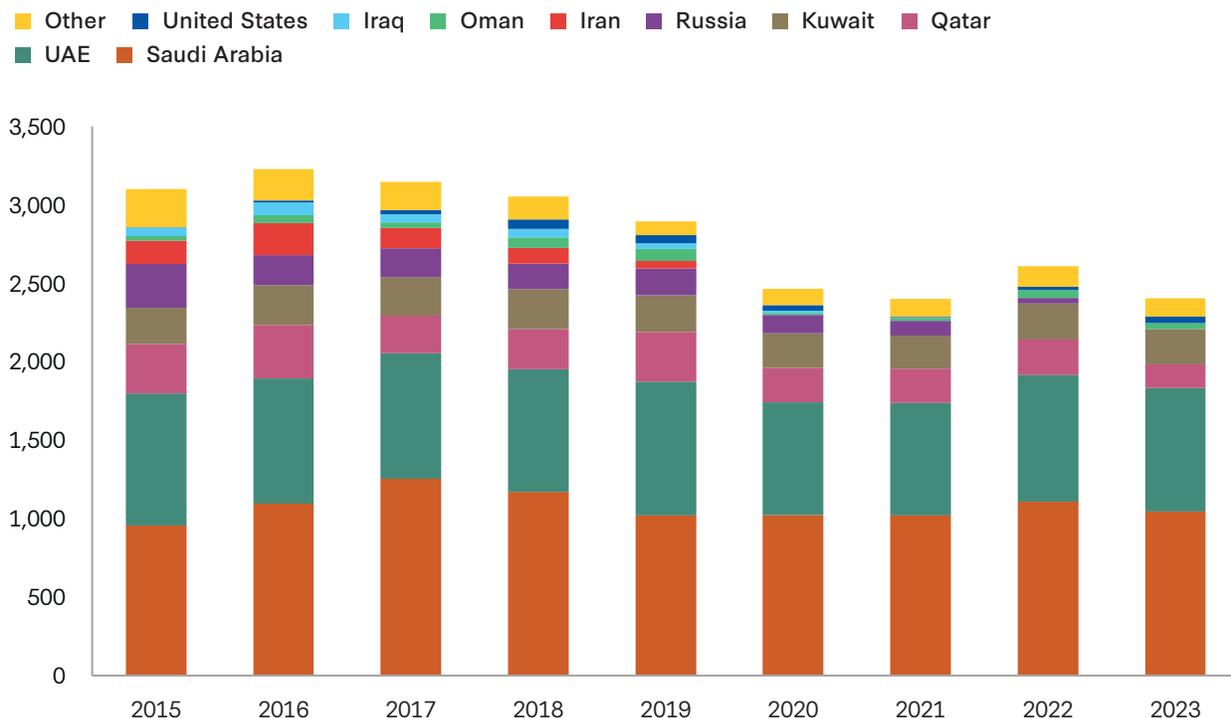
Japan has made strategic energy investments over decades in the Middle East. It is one of the largest crude oil export markets for Saudi Arabia, and Japanese companies have invested in the country's petrochemicals industry, which remains open to equity investments (unlike the domestic upstream sector, where Saudi Aramco holds a monopoly). The first generation of chemical projects in Saudi Arabia involved joint ventures with Japanese companies such as **Sumitomo**. In the UAE, Japan has been a partner in upstream oil and gas since the 1970s, with companies including Jodco (the local Inpex subsidiary) and Cosmo Oil operating smaller concessions while U.S. and European majors partnered in the largest onshore and offshore concessions. Inpex is an **important partner** for Abu Dhabi National Oil Company in onshore and offshore concessions as well as a newer onshore exploration block. In Qatar, Japanese companies including Mitsui and Marubeni were joint venture **partners** in the country's first LNG trains and Chubu Electric was a **foundation buyer**. Japanese lenders and the Japanese export credit agency provided critical **funding** to help get Qatar's LNG industry up and running.

And in Iraq, several Japanese companies won stakes in the country's postwar oil and gas bid rounds.

While South Korean, Chinese, and more recently South Asian companies have emerged as important investment partners in the UAE and Qatar, these host governments value the long-standing presence of Japanese companies. Japan has also sought other ways to strengthen energy trade and investment opportunities in the region. It has often paired energy sector investments with **support** from its policy-based financial institution, the Japan Bank for International Cooperation (JBIC); technical **cooperation** from the Japan Organization for Metals and Energy Security (JOGMEC); or **insurance** from Nippon Export and Investment Insurance (NEXI).

Of course, there are commercial drivers for individual energy investments in the region, and national energy security considerations are not always an important factor. It is also **debatable** that Japan's decades-long investment in Middle Eastern energy projects has helped bolster its energy security. Japan has faced the same political and commercial risks with its Middle Eastern ventures as other investors. Still, Japan has recognized the importance of

Figure 4: Japan's Oil Imports by Country, Crude and Condensate, Thousand Barrels Per Day



Source: Kpler.

Middle Eastern energy resources and has developed ties over many years to secure supplies from the region.

LNG INVESTMENTS

It is no exaggeration to say that Japan **helped to build** the global LNG industry. As it sought to address growing air pollution concerns, satisfy energy demand, and find alternatives to oil and coal-derived gas, Japan first explored the possibility of importing LNG in the early 1960s. Tokyo Electric Power Company and Tokyo Gas were foundation buyers for the country’s first LNG imports, with the **maiden cargo** from Alaskan LNG arriving in 1969. In the ensuing decades, Japan played a pivotal role in supporting new LNG projects in Brunei, Malaysia, Australia, Indonesia, and Qatar. In the backdrop of the oil crises and increasing climate change concerns, Japanese corporations grew their interests in LNG projects and state level support played a unique role in de-risking these capital-intensive ventures in the early stages. Now, state support is considered a vital tool to allow energy access to Japanese companies but also enable natural resource projects to receive financing and guarantees.

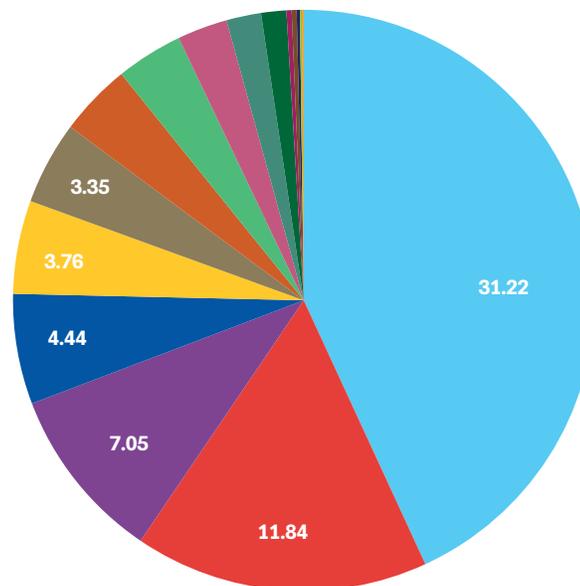
Support from Japanese state institutions has helped to unlock private capital for LNG projects. JBIC, with its **man-**

date to support Japanese energy security, has played an especially important role in LNG **project developments**. Affiliated with the Ministry of Finance, JBIC provides financing and loan guarantees—often alongside **trade insurance** from NEXI, which is affiliated with the Ministry of Economy, Trade, and Industry (METI)—that helps reduce political and commercial risks and encourage investment from private lenders. JOGMEC, also affiliated with METI, has expanded its role in supporting commercial projects over the decades. It provides equity investments in upstream exploration and production, alongside loan guarantees for Japanese banks that have participated in many syndicated loans for LNG projects, including some of the **largest** project finance deals in history. Equity investment and financing from these agencies signals government backing for these projects.

Japanese companies support LNG projects as foundation buyers but also as equity investors. By the 1990s, Japanese utilities had secured offtake agreements from many LNG projects and began to extend their presence as equity investors. Direct **investment** in liquefaction ventures gave Japanese companies a stake in the commercial structuring of various projects, and in addition to securing

Figure 5: Japan’s LNG Imports by Country, 2022, Million Tons, Net Imports

■ Australia ■ Malaysia ■ Russia ■ United States ■ Papua New Guinea ■ Brunei ■ Indonesia
■ Oman ■ Qatar ■ UAE ■ Nigeria ■ Peru ■ Egypt ■ Trinidad & Tobago
■ Algeria ■ Equatorial Guinea



Source: International Gas Union, *2023 World LNG Report* (London: International Gas Union, July 2023), <https://igu.org/resources/Ing2023-world-Ing-report>.

equity offtakes, this perhaps helped them better manage aboveground risks and partnership risks. Japanese gas buyers hold ownership stakes in many LNG projects in Australia, Qatar, Oman, the United States, Southeast Asia, and elsewhere.

Japan is one of the world’s largest LNG buyers, and it has **traded places** with China in recent years as the world’s largest importer. Japan continues to rely on LNG as a critical energy source, and the government takes a keen interest in the long-term role of gas due to Japan’s dependence on LNG as well as the presence of Japanese companies throughout the LNG value chain. However, dependence on LNG creates vulnerabilities as well. In this regard, the growth of U.S. LNG has provided geopolitical, market, and energy security **benefits** to Japanese buyers.

Long-term contracted LNG volumes for Japanese utilities **are decreasing**, with many legacy contracts coming to an end in the 2030s. Some of this is due to supply-side factors, but the main reason is uncertainty over long-term gas demand—and in particular the prospective role for gas alongside renewable energy and nuclear energy. Japan’s forthcoming 7th Strategic Energy Plan will have a signifi-

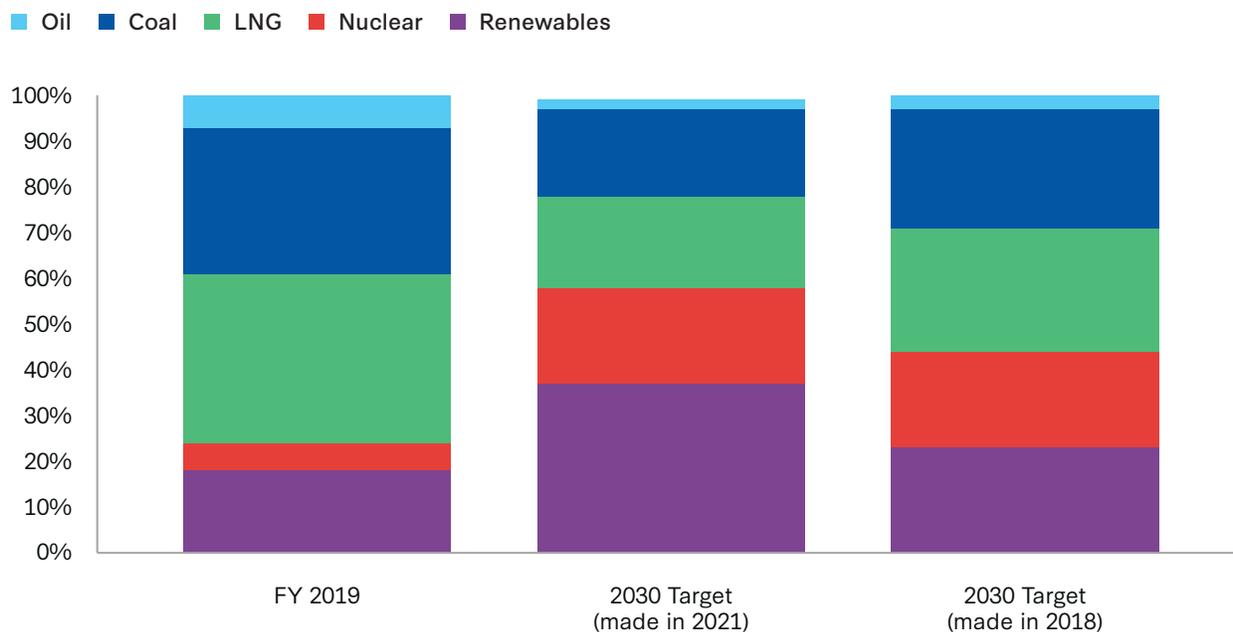
cant impact on the mandates for various gas and power utilities and other gas buyers for decades to come.

RELEVANCE FOR GLOBAL ENERGY AND CLIMATE POLICY

Japan’s energy security challenges are considerable. As an import-dependent country, it is extremely vulnerable to supply disruptions as well as price shocks. Japan has invested in fossil fuel projects and established strong relationships with energy-exporting countries to secure energy supplies. More recently, its largest utilities as well as state institutions have focused on raising investment in **renewable energy**, to decarbonize while retaining a diversity of energy sources. Lower-carbon fuels such as hydrogen and ammonia feature prominently in the net-zero plans of Japan’s largest utilities.

Some analysts argue that Japan is **falling behind** in its energy planning and failing to cut emissions as rapidly as it should. Contributing factors include an electricity market structure and tariff schemes that hamper renewable energy penetration. Critics also argue that Japan’s nationally determined contribution (NDC)—its **plan** to reduce

Figure 6: 6th Strategic Energy Plan Targets, Share of Electricity Generation, Percentage



Source: Agency for Natural Resources and Energy, “Outline of Strategic Energy Plan,” Ministry of Economy, Trade, and Industry (METI), October 2021, https://www.enecho.meti.go.jp/en/category/others/basic_plan/pdf/6th_outline.pdf.

economy-wide emissions by 46 percent from 2013 levels by the year 2030—lacks ambition.

But transition pathways will vary in every country, and Japan naturally takes a different view on energy matters than resource-rich countries like the United States or large networked regions such as the European Union. There is a world of difference between Japan's challenges and the abundance in North America of oil, natural gas, coal, wind and solar resources, energy and transport infrastructure, and deep capital markets to facilitate investments. China has an abundance of energy resources—although its population size and rapid growth necessitate ever-larger imports—and even the European Union holds **8 percent** of global coal reserves and some oil and gas resources, plus proximity to stable supplies from Norway. Japan has none of these resources. To complicate its energy planning, the country is also vulnerable to natural disasters, including earthquakes and typhoons.

Resource scarcity and import dependence raise the stakes in Japan's transition planning. The country must meet its decarbonization pledges while also maintaining a safety net in case its efforts fall short. Its energy security has been built on prudent planning, including consultations with the energy industry that provide long-term assurance for investments and contract commitments and help avoid misalignment between public and private sector interests. Japan's utilities and industrial players, like their counterparts abroad, have set net-zero and emissions reduction targets. But electrification, for example, poses challenges in Japan, where heavy industry also grapples with relatively high energy costs and the country faces more supply chain costs and complexity than other industrialized economies. Energy security concerns and import dependence also make Japan wary of carbon border adjustments and other fees on embedded emissions.

None of these factors suggest that Japan is ignoring the imperative to cut emissions. In fact, Japan is doing much better than most G7 countries in achieving its **NDC targets**. But the country's energy realities mean that it generally expresses greater caution on the pace of the energy transition, including how quickly it can phase out coal and natural gas. In this regard, Japan's approach is not so different from many other importing countries—both developed economies and emerging markets.

Japan's climate targets and energy planning show that progress is possible without following exactly the same trajectory as Washington or Brussels. Japan has a unique perspective to offer in G7 negotiations and global climate talks, reflecting climate ambitions as well as pragmatism. And as Japan continues to pursue its energy security goals and its long-term transition plans, the United States has a key role to play in enhancing Japanese energy security, both as a fossil fuel exporter and a country working through its own complicated but inexorable energy transition. ■

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