

Japan's Largest LNG Buyers Have a Surplus Problem

As Domestic Gas Demand Falls, Japanese Utilities
are Looking to Offload Excess LNG Supply in South
and Southeast Asia

Sam Reynolds, Research Lead, LNG/Gas Asia
Christopher Doleman, LNG/Gas Specialist, Asia



Contents

Key Findings.....	4
Executive Summary.....	5
I. Introduction	7
Japanese LNG Market Overview	7
Background on Japan's LNG Contracting Activity	8
Japanese Companies Focus on Growth Opportunities in Southeast Asia	10
II. Limited Growth Opportunities in Japan's Domestic Gas Market	11
A Nuclear Resurgence and the Growth of Renewables.....	11
Long-term Climate and Energy Plans.....	13
Demographic Fundamentals	14
Restructuring of Domestic Gas and Power Markets	14
III. Dealing with Surplus LNG	15
IV. Company Case Studies	17
JERA.....	17
Tokyo Gas.....	19
Osaka Gas	21
Kansai Electric.....	23
V. A Global Market Perspective.....	25
Conclusion	28
APPENDICES.....	29
Appendix 1: Summary of JERA's Business Activities in Southeast Asia.....	29
Appendix 2: Summary of Tokyo Gas's Business Activities in Southeast Asia	31
Appendix 3: Summary of Osaka Gas's Business Activities in Southeast Asia.....	32
Appendix 4: Summary of Kansai Electric's Business Activities in Southeast Asia	33
About IEEFA.....	34
About the Authors.....	34

Figures and Tables

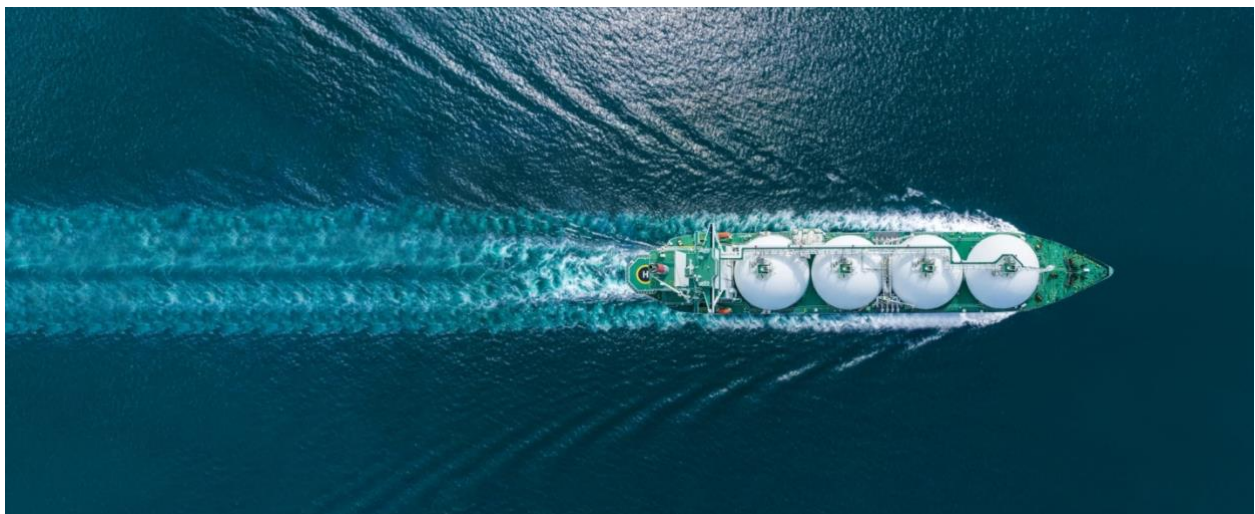
Figure 1: Japan Gas Demand by Sector in Million Tonnes; Japan Annual LNG Imports	7
Figure 2: Japanese LNG Imports by Source	8
Figure 3: Annual LNG Contract Activity of Japanese Buyers (2010-2023).....	9
Figure 4: Japan's Operable Nuclear Capacity and Nuclear Output	11
Figure 5: Japan's Power Generation Capacity, 2014 to 2022, Gigawatts (GW)	12
Figure 6: METI Sixth Strategy Energy Plan for Power Generation; LNG-fired Power Generation	13
Figure 7: Power Market Share (%) of Incumbents and New Entrants; Gas Sales of Major Gas Utilities.....	14
Figure 8: LNG Sales by Japanese Companies to Third Countries; 2023 Sales Volume by Company	16
Figure 9: JERA LNG Purchase Contracts vs. Domestic Gas Demand.....	17
Figure 10: JERA LNG Sales Volume	18
Figure 11: Tokyo Gas LNG Purchase Contracts vs. Domestic Gas Demand.....	19
Figure 12: Tokyo Gas LNG Sales Volume	20
Figure 13: Osaka Gas Net LNG Contract Position vs. Domestic Gas Requirements	21
Figure 14: Osaka Gas LNG Sales Volume	22
Figure 15: Kansai Electric LNG Purchase Contracts vs. Domestic Gas Demand	23
Figure 16: Kansai Electric LNG Sales Volume.....	24
Figure 17: Forecasted Liquefaction Capacity Additions (mtpa) 2023-27	25
Figure 18: Diversity of Pricing Indices in Japan's LNG Purchase Contracts	26
Figure 19: Difference Between East Asian Spot LNG Prices and Japan's Oil-Indexed Purchase Contracts	26
Figure 20: LNG Forward Price Curves, Japan and France	28

Key Findings

Japan's demand for LNG has fallen rapidly in recent years, marking an important shift in global markets. Japanese utilities—once considered purely consumers of LNG—are increasingly focused on marketing and reselling the fuel abroad, putting them in more direct competition with global suppliers.

IEEFA finds that the over-contracted position of Japan's four largest utilities — JERA, Tokyo Gas, Osaka Gas, and Kansai Electric — could increase in the coming years. Their emphasis on overseas growth is driven by declining opportunities in Japan's domestic gas market.

With a flexible surplus of LNG, these Japanese utilities are looking to cultivate demand in Asia's emerging markets. As demand from Japan and other key markets wanes, prices are widely expected to fall over the remainder of the decade. LNG marketers, which increasingly include Japanese utilities, could see sales margins drop and potentially turn negative.



Executive Summary

For most of the last 50 years, Japan has been the world's largest, most important buyer of liquefied natural gas (LNG). Japanese companies were critical to the foundation of the industry, providing creditworthy commitments to purchase LNG that underpinned long-term investments in the global supply chain.

However, Japan's demand for LNG has fallen rapidly in recent years, marking an important shift in global markets. Japanese utilities—once considered purely consumers of LNG—are increasingly focused on marketing and reselling the fuel abroad, putting them in more direct competition with global suppliers. Rather than absorbing more volumes from the global supply pool, Japanese companies aiming to resell LNG may add to a looming global glut later this decade.



Rather than absorbing more volumes from the global supply pool, Japanese companies aiming to resell LNG may add to a looming global glut later this decade.

Their emphasis on overseas growth is driven by declining opportunities in Japan's domestic gas market. Higher generation from restarted nuclear facilities and additional renewable energy capacity are displacing the need for LNG in the country's power mix. In the longer term, net-zero emissions targets and demographic fundamentals present hard limits to domestic expansion. Meanwhile, Japan's incumbent utilities have lost market share since 2017 due to the introduction of retail competition in gas and power sectors.

For some companies, consumer demand is falling faster than volume commitments in LNG purchase contracts. As a result, IEEFA finds that the over-contracted position of Japan's four largest utilities—JERA, Tokyo Gas, Osaka Gas, and Kansai Electric—could increase to almost 12 million tonnes (mt) in the coming years. Moreover, the share of Japan's contracts without destination restrictions is set to rise through 2030, indicating companies will have greater flexibility to resell volumes overseas.

With a flexible surplus of LNG, these companies are looking to cultivate demand in Asia's emerging markets.^{1 2} They have invested heavily in the midstream and downstream gas sectors of South and Southeast Asia, including in regasification terminals, LNG-fired power plants, and gas distribution infrastructure. Government policies have aligned with corporate strategies to transact higher volumes of LNG and develop demand abroad, while Japanese companies are actively engaged in negotiations for new LNG purchase contracts despite declining demand at home.

According to figures from the Japan Oil, Gas and Metals National Corporation (JOGMEC), LNG sales by Japanese companies to third countries has increased 2.5 times since FY2018, from 14.97 mt to

¹ Financial Times. [‘Mr LNG’ plans to pivot Jera into global trading powerhouse](#). December 5, 2017.

² Reuters. [Japan's JERA sees more LNG going to Asia as domestic demand shrinks](#). April 30, 2023.

38 mt in FY2021.³ Although domestic sales have declined, the volume of LNG transacted by Japanese companies increased over that timeframe. Today, the volume of LNG sold abroad is nearly 50% of the volumes consumed domestically.⁴

These trends have consequences for global LNG exporters and the industry writ large. First, many exporters continue to justify new liquefaction investments under the false impression that Japan needs more volumes. In fact, the opposite is true: Japanese companies may increasingly compete for potential customers in prospective markets, adding to supply rather than pulling cargoes off the water. This double counting risk may fuel unnecessary investments in new supply capacity.

Second, an increase of LNG sales by Japanese utilities coincides with a flood of new LNG supply entering the market. The world is set to add record amounts of new export capacity in 2026. As demand from Japan and other key markets wanes, prices are widely expected to fall over the remainder of the decade. LNG marketers, which increasingly include Japanese utilities, could see sales margins drop and potentially turn negative. This has happened to Japanese resellers during past periods of oversupply, demonstrating the financial risk involved with LNG trading.

Japanese utilities marketing LNG abroad may face a unique set of challenges amidst a looming global glut. A large majority of Japan's older purchase commitments contain pricing formulas indexed to oil benchmarks, often at relatively steep rates that may be out of the money compared to falling spot prices. Companies aiming to resell contracted cargoes in spot markets could therefore be exposed to financial risks if spot prices fall below oil-linked contract formulas. Diversifying contracts to alternative price indices—e.g., U.S. Henry Hub natural gas prices—may reduce oil indexation risk but could expose Japanese utilities to a host of other factors.

This report details the recent evolution of Japan's LNG market and its key actors. Section I provides an overview of the country's supply and demand for LNG, as well as the contracting activity of major utilities and their expansion into emerging Asia. Section II details ongoing trends in Japan's domestic market that are causing utilities to pursue growth opportunities abroad. Section III explains how utilities might deal with over-contracted supplies of destination flexible LNG. Section IV provides case studies on Japan's major gas and power utilities, their contracting positions, and their expansion into foreign markets, particularly in South and Southeast Asia. Section V analyzes the potential implications of Japan's increasing focus on LNG trading.

³ JOGMEC notes that its survey of Japanese companies trading LNG "may double count those volumes reported by each company in the case where multiple companies were involved in the same cargo in the process of resale." JOGMEC. [Results of FY2023 Survey on LNG Handling Volume by Japanese Companies](#). November 10, 2023.

⁴ Ibid.

I. Introduction

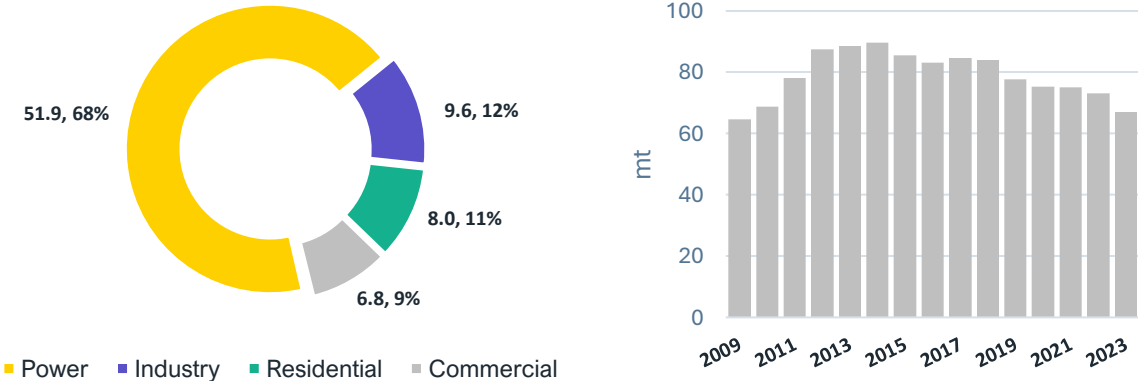
Japanese LNG Market Overview

Japan has played a foundational role in the global LNG supply chain since its first shipment in 1969. Due to a lack of indigenous gas resources, the country relies on imported LNG for nearly all of its gas requirements and was the world’s second largest LNG buyer in 2023, behind China.

Following the 2011 Fukushima nuclear disaster, which caused Japan to shutter its entire nuclear fleet, generating companies turned to LNG as a replacement fuel for power. Japan’s LNG imports rose rapidly and peaked at 89 million tonnes (mt) in 2014, before the country restarted its first nuclear reactor the following year.⁵

Today, Japan still uses LNG predominantly in the power sector, followed by the industrial, residential, and commercial sectors (Figure 1, left). However, the gradual restart of 12 nuclear reactors and the steady rise of renewable power have caused LNG imports to fall to 67 mt in 2023, a 25.3% drop from 2014 and the lowest level since 2009 (Figure 1, right).⁶ Reasons for this decline are detailed in Section II.

Figure 1: Japan Gas Demand by Sector in Million Tonnes (left); Japan Annual LNG Imports (Right)



Source: IEA. [Japan Natural Gas Security Policy](#), August 2022; Various GIIGNL annual reports and Reuters. Kpler.^{7,8}

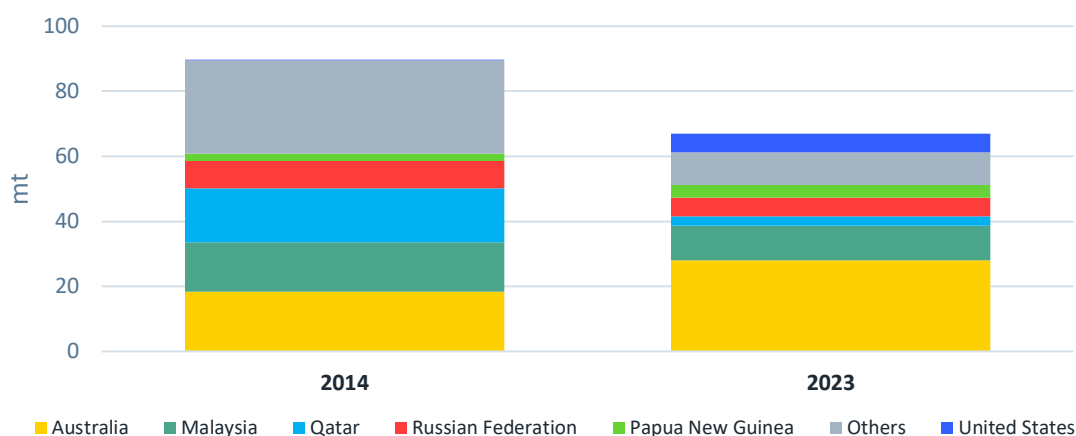
⁵ EIA. [Japan restarts first nuclear reactor under new safety rules](#). August 12, 2015.

⁶ Kpler.

⁷ GIIGNL. [Resources](#).

Japan procures LNG from around 20 countries, which allows it to pivot to other suppliers in the event of a disruption. The country's largest suppliers in 2023 included Australia, Malaysia, Russia, the United States, and Papua New Guinea (Figure 2).

Figure 2: Japanese LNG Imports by Source



Source: Kpler.

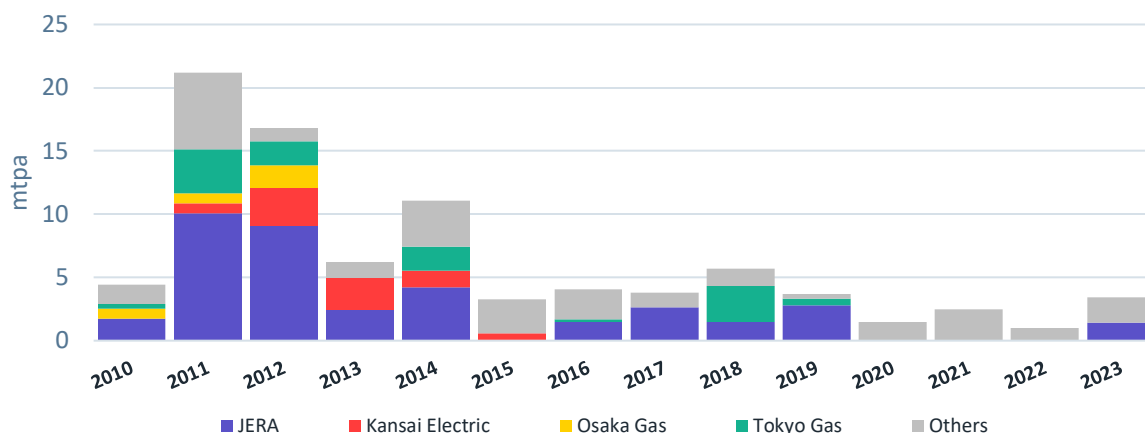
Background on Japan's LNG Contracting Activity

Four companies account for almost three-quarters of Japan's historical contracting activity: JERA, Tokyo Gas, Kansai Electric, and Osaka Gas. JERA, including the contracts inherited from its parent companies Tokyo Electric and Chubu Electric,⁹ is responsible for 40%. Meanwhile, Tokyo Gas, Kansai Electric and Osaka Gas make up 14%, 9% and 8% of Japan's total contracting activity, respectively.

Following the Fukushima disaster, Japanese utilities initially turned to spot and short-term markets for LNG supplies, but high costs prompted importers to sign significant volumes of long-term contracts. From 2011 to 2014, the total volume of contracts signed was nearly double the amount signed in the following years combined (Figure 3 below). Many of these contracts contained destination restrictions, preventing Japanese buyers from reselling LNG elsewhere and capturing overseas arbitrage opportunities.¹⁰

⁹ JERA is a 50-50 joint venture between Tokyo Electric Power Company (TEPCO) and Chubu Electric Power. JERA was founded in 2015 as a consolidation of both companies' fuel and thermal power assets, making it the largest power generation company in Japan. JERA. [About Us](#). 2024.

¹⁰ Destination clauses designate specific LNG receiving terminals for cargoes made under a sales purchase Agreement (SPA), which in effect prevents buyers from unloading cargoes at other facilities. This can prevent them from capitalizing on arbitrage opportunities via cargo diversions and require LNG to be offloaded, then reloaded, before it can be resold to other parties. These destination restrictions were initially designed by LNG exporters to prevent their own customers from competing for prospective buyers. Destination restrictions and flexibilities are discussed further in Section III. Offshore Energy Law. [Destination clauses: destined for the chop?](#) 2019.

Figure 3: Annual LNG Contract Activity of Japanese Buyers (2010-2023)

Source: ICIS, IEEFA calculations.

As domestic gas demand started to decline in 2015, however, Japan's LNG buyers sought to resell excess supplies and pushed for a relaxation of destination restrictions and greater contractual flexibilities. Japan found itself over-contracted for the first time in 2017,¹¹ the same year that the country's Fair Trade Commission (FTC) determined that destination restrictions in certain contracts may breach competition rules.^{12 13}

Despite falling demand at home, the government remained intent on protecting Japan's influence in the global LNG market. In 2020, Japan's Ministry of Economy, Trade, and Industry (METI) established the New International Resource Strategy for Enhancing LNG Security,¹⁴ which set a 2030 LNG handling target of 100 million tonnes per annum (mtpa) for Japanese companies.¹⁵

This handling target is well above the 79 mtpa that Japanese buyers have currently contracted through long-term sale and purchase agreements (SPAs) but in line with recent transaction volumes.¹⁶ Despite declining domestic demand, the policy sends a clear signal that Japanese companies will likely continue to play a major role in LNG markets and transactions, either through long-term contracts, spot market trades, and/or investments in upstream and LNG export projects.

¹¹ IEA and the Korea Energy Economics Institute (KEEI). [LNG Market Trends and Their Implications - Structures, drivers and developments of major Asian importers](#), p. 22. June 2019.

¹² Akin Gump. [The Japan Fair Trade Commission Has Said No to LNG Resale Restrictions—What Does This Mean for Japanese and Non-Japanese LNG Importers?](#) July 17, 2017.

¹³ Reuters. [JERA renegotiates LNG contracts to drop destination clause – executive](#). September 20, 2019.

¹⁴ METI. [Japan's New International Resource Strategy for Enhancing LNG Security](#). July 22, 2020.

¹⁵ Handling includes not only domestic use of LNG covered by long- and short-term contracts and spot purchases, but volumes sent to other countries via offtake rights or tolling agreements or short-term or spot procurement.

¹⁶ Note that contracted volumes are set to fall to 55 mtpa by 2030. Japan handled 102 mt of LNG volumes in FY2022. JOGMEC, [Results of the FY2023 Surveys: LNG Handling Volume and Destination Restrictions in SPAs by Japanese Companies](#), November 10, 2023.

Japanese Companies Focus on Growth Opportunities in Southeast Asia

The 2020 New International Resource Strategy specifically focuses on increasing LNG trade with South and Southeast Asia.¹⁷ This continues a strategy that began years before, when Japan was first over-contracted for LNG in 2017. That year, the government announced a US\$ 10 billion funding package to develop Asia's LNG market,¹⁸ which was partly designed to position Japanese companies to capitalize on LNG trading opportunities.

According to the president of Tokyo Gas, "*We want to use Japanese funding and technology to advance Southeast Asia's shift toward LNG.*"¹⁹ After Tokyo Gas established an LNG trading desk in Singapore in 2017,²⁰ the company partnered with the Development Bank of Japan to invest JP¥ 4 billion (US\$ 35 million) in an Indonesian gas distributor to boost urban gas demand.²¹

In the years that followed, Japan's largest utilities increasingly turned outward, focusing on growth opportunities abroad.²² In September 2019, the government of Japan announced another US\$ 10 billion funding package for the development of LNG infrastructure globally.

By 2021, prior to the Russian invasion of Ukraine, the Japanese government largely viewed its LNG supply as stable.²³ Japanese buyers opted not to renew long-term purchase commitments with Qatar for a combined 7.2 mtpa, due largely to Japan's long-term demand uncertainty, as well as disagreements over contract restrictions.²⁴

In the wake of the Russian invasion of Ukraine in February 2022, however, concerns about over-contracting took a backseat to a renewed focus on bolstering Japan's energy security. METI urged Japanese companies to supply more long-term LNG contracts,²⁵ and as of early 2024, several Japanese companies are still in negotiations to buy Qatari LNG.²⁶

Despite recent contract negotiations, the largest Japanese utilities are still likely to find themselves with persistent oversupply through 2030.

¹⁷ METI. [Japan's New International Resource Strategy for Enhancing LNG Security](#). July 22, 2020.

¹⁸ Nikkei Asia. [Japan floats \\$10bn plan to build out Asian LNG market](#). October 19, 2017.

¹⁹ Nikkei Asia. [Japan floats \\$10bn plan to build out Asian LNG market](#). October 19, 2017.

²⁰ Kansai Electric also opened a Singapore trading desk in 2017.

²¹ Nikkei Asia. [Japan floats \\$10bn plan to build out Asian LNG market](#). October 19, 2017.

²² In 2019, Michiaki Hirose, former chairman of Tokyo Gas and of the Japan Gas Association, summarized the problem: "*Japan has been leading the way to grow the LNG market, but we now have to think from a global viewpoint as Japan's domestic demand will fall due to an ageing population and declining birthrate.*" Reuters. [Japan marks 50 years of LNG imports with eye on Asia growth](#). November 6, 2019.

²³ National Bureau of Asian Research. [The Revenge of Energy Security - Reconciling Asia's Economic Security with Climate Ambitions](#), p. 29. November 2023.

²⁴ Contract expiries included a 5.5-mtpa deal between JERA and Qatargas that amounted to roughly 20% of JERA's entire contracting portfolio. S&P Global. [Japan's JERA will not renew 5.5 mil mt/year of long-term Qatari LNG supply: president](#). November 25, 2021.

²⁵ Bloomberg. [Japan Urges LNG Buyers to Sign Long-Term Deals for Fuel Security](#). November 21, 2023.

²⁶ S&P Global. [Qatari energy minister's Japan visit signals LNG deals on the cards](#). October 3, 2023.

II. Limited Growth Opportunities in Japan’s Domestic Gas Market

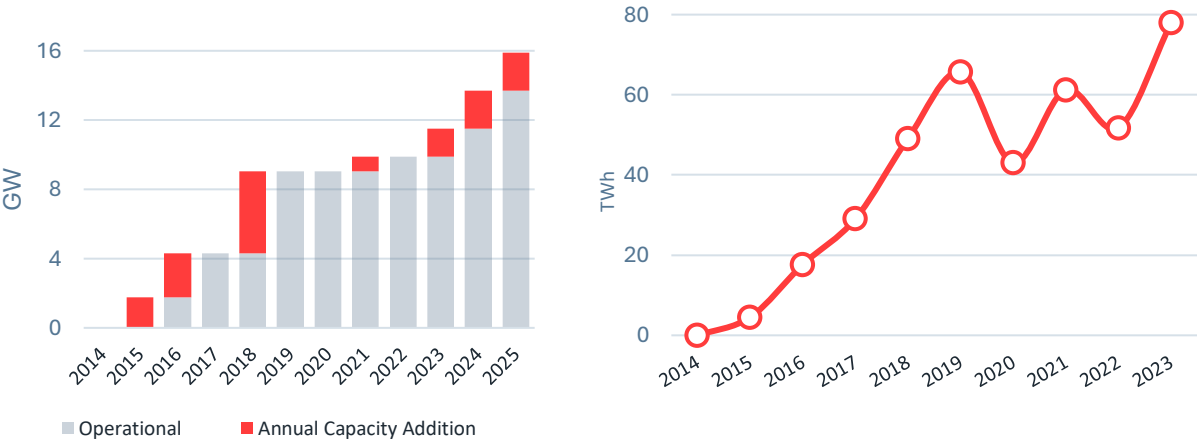
This section details why Japanese utilities are likely to remain oversupplied through 2030, including (1) a nuclear resurgence and the growth of renewables; (2) long-term net-zero targets; (3) demographic fundamentals; and (4) the restructuring of domestic gas and power markets.

A Nuclear Resurgence and the Growth of Renewables

Following the Russian invasion of Ukraine, Japan pushed to accelerate the pace of nuclear restarts.²⁷ As nuclear and renewable energy generation jumped 54% and 7% through November 2023, respectively, LNG imports fell 8%. This drop in LNG imports is significantly higher than the average 3% rate of decline over the past decade.

In total, Japan has 27 reactors potentially eligible for restart with 28 GW of capacity. By 2022, the country had brought back 10 reactors with a combined capacity of 9.9 GW. Despite this, generation fell in 2022 compared to 2019 due to scheduled and unplanned outages (Figure 4, right). In the summer of 2023, Japan restarted two more reactors with 1.7 GW of capacity, bringing Japan’s operable nuclear capacity to 11.5 GW.²⁸ In 2023, nuclear output reached its highest level since 2011.

Figure 4: Japan’s Operable Nuclear Capacity (left) and Nuclear Output (right)



Source: Nuclear Regulation Authority, company statements, media reports.

²⁷ Prime Minister Kishida urged an acceleration of the nuclear restarts, but regulatory hurdles and safety concerns will need to be overcome before remaining nuclear assets are commissioned. Bloomberg. [Japan Wants Up to Nine Nuclear Reactors Online This Winter](#). July 14, 2022.

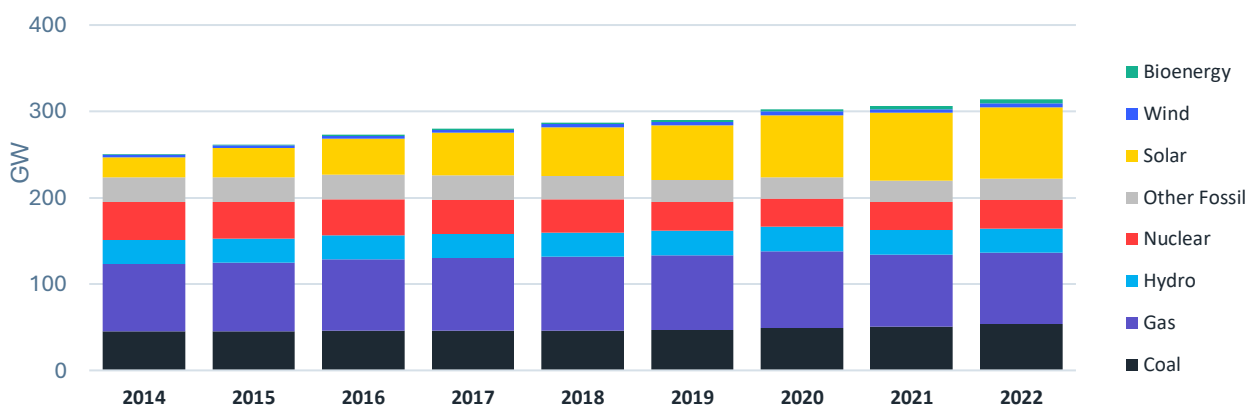
²⁸ Central to Japan’s Green Transformation (GX) policy is an extension of nuclear facility lifetimes to 60 years, including an exclusion of years that a facility not operating, and a commitment to build new nuclear reactors. This extension will buoy the country’s nuclear output by keeping two units that would retire operational throughout the decade. METI. [Japan’s energy policy toward achieving GX \(Part 1\)](#). March 22, 2022.

In 2024, nuclear availability could increase to 14 reactors with a total fleetwide capacity of 13.7 GW this year and 16 reactors (15.9 GW total fleetwide capacity) in 2025 (Figure 4, left).²⁹ There are also 11 more reactors undergoing review with Japan's Nuclear Regulation Authority (NRA). Restarting these would increase the total capacity of Japan's operating nuclear fleet from 15.9 GW to 27.6 GW.³⁰

Overall, Japan's LNG demand has fallen 22 mt since 2014. In 2024 and 2025, nuclear restarts could cause LNG demand to fall further by up to 6 mt, or 9% of 2023 levels.³¹ If all remaining reactors under review are brought back online, this could reduce Japan's LNG demand by up to an additional 12.5 mtpa.

The continued deployment of renewable energy resources should reduce LNG demand further. Since 2014, solar capacity has grown over 3.5-fold and wind capacity has risen by 60% (Figure 5). Together, wind and solar generated almost 14% of Japan's power requirements in 2023, up from 1.7% a decade earlier. METI is targeting a further increase to 24% in its Sixth Strategic Energy Plan (discussed in the next section).³² Furthermore, the country is in the process of launching more tenders for offshore wind licenses, which should advance the country's goal of deploying 10 GW of offshore wind by 2030, up from 136 MW in 2022.³³

Figure 5: Japan's Power Generation Capacity, 2014 to 2022, Gigawatts (GW)



Source: EMBER.

²⁹ In 2024, Japan could restart TEPCO's Kashiwazaki Kariwa Units 6 and 7. In 2025, the country may recommission Tohoku Electric Power Co. Inc.'s Onagawa Unit 2, and Chūgoku Electric Power Company's Shimane Unit 2 reactors.

³⁰ Four of these reactors have advanced past the initial review process of Japan's Nuclear Regulation Authority (NRA) and plan to restart by the end of the decade. World Nuclear Association. [Nuclear Power in Japan](#). January 2024.

³¹ This assumes that the restarted nuclear facilities operate at 80% capacity factors.

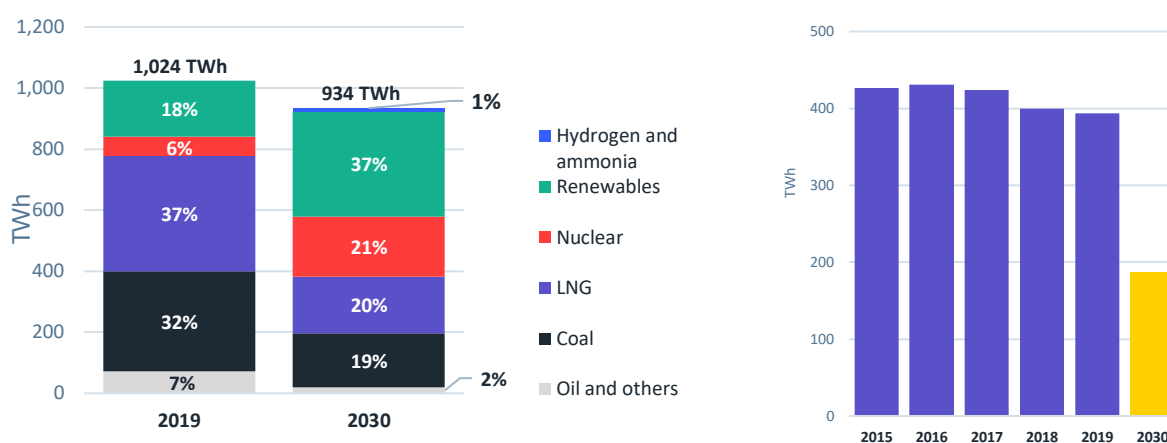
³² METI. [Outline of Strategic Energy Plan](#). October 2021.

³³ Japan's investments to reduce grid congestion and regulatory changes to electrical dispatching should help increase renewable output. Central to Japan's Green Transformation (GX) policy is to reduce grid congestion with large-scale transmission investments. Projects include 6 to 8 GW in interconnections between Hokkaido, Tohoku and Tokyo, a 2.7 GW interconnect between the Eastern and Western electricity markets, and a 2.8 GW interconnect between Kyushu and Chugoku. METI. [Japan's energy policy toward achieving GX \(Part 1\)](#). March 22, 2022.

Long-term Climate and Energy Plans

Japan's long-term decarbonization commitments leave no role for unabated natural gas in the energy mix. The country has committed to achieving net-zero greenhouse gas (GHG) emissions by 2050 and signed onto a Group of Seven (G7) pledge to “fully or predominantly” decarbonize its power sector by 2035.³⁴ The country has also established an interim goal of reducing GHG emissions by 46% by 2030, which was incorporated into METI's Sixth Strategic Energy Plan in 2021.

Figure 6: METI Sixth Strategy Energy Plan for Power Generation (left); LNG-fired Power Generation (right)



Source: IEA Technology Collaboration Programme. *Member Country Report 2023 – Japan, 2023*; Bloomberg. *Global LNG Market Faces Shakeup From Japan's Green Shift*, July 26, 2021; IEEFA calculations based on: METI. *Outline of Strategic Energy Plan*, October 2021.

The plan states that in the power sector—the country's largest source of emissions and largest gas-consuming sector—LNG-fired electricity generation could fall from 394 TWh in 2019 to 187 TWh (-53%) by 2030.³⁵ By contrast, METI envisions generation from renewables increasing from 192 TWh to 355 TWh (+85%), and nuclear output rising from 63.9 TWh to 206 TWh (+222%). As a result, IEEFA estimates that Japan's LNG demand could fall between 25.7 and 31.6 mtpa.³⁶ Electrification and energy efficiency measures in the residential and commercial sectors could also have potentially significant long-term impacts on natural gas demand.³⁷

³⁴ White House. *G7 Hiroshima Leaders' Communiqué*, May 20, 2023.

³⁵ IEEFA calculations based on: METI. *Outline of Strategic Energy Plan*, October 2021.

³⁶ Estimates are calculated based on a range of heat rates for Japan's combined cycle gas turbine fleet of 6,500 British thermal units per kilowatt-hour (BTU/kWh) and 8,000 BTU/kWh.

³⁷ The domestic market for electric heat pumps for both heating and cooling is well-developed—37% of Japanese households use air conditioners for space heating and 15% use electric heat pumps for water heating. In 2022, air-to-water heat pump sales grew 19%, up from 11% growth in the previous year. According to the International Energy Agency, the up-front costs of some air-to-air heat pump models have fallen below the cost of gas boilers—a stark contrast to most markets. Bloomberg New Energy Finance (BNEF). *New Energy Outlook Japan*, p. 38. July 24, 2023; IEA. *Heat Pumps*; IEA. *The Future of Heat Pumps*, p. 67. November 2022.

Demographic Fundamentals

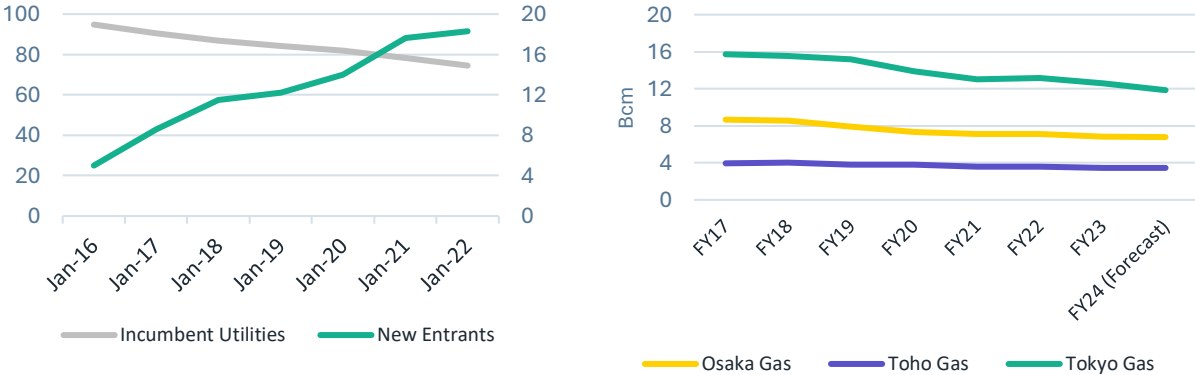
Japan’s underlying macroeconomic conditions are not in the favor of higher LNG usage. Overall electricity demand has fallen 12% since 2007,³⁸ while combined gas demand in the residential, commercial, and industrial sectors has fallen 8.9%. The country’s overall energy demand has fallen 20% over the same timeframe.³⁹ Japan’s economy is advanced, and its population is declining. Economic activity is expected to maintain its low historical growth of about 0.7% per year out to 2030, while population is set to fall from 124 million today to 119 million.⁴⁰ These fundamentals are likely to limit growth opportunities for gas and power utilities in the domestic market.

Restructuring of Domestic Gas and Power Markets

Japan’s gas and power markets were historically dominated by vertically integrated regional monopolies, but the government began to gradually introduce competition in 1995. Retail gas and power markets were fully liberalized in 2016 and 2017, respectively, allowing households to choose suppliers and ending incumbent utilities’ regional monopoly status.

Since full liberalization, the market share of incumbent utilities has fallen dramatically. In the power sector, former monopolistic utilities saw their market share inside designated supply areas decline from 95% April 2016 to 74% in April 2022. Meanwhile, the share of new entrants increased their share from 5% to 18% over the same timeframe (Figure 7, left). Since 2017, major gas utilities have seen city gas customers and sales decline (Figure 7, right).

Figure 7: Power Market Share (%) of Incumbents and New Entrants (left); Gas Sales of Major Gas Utilities (right)



Source: Renewable Energy Institute of Japan; company reports.

³⁸ EMBER. [Electricity Data Explorer](#). January 2024.

³⁹ IEA. [Japan Data Explorer](#). 2024.

⁴⁰ Projection for 2030 population levels is taken from the United Nations Department of Economic and Social Affairs, Population Division’s World Population Prospects 2022 Revision. UN DESA, [World Population Prospects 2022](#), 2022.

The Russian invasion of Ukraine has slowed the influx of new power and gas retailers.⁴¹ However, market liberalization—along with demographic shifts, energy mix changes, and long-term climate targets—have created a highly uncertain environment for LNG demand, complicating LNG procurement among major utilities. These challenges are detailed in the case studies in Section IV.

III. Dealing with Surplus LNG

With LNG contract volumes set to outpace demand profiles, Japanese utilities will be driven to find channels for their surplus LNG volumes. Potential channels include: (1) exercising contractual volume flexibilities and cargo cancellation rights; (2) storing LNG; (3) reselling LNG into domestic or overseas markets.

Exercising Contractual Volume Flexibilities. Volume flexibilities in LNG contracts allow buyers to adjust purchase obligations, which can be particularly important when facing uncertain demand. This may include downward quantity tolerances (DQTs), which specify an amount by which buyers can offtake less than the full annual contract volume without incurring penalties (typically 5-10%).⁴²

Under take-or-pay contract structures, buyers also have an option to cancel cargoes and pay a penalty, which covers the seller's fixed costs. This fee performs a similar function as the tolling fees common in U.S. LNG contracts. This penalty can make cancellations costly, along with two other factors: (1) buyers have typically arranged long-term vessel charters to align with offtake commitments; (2) the offtaker is essentially forgoing potential revenues from reselling the volumes elsewhere.

LNG Storage. Japan's total storage capacity is about 12 billion cubic meters (Bcm), or just over a month of Japanese LNG demand in 2022.⁴³ The Japanese government and large gas users are working to secure LNG stockpiles to mitigate future supply disruptions. For example, the strategic buffer LNG (SBL) initiative began in 2023 and aims to store an additional cargo per month. The SBL would increase storage by at most 0.9 mtpa this decade.

Reselling LNG at Home or Abroad. LNG contracts may contain destination flexibility and diversion rights that allow buyers to determine where LNG is delivered. A recent survey of Japanese LNG buyers indicates that the share of contracts without destination restrictions was 58% in 2022, rising to 60% by 2030.⁴⁴ Without restrictions, buyers can send cargoes to domestic or overseas markets.

⁴¹ The outbreak of the crisis caused global natural gas and coal prices to skyrocket, with knock-on effects on Japan's wholesale power prices. New entrants into the retail power market—which often lack generation assets themselves and opt to purchase power from the wholesale market—saw their costs balloon and profits collapse. By the end of 2022, about 20% of new entrants into the retail power segment had filed for bankruptcy. While these players accounted for 20% of the electric power market in 2021, that share fell to 17% in the wake of the invasion. Nikkei Asia. [Ukraine war decimates Japan's small power retailers](#). December 10, 2022. Renewable Energy Institute. [Statistics - Electricity Market](#). Accessed: February 7, 2024.

⁴² Other contract terms, such as "make-up rights" and "carry forward cargoes" allow buyers to reduce purchases now and take additional quantities in future years. Oil, Gas & Energy Law Intelligence (OGEL). [Trends in LNG Supply Contracts and Pricing Disputes in the Asia Pacific Region](#), p. 19. May 2020.

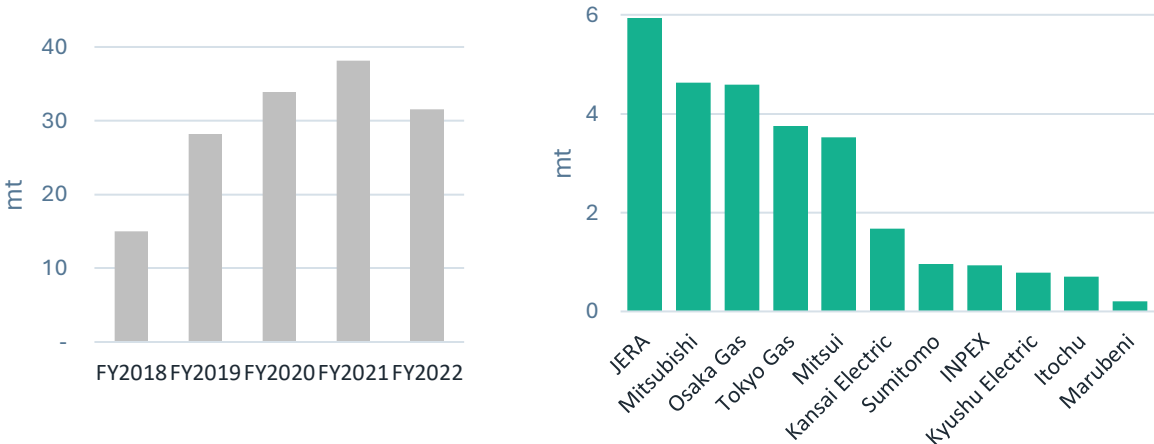
⁴³ IEA. [Japan Natural Gas Security Policy](#). August 18, 2022.

⁴⁴ JOGMEC. [Results of FY2023 Survey on Destination Clauses and Price Indices in Fixed-term LNG Sales and Purchase Agreements concluded by Japanese companies](#). November 10, 2023.

However, Japan’s retail gas market is unlikely to absorb much surplus volume due to declining demand. Moreover, utilities attempting to resell surplus LNG in Japan will likely do so at the expense of other retailers, with a marginal net impact on the country’s total demand.

Instead, utilities with excess LNG are more likely to look overseas, particularly in South and Southeast Asia, where population growth, rising living standards and urbanization are increasing energy demand. This aligns with the 2020 New International Resource Strategy, which explicitly cites an LNG market expansion into these regions to meet LNG transaction targets of 100 mt by 2030. According to a JOGMEC survey, Japanese companies sold more than 38 mt to third countries in FY2021, roughly 2.5 times the volume sold in FY2018.

Figure 8: LNG Sales by Japanese Companies to Third Countries (left); 2023 Sales Volume by Company (right)



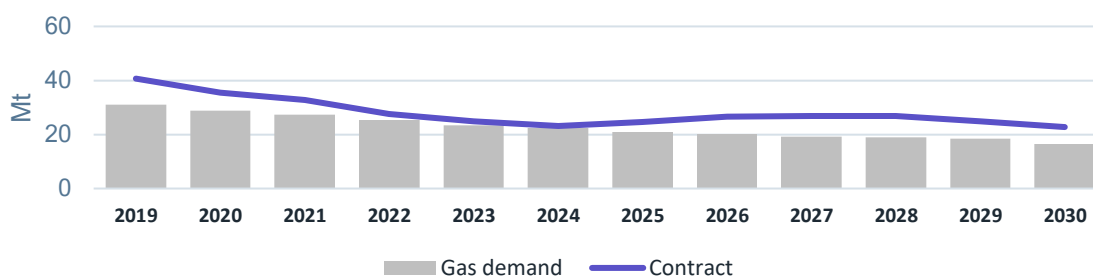
Source: JOGMEC. Results of FY2023 Survey on LNG Handling Volume by Japanese Companies. November 10, 2023; Right chart uses Kpler ship tracking data.

IV. Company Case Studies

JERA

JERA is a joint venture created to manage the thermal assets of Tokyo Electric and Chubu Electric. JERA's LNG demand has historically been driven by the electricity sales of its parent companies,⁴⁵ making it Japan's largest electricity producer and one of the world's largest importers of LNG. However, rising nuclear generation, new coal capacity, greater efficiency, and lower overall electricity generation has reduced JERA's gas consumption at a rate of 5.7% since 2017.⁴⁶ IEEFA conservatively estimates that the rate of decline in JERA's gas sales could continue at a pace of 4.9% this decade.^{47 48 49}

Figure 9: JERA LNG Purchase Contracts vs. Domestic Gas Demand



Source: Company reports, IEEFA calculations based on contract data from BNEF, Kpler, JOGMEC, METI, and public media.

In 2022, JERA held net long-term contracts for 27.7 mtpa, while domestic usage totaled 25.5 mtpa (Figure 9),⁵⁰ leading to an over-contracted position of 2.2 mtpa. The over-contracted position has fallen recently due to the expiry of several contracts, with 6 mtpa of contract volumes set to expire this decade. However, new contract signings before 2019 plus more recent contracts are likely to increase its over-contracted position to 8.0 mtpa by 2028.^{51 52}

⁴⁵ Parent companies primarily serve the Tokyo and Nagoya regions.

⁴⁶ JERA, JERA Group Integrated Report 2023, page 83, November 2023

⁴⁷ IEEFA assumes that TEPCO's Kashiwazaki Kariwa Unit 7 comes online in June 2024, Unit 6 follows in April 2025, and that CEPCO's Hamaoka Units 3, 4 and 5 come on during the later part of the decade.

⁴⁸ JERA commissioned the 650 MW Unit 1 Yokosuka coal plant in 2023 and will commission the 650 Unit 2 plant in early 2024.

⁴⁹ IEEFA assumes that nuclear restarts and parent companies' modest renewable electricity targets perfectly displace LNG generation, and that supercritical coal units are retired in the late 2020s.

⁵⁰ Actual volumes handled by JERA likely surpass the historical contract values shown here. JERA reported LNG handling volumes of 35 mt from its entire JERA Group for the Fiscal Year 2022, while JERA Global Markets [reported 45 mt](#) of gross executed LNG trades. [FY2022 Investors Meeting](#), April 23, 2023.

⁵¹ Even if the 20-year, 1-mtpa sales and purchase agreement (SPA) with Venture Global from the Calcasieu Pass 2 project is nulled by the Biden administration's recent pause on permits for new U.S. LNG export facilities, JERA will remain over-contracted. JERA, [Signing LNG Sales and Purchase Agreement with Venture Global](#), April 28, 2023.

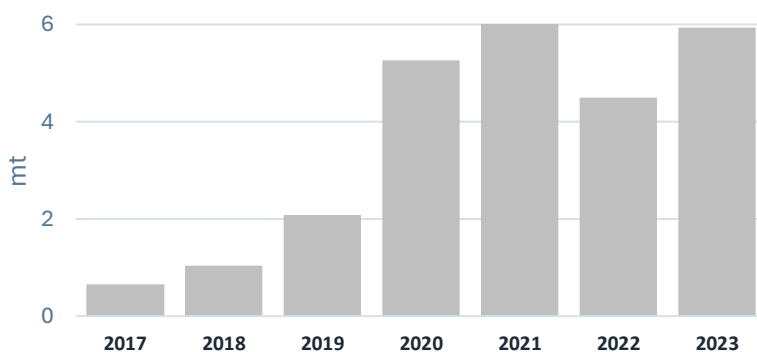
⁵² This includes the a the 10-year SPA with Woodside to purchase 1.5 mtpa of LNG from the Scarborough gas field development project starting in 2026. JERA, [JERA to enter agreement with Australia-based Woodside to acquire participation interest in Scarborough Gas Field to secure stable LNG supply and sign LNG Sales and Purchase Heads of Agreement with Woodside](#), February 23, 2024

JERA has remained focused on growing its overseas business. It set a profit target of 20% for its overseas power segment, despite it incurring a loss in the last three fiscal years.⁵³ The company has expressed a desire to transition coal fleets in the Philippines and Vietnam to fire LNG and other gases.^{54 55} These moves are in line with Japan's Asia Zero Emission Community (AZEC) initiative, a project that aims to replicate Japan's energy mix across the Asian region.⁵⁶

JERA representatives have expressed a desire to turn the company into a major global LNG trader.⁵⁷ In 2017, for example, the company president said, "*The plan is to become a portfolio player like BP and Total.*" In 2019, the company announced a partnership with France's EDF for global trading activities and has developed a large LNG shipping fleet of 17 carriers. JERA has also invested in assets designed to stimulate LNG demand abroad, particularly in Southeast Asia. These include LNG-fired power plants, regasification terminals, and distribution companies in, notably, Bangladesh, Indonesia, the Philippines, Vietnam, Singapore, and Thailand. For a summary of the company's gas-related business activities in South and Southeast Asia, see [Appendix 1](#).⁵⁸

Since 2017, the company's LNG sales have increased from 0.6 mtpa to 6 mtpa (Figure 10). However, JERA has not always had success in profiting from LNG sales. Market declines during the onset of the COVID-19 pandemic caused JERA to lose JP¥ 9.4 billion (US\$ 123 million) reselling surplus cargoes.⁵⁹ Although LNG sales returned to profitability the following year, this indicates that trading activities have exposed JERA to downturns in global LNG prices (discussed further in Section 4).

Figure 10: JERA LNG Sales Volume



Source: Kpler.

⁵³ JERA. [Summary of Q&As at Investors Meeting for FY2022](#). May 11, 2023.

⁵⁴ Manila Bulletin, [PH transition to new energy sources needs gov't subsidy](#), June 25, 2023.

⁵⁵ Vietnam Investment Review. [JERA considers potential investments in Vietnam's bid for net-zero](#). July 2023.

⁵⁶ Vietnam Investment Review. [JERA considers potential investments in Vietnam's bid for net-zero](#). July 2023.

⁵⁷ Financial Times. ['Mr LNG' plans to pivot Jera into global trading powerhouse](#). December 5, 2017.

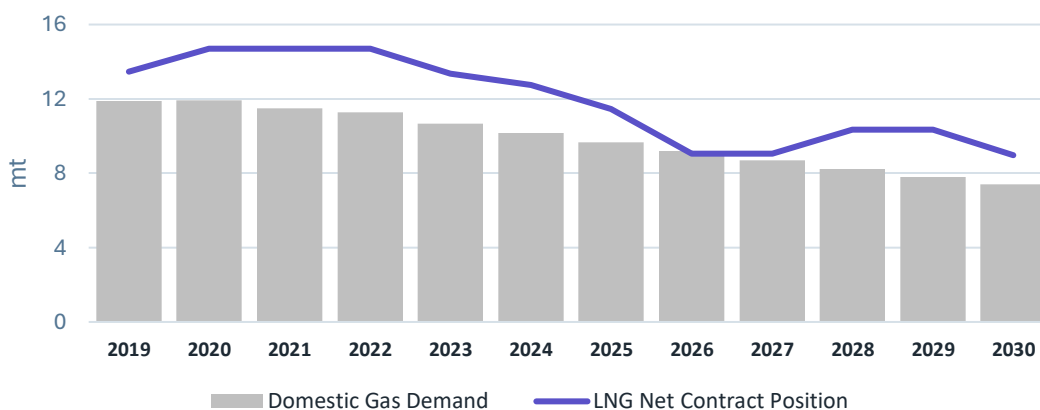
⁵⁸ Note that these do not include JERA's significant investments in coal-fired capacity across Asia, which JERA could leverage for conversion into gas-fired units if it proceeds with its stated goals over the past year.

⁵⁹ JERA. [FY2020 Consolidated Financial Results](#). May 17, 2021.

Tokyo Gas

Tokyo Gas is Japan's largest city gas utility and its second largest LNG buyer. However, the company's domestic gas sales have declined at an average rate of 4.5% since 2017, and the company has lost over 1.5 million gas customers.⁶⁰ IEEFA believes that the rate of decline in the company's city gas sales could accelerate to between 5.5-6.0%.^{61 62}

Figure 11: Tokyo Gas LNG Purchase Contracts vs. Domestic Gas Demand



Source: Company reports, IEEFA calculations based on contract data from BNEF, Kpler, JOGMEC, METI, and public media.

In 2022, Tokyo Gas had long-term contracts to purchase 13.4 mtpa (Figure 11). Domestic gas sales and in-house usage, meanwhile, amounted to 10.7 mtpa, representing an over-contracted position of 2.7 mtpa. Over-contracted volumes are set to fall due to the expiry of offtake contracts. In March 2023, Tokyo Gas opted not to renew a 1-mtpa contract with Brunei LNG;⁶³ several contracts for a combined 1.7 mtpa with Malaysia's Petronas are set to expire in 2024 and 2025;⁶⁴ and a 1.5-mtpa deal with Woodside Energy is set to expire in 2025.

However, Tokyo Gas has also committed to purchase 1.3 mtpa of LNG from TotalEnergies' Mozambique LNG project, which is targeting completion in 2028 following multi-year delays.⁶⁵

⁶⁰ Tokyo Gas has also failed to meet a medium-term target set in 2020 to expand overall customers from gas, power, and other services to 14.8 million. As of September 2023, the company has 12.4 million gas and power customers. Tokyo Gas. [FY2023 2Q Financial Results ended September, 2023](#), page 7. October 26, 2023. Reuters. [Tokyo Gas aims to boost power market share, expand LNG trading](#). March 25, 2020. Tokyo Gas. [Consolidated Financial Results Bulletin for the 2nd Quarter Ended September 30, 2023](#), pg. 2-3. October 26, 2023.

⁶¹ Tokyo Gas's own estimates expect domestic gas sales to decline 5.8% in FY2023. Moreover, Bloomberg Intelligence has estimated that Tokyo Gas sales volume could decline 6.3% annually through 2030. Tokyo Gas. [FY2023 2Q Financial Results ended September, 2023](#). October 26, 2023. Bloomberg Intelligence. [Tokyo Gas - Long-Term Volume Decline](#). November 15, 2023.

⁶² We also expect Tokyo Gas's own gas consumption—used to fuel 1.53GW of existing gas plants—to plateau and decline over the decade. The completion of the Tokyo Gas's 2GW Sodegaura combined cycle gas turbine (CCGT) was delayed to FY2030 after Kyushu Electric exited the project due to ongoing turmoil in global LNG markets. Kyushu Electric. [Kyushu Electric Power withdraws from feasibility study on the LNG-fired thermal power plant in Sodegaura, Chiba Prefecture](#). June 15, 2022.

⁶³ S&P Global. [INTERVIEW: Tokyo Gas mulls new LNG supplies, long-term contract renewals as net-zero looms: CEO](#). June 8, 2023.

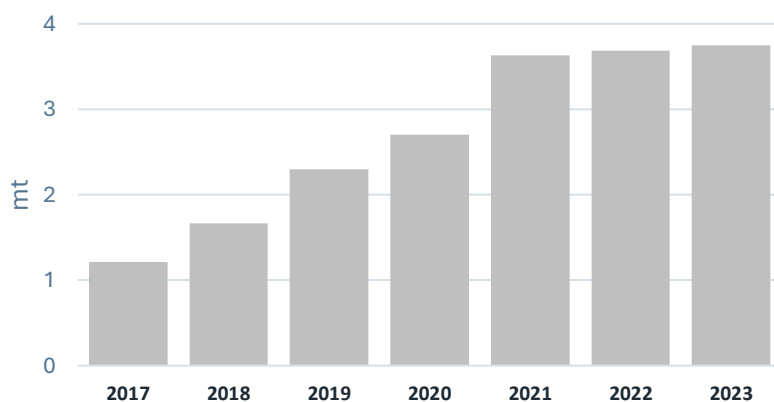
⁶⁴ Petronas is reportedly in talks to renew the deals. Offshore Technology. [Petronas to resume gas pipeline operations in Malaysia by Q1 2024](#). April 13, 2023.

⁶⁵ Argus. [Pertamina cancels Mozambique LNG offtake deal](#). December 8, 2023.

Offtake from the project would increase the over-contracted position of Tokyo Gas to over 2 mtpa. Notably, Indonesia's Pertamina recently cancelled an offtake agreement from Mozambique LNG without penalty, citing force majeure.⁶⁶ Tokyo Gas also signed Heads of Agreements (HOAs) to purchase a combined 1.4 mtpa from LNG Canada and Mexico's Energía Costa Azul liquefaction project.⁶⁷

Despite a bleak outlook for city gas sales, Tokyo Gas has set targets to transact an increasingly large volume of LNG. The company launched an LNG trading unit in September 2020, along with plans to increase its LNG transaction volume to 20 mtpa by 2030.⁶⁸ In the company's latest annual report, it states a goal of generating 25% of operating profits from overseas businesses by 2030, up from 17% in FY2022.⁶⁹ The company's LNG sales have increased nearly four-fold since 2017 (Figure 12).

Figure 12: Tokyo Gas LNG Sales Volume



Source: Kpler.

Tokyo Gas has said that the “ultimate target is to form a Southeast Asia LNG value chain,”⁷⁰ primarily through investments to stimulate LNG demand.⁷¹ In Vietnam, for example, the company is developing two 1.5 GW LNG-fired power plants, both of which come with commitments to supply LNG to the projects.^{72 73} For a summary of the company's business activities in South and Southeast Asia, see [Appendix 2](#).

⁶⁶ Argus. [Pertamina cancels Mozambique LNG offtake deal](#). December 8, 2023.

⁶⁷ HOAs are not included in Figure 11.

⁶⁸ LNG Prime. [Tokyo Gas launches LNG trading unit](#). September 2, 2020.

⁶⁹ Tokyo Gas. [Integrated Report 2023](#), page 7.

⁷⁰ Tokyo Gas. [Overseas Business](#), 2017.

⁷¹ Tokyo Gas. [Annual Report 2018](#), page 34. 2019.

⁷² The Star. [Vietnam awards licence to Tokyo Gas, partners to build RM9.35bil LNG power plant](#). December 17, 2023.

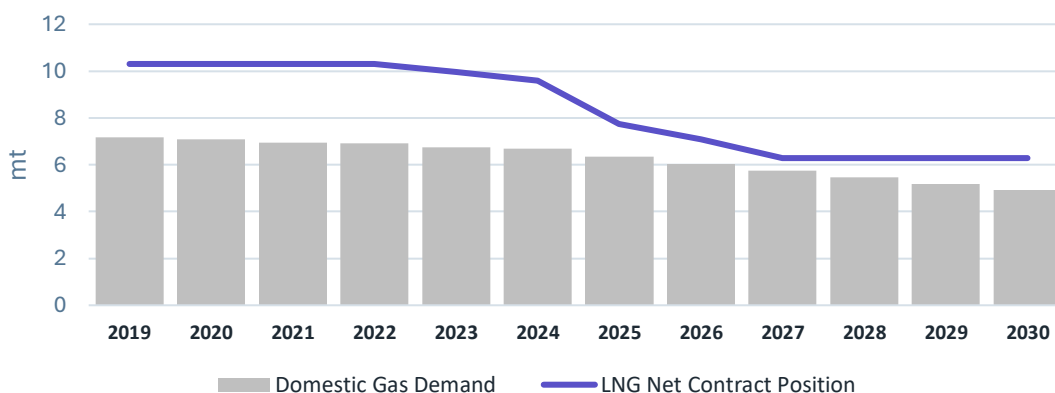
⁷³ Offshore Energy. [Tokyo Gas and partners to work on LNG-to-power project in Vietnam](#). January 25, 2024.

Osaka Gas

As Japan's second largest city gas utility, Osaka Gas supplies roughly 10% of the country's total LNG demand, primarily in the Kansai region. Following market liberalization, however, Kansai saw more gas customers switch providers than any other region in Japan.⁷⁴

Since 2017, the company's gas sales have declined at an average annual rate of nearly 4%. IEEFA expects the rate of decline to increase to 5% through 2030. The company has pivoted to providing electricity, though electricity sales have slowed markedly in recent years, declining 5.2% in 2023.⁷⁵ Gas sales reached the LNG equivalent of 5 mt in 2023, down 21% from 2017. And although Osaka Gas does not provide figures for its own gas consumption, IEEFA estimates the company used 6.7 mt in 2023 for domestic sales and own use.⁷⁶

Figure 13: Osaka Gas Net LNG Contract Position vs. Domestic Gas Requirements



Source: Company reports, IEEFA calculations based on contract data from BNEF, Kpler, JOGMEC, METI, and public media.

In 2023, Osaka Gas had LNG purchase commitments for a combined 11.7 mtpa, along with several contracts to resell LNG worth a combined 1.7 mtpa of LNG. This left the company with a net contracting position of 10 mtpa, or 3.2 mtpa more than city gas sales and own use (Figure 13).

The company's sizable over-contracted position is set to decline in the coming years with the expiry of multiple LNG purchase contracts.⁷⁷ Through 2025, contracts for a combined 2 mtpa are set to expire with Oman and Malaysia, helping balance Osaka Gas's position. However, IEEFA expects that further declines in domestic gas sales and consumption mean the company could remain over-contracted by 1.4 mtpa in 2030.

Under a long-term plan set in 2017 entitled "Going Forward Beyond Borders," the company aims to accelerate its international energy business and transact 17 mt of LNG by 2030, up from 10.3 mt in

⁷⁴ Reuters. [Japan's Kansai region a major battleground for gas and electric utilities](#). July 22, 2018.

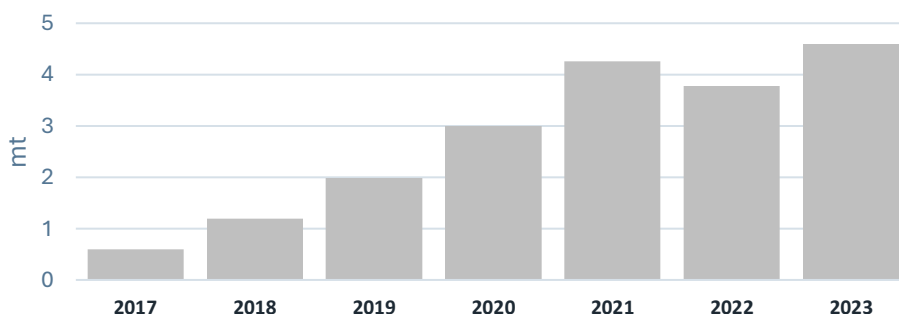
⁷⁵ The company expects power sales to decline nearly 2% in 2024. Osaka Gas. [Daigas Group Financial Report for 2nd Quarter of FY2024.3](#), page 24. October 27, 2023.

⁷⁶ Specifically, IEEFA estimates that the company requires roughly 1.7 mtpa to power 1,802MW of gas-fired power plants.

⁷⁷ Contracts for a combined 0.7 mtpa with Qatar and Brunei expired in 2022 and 2023, respectively.

2019.⁷⁸ Under the strategy, Osaka Gas established a goal to generate 33% of its profits from its overseas business in 2031, up from just 5% in 2017.⁷⁹ ⁸⁰ Osaka sold 4.6 mt of LNG in 2023, up from 0.6 mt in 2017.

Figure 14: Osaka Gas LNG Sales Volume



Source: Kpler.

The company's 2030 strategic vision highlights Southeast Asia as a priority area for growth.⁸¹ However, investments in the region have faced key challenges, including bureaucratic delays, political instability, and currency risks, among others.⁸² In 2017, a company representative for Southeast Asia expressed doubts: *"Every country has big state-owned giants and to cooperate with them is inevitable, essential and necessary, but it is not so easy. In Southeast Asia we are not exactly optimistic."* In 2015, Osaka Gas cancelled a US\$ 2 billion, 1.5GW LNG-fired power plant and receiving terminal in the Philippines due to high costs and uncertain demand.⁸³

The company has continued to focus on the region, though investments have primarily centered around gas distribution and technical services, rather than power generation. In 2019, for example, the company established a gas distribution business in Vietnam and invested in Atlantic Gulf & Pacific (AG&P), which recently completed an LNG regasification terminal in the Philippines.⁸⁴ For a summary of the company's business activities in South and Southeast Asia, see Appendix 3.

⁷⁸ Daigas Group. [Long-term Management Vision 2030 and Medium-term Management Plan 2020 "Going Forward Beyond Borders."](#) March 9, 2017.

⁷⁹ Singapore International Energy Week. [Optimising natural gas solutions in Asia and transitioning to a low-carbon future: An interview with Kazuhisa Yano, Chief Asia Representative, Osaka Gas.](#) October 24, 2019.

⁸⁰ The plan also established a target to increase the company's power portfolio to 9,000MW in Japan and abroad, up from 4,691MW in 2021 (2,371MW in Japan; 2,320MW abroad). In 2021, nearly all the company's investments in power projects abroad were in natural gas-fired plants in the United States, Australia, and UAE. The long-term strategy aims to increase renewables capacity by just 680 MW. Daigas Group. [Osaka Gas in brief 2021.](#)

⁸¹ S&P Global. [Sluggish growth dogs Osaka Gas plans in Southeast Asia.](#) October 25, 2017.

⁸² S&P Global. [Sluggish growth dogs Osaka Gas plans in Southeast Asia.](#) October 25, 2017.

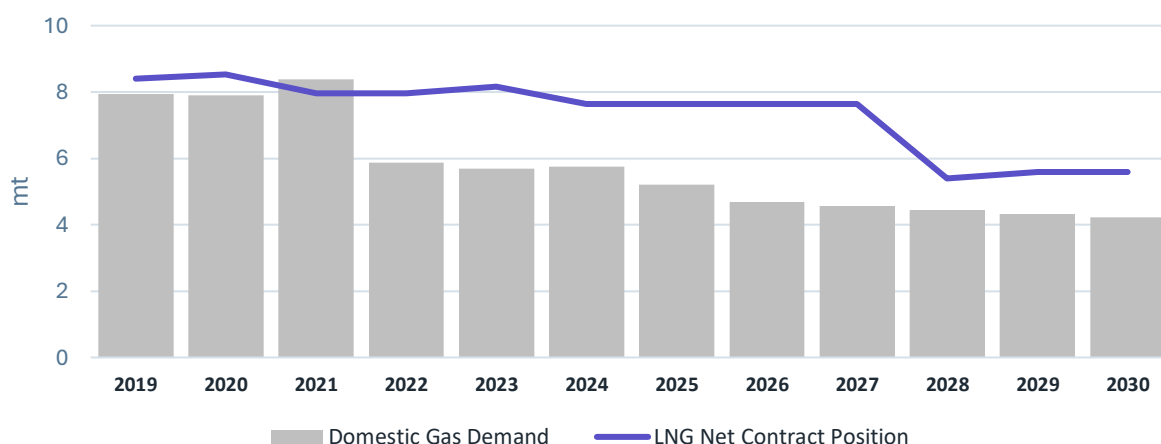
⁸³ Philippine Star. [Energy mix, pricing hamper Meralco's entry into LNG.](#) August 30, 2016.

⁸⁴ According to company press releases, Osaka Gas has "provided technical consulting services related to the construction, operation and maintenance of LNG receiving terminal for 40 projects in 9 countries including Taiwan." Business Wire. [Daigas Gas and Power Solution Was Awarded FEED and Technical Consulting Service Contract for LNG Receiving Terminal Expansion Project in Taiwan.](#) April 5, 2022.

Kansai Electric

The Kansai Electric Power Company (Kansai Electric) primarily engages in the generation, transmission, and distribution of electricity across Japan's Kansai region.⁸⁵ The company historically procures LNG for its domestic power business and its retail gas sales business. Since 2017, Kansai Electric's gas demand has fallen 37% due largely to the restart of seven nuclear reactors with a combined 6.3GW of capacity.⁸⁶ Lower demand led the utility to cancel an LNG-fired power plant at the end of 2023.⁸⁷ IEEFA estimates that Kansai Electric's gas demand could continue declining at 7.3% per year through this decade.⁸⁸

Figure 15: Kansai Electric LNG Purchase Contracts vs. Domestic Gas Demand⁸⁹



Source: Company reports, IEEFA calculations based on contract data from BNEF, Kpler, JOGMEC, METI, and public media.

In 2022, Kansai Electric held net long-term contracts for 8 mtpa, while domestic usage totaled 5.9 mtpa (Figure 15), yielding an over-contracted position of 2.1 mtpa. This position is set to increase this decade as gas supply requirements fall due to rising nuclear availability and demand conservation. By mid-decade, Kansai Electric could be over-contracted by about 3 mt. However, the

⁸⁵ Kansai Electric energy segment includes overseas power generation and retail gas sales. The company has an IT/Communications business segment and a Life/Business solution segment, but the energy, transmission and distribution components make up over 90% of company revenues. Kansai Electric, [Consolidated Financial Statements for the Year Ended March 31, 2023, and Independent Auditor's Report](#), July 2023

⁸⁶ LNG use by power segment retrieved from several environmental reports from 2019 to 2023. Kansai Electric. [Environmental Data](#), July 2023.

⁸⁷ Nikkei Asia. [Japan's Kansai Electric cancels new LNG-fired power plant](#). December 19, 2023.

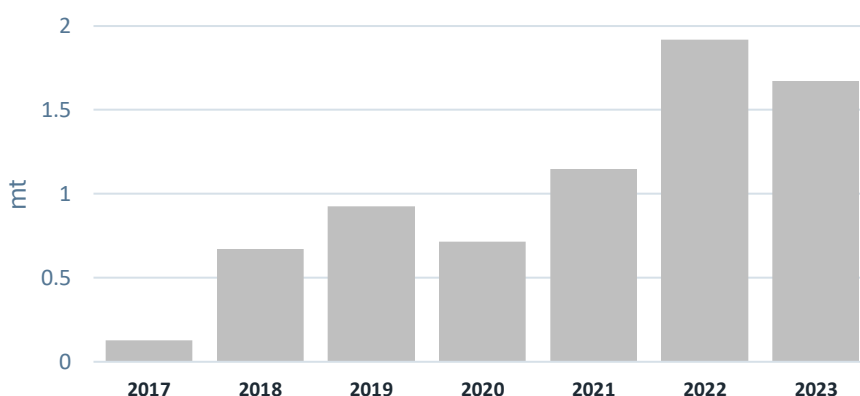
⁸⁸ IEEFA assumes: that the possible life extension of both Takahama Units 1 and 2 are approved next year, buoying nuclear availability at current levels throughout the decade; that the operating nuclear fleet runs at a capacity factor of 70% in 2024 and 75% thereafter; and that electricity demand falls in line with METI's 6th Strategic Energy Plan.

⁸⁹ Domestic gas demand includes gas use by Kansai power generators and its domestic retail sales of gas.

expiry of a 1.8-mtpa sales and purchase agreement (SPA) with Woodside Energy in 2027 will reduce this gap to roughly 1 mt by the end of the decade.^{90 91}

Kansai Electric's retail gas sales have doubled since 2017, highlighting the opportunity for retail gas expansion presented by gas market liberalization. However, sales have flatlined around 1.5 mt since 2020, and the company does not always profit from the practice. During FY2022, high procurement costs saw the retail gas business lose JP¥ 21.6 billion (US\$ 193 million), and in FY2023, the segment broke even at JP¥ 0.8 billion (US\$ 5.9 million) of profit.⁹²

Figure 16: Kansai Electric LNG Sales Volume



Source: Kpler.

Kansai Electric has an established presence in Southeast Asia, via its overseas power generating, transmission and distribution investments, and through its active role in providing engineering and services solutions to improve the operation and maintenance of existing facilities. The company's Overseas Energy Business segment participates in the generation of power from 22 projects across 11 countries. These include thermal assets, such as gas-fired projects in Singapore, Indonesia and Taiwan and a coal-fired plant in Indonesia and a distribution company in Philippines.

However, the company's current project pipeline is largely focused outside of Asia. While the company did move its LNG trading arm to Singapore to form KE Fuel Trading Singapore Pte Ltd in 2017, the current focus of the group is on the Atlantic LNG market.⁹³ Kansai Electric's current business activities suggest that they are less focused on cultivating LNG demand across the Southeast Asia region than peers. For a summary of the company's business activities in South and Southeast Asia, see [Appendix 4](#).

⁹⁰ These estimates do not include a deal signed in late 2023 with Hartree Partners, for an unspecified size and duration. LNG Prime. [Kansai Electric Hartree Partners Ink LNG Supply Deal](#). December 15, 2023.

⁹¹ Kansai Electric's medium-term plan includes "[rationalizing] fuel procurement and supply-demand balancing" en route to restoring consistent profitability by mid-decade. This suggests that the company could manage its contracts closer to its use requirements, despite government pressure to secure more long-term contracts.

⁹² Kansai Electric. [Financial results for FY ending 3/2023 & Financial forecasts for FY ending 3/2024](#). April 27, 2023.

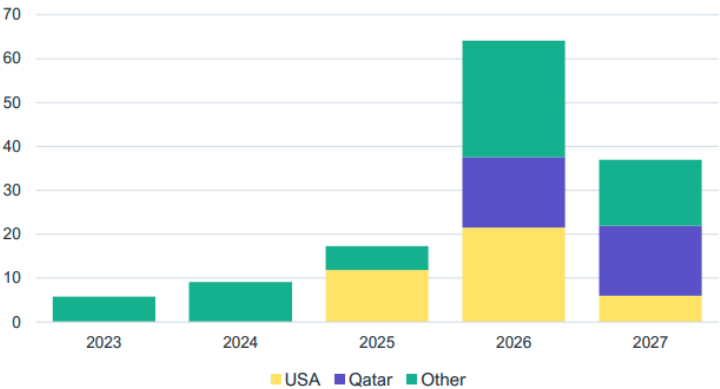
⁹³ Kansai Electric. [Kansai Electric Power Group Integrated Report 2023](#). September 2023.

V. A Global Market Perspective

The preceding case studies demonstrate that Japan’s major gas and power utilities are all likely to face a surplus of contracted LNG volumes through 2030 due to the structural decline of Japanese LNG demand. These utilities are developing gas and LNG infrastructure in emerging Southeast Asian markets and other regions as potential outlets to resell excess volumes.

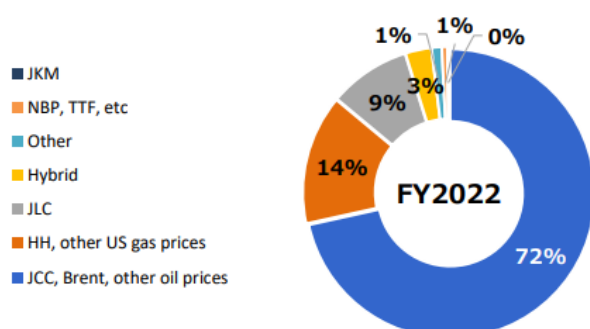
However, a higher emphasis on LNG resales is likely to put Japanese utilities in direct competition with other global LNG suppliers—a stark difference from the traditional structure of LNG markets. IEEFA has demonstrated previously that a record increase in global LNG export capacity by the mid-2020s is likely to create a medium-term glut. A flood of capacity already under construction, particularly in Qatar and the United States, is expected to come online beginning in 2025, and the world could see a record annual capacity addition in 2026 (see Figure 17).

Figure 17: Forecasted Liquefaction Capacity Additions (mtpa) 2023-27



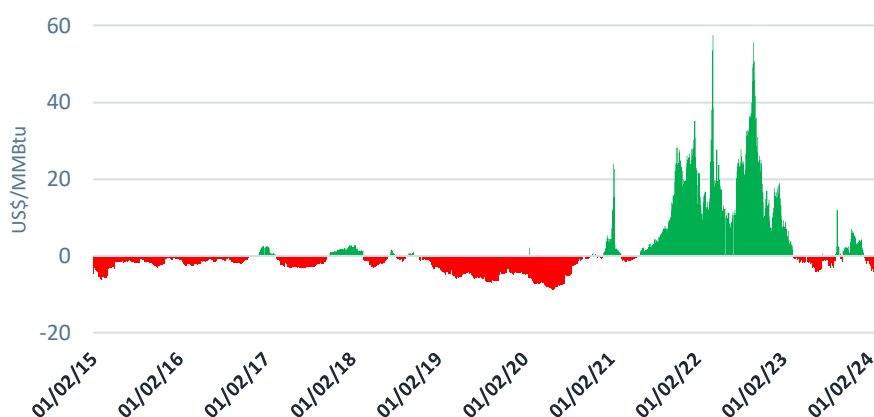
Source: IEEFA LNG Outlook.

This flood of supply coincides with declining LNG demand in mature markets like Japan. IEEFA also notes that LNG imports are likely to decline further in the major LNG markets of Europe and South Korea. A combination of waning demand from the world’s largest buyers, combined with an influx of new supply, could cause LNG prices to fall over the medium-term, resulting in smaller margins for LNG exporters and resellers.

Figure 18: Diversity of Pricing Indices in Japan's LNG Purchase Contracts

Source: [JOGMEC](#), p. 6.

Moreover, a large majority of Japan's LNG purchase contracts contain pricing formulas linked to oil (Figure 18), indicating a risk that spot and short-term market prices deviate from oil-linked prices. Spot market prices have been significantly higher than oil-indexed contract prices for most of the last three years, signaling an opportunity to arbitrage cargoes for LNG resellers. However, this reversed in January 2024, when spot market prices fell below oil-linked prices modeled for Japan's traditional long-term contracts (Figure 19).

Figure 19: Difference Between East Asian Spot LNG Prices and Japan's Oil-Indexed Purchase Contracts

Source: IEEFA calculations based on pricing assessments from [ICIS](#).

When spot market prices fall below the pricing formulas established in Japanese utilities' oil-linked contracts, this indicates a risk of financial losses for Japanese utilities reselling LNG. For example, Kyushu Electric lost more than US\$ 240 million in the second half of 2019 due to LNG resales, as prices in the Asian spot market dipped to US\$ 4-6 per million British thermal units (MMBtu). JERA lost JP¥ 9.4 billion (US\$ 123 million) on LNG resales due to market downturns in 2020. Japan's import prices based on long-term contracts have averaged US\$ 12.4/MMBtu since 2021. Spot

market prices below this level may incur downside risks on LNG resale margins from traditional Japanese contracts, though this will depend on the portfolio of contracts at each utility's disposal.

Japan's LNG buyers are aiming to diversify from their high exposure to oil indexation by signing contracts with alternative pricing formulas linked to non-oil benchmarks. The country's share of oil-indexed LNG purchase contracts is set to fall from 72% in 2023 to 58% by 2030. Purchase contracts linked to Henry Hub gas prices, meanwhile, are set to grow from 14% in 2023 to 25% in 2030.⁹⁴

While this may reduce price risks stemming from oil indexation, it could expose buyers to a host of other factors. For example, Henry Hub linkages in U.S. contracts would subject buyers to fundamentals in the U.S. domestic gas market that could diverge from Asian spot benchmarks. Growing U.S. LNG exports present a risk of upward pressure on Henry Hub prices, which could in turn result in higher costs and lower margins for offtakers looking to resell U.S. LNG into Asian spot markets.

Buyers in Japan are facing long-term domestic demand uncertainty, combined with government targets to transact higher volumes of LNG. As a result, some may opt to balance these competing forces by buying LNG on short-term, more flexible contracts rather than multi-decade contracts. However, shorter, more flexible contract terms would likely drive the value of the contract higher, adding a premium to the price of LNG that could negatively impact re-sale margins.⁹⁵ In other words, adding contractual flexibilities to balance divergent trends could make Japan's LNG resales less economically competitive in emerging markets compared to the incoming flood of new supply.

In a global glut scenario, spot prices in Asia could fall well below that level. For example, the Oxford Institute for Energy Studies (OIES) has flagged the risk that prices could fall to between US\$ 5-8/MMBtu in Europe and Asia by 2030.⁹⁶ Similarly, the International Energy Agency (IEA) has forecast that LNG import prices in Asia could fall from US\$ 15.9/MMBtu in 2022 to US\$ 9.4/MMBtu by 2030 under a stated policy scenario.⁹⁷ Under global net-zero scenarios, spot prices fall further to US\$ 5.5/MMBtu by 2030 due to lower demand for LNG and other fossil fuels.

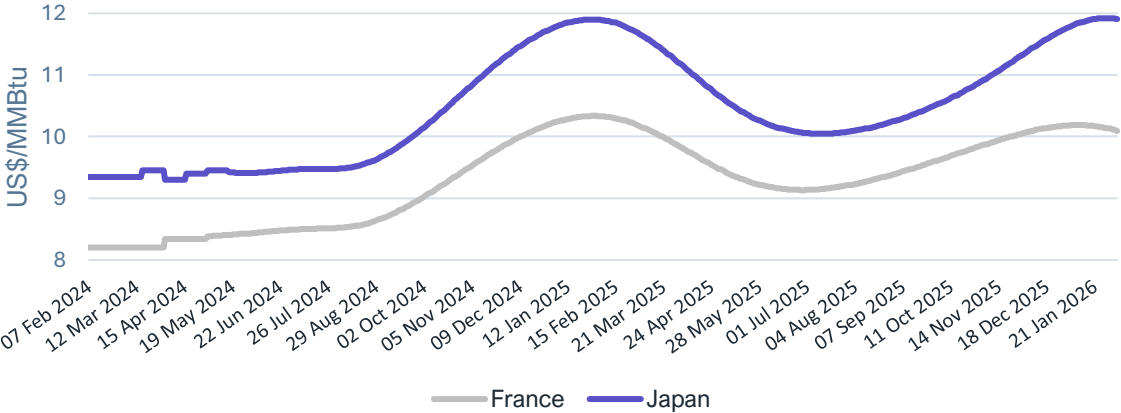
⁹⁴ JOGMEC. [Results of FY2023 Survey on Destination Clauses and Price Indices in Fixed-term LNG Sales and Purchase Agreements concluded by Japanese companies](#), November 10, 2023.

⁹⁵ Timera Energy has estimated the value of adding individual contract terms that support buyer flexibility. See: Timera Energy. [LNG contract valuation case study: 'flex ain't free'](#), March 8, 2021.

⁹⁶ Oxford Institute for Energy Studies (OIES). [A New Global Gas Order? \(Part 1\): The Outlook to 2030 after the Energy Crisis](#), p. ii. July 2023.

⁹⁷ International Energy Agency (IEA). [World Energy Outlook 2023](#), p. 96. October 2023.

Figure 20: LNG Forward Price Curves, Japan and France



Source: ICIS.

Forward curves from February 2024 to February 2026 indicate that the market expects prices to remain between US\$ 9-12/MMBtu in Asia and US\$ 8-10.5/MMBtu in Europe (Figure 20). At this level, Japanese utilities aiming to resell LNG to other markets may realize only slim margins on rerouted cargoes.

Prices could fall further beginning in 2026, when global LNG supply is anticipated to increase 13%—the largest annual increase in the world’s LNG export capacity ever.

For Japan’s utilities faced with structurally declining demand at home, the desire to resell and transact greater volumes of LNG will coincide directly with a flood of new supply capacity entering the market in the mid-2020s.

Conclusion

Ultimately, Japan’s surplus of contracted volumes and trading activities in emerging Asia have important implications for global LNG exporters and marketers. First, many exporters continue to justify new liquefaction investments under the false impression that Japan needs more volumes. In fact, the opposite is true: Japanese companies may increasingly compete for potential customers in prospective markets, adding to supply rather than pulling cargoes off the water. This double counting risk may fuel unnecessary investments in new supply capacity.

Second, an increase of LNG sales by Japanese utilities coincides with a flood of new LNG supply entering the market. As demand from Japan and other key markets wanes, prices are widely expected to fall over the remainder of the decade. LNG marketers, which increasingly include Japanese utilities, could see sales margins drop and potentially turn negative.

APPENDICES

Appendix 1: Summary of JERA's Business Activities in Southeast Asia

Country	Area	Description
Bangladesh	Power generation, LNG supply	Acquired a 19% interest in Summit Power International Limited, a power generating company and LNG importer in Bangladesh, in 2019, and in 2023 revealed plans to develop LNG regasification, storage and supply with Summit Power.
Indonesia	LNG	JERA and PT Pertamina sign an MOU to share information and discuss developing LNG, ammonia and hydrogen supply chain infrastructure and O&M best practices.
	LNG supply	Subsidiary PT JERA Energi Indonesia (JERA EI) began operations in Indonesia in August 2023. Aims to conduct market research, forge relationships with government and local companies to influence decarbonization roadmaps in the country and the Asian region. Aiming to develop power projects, including LNG-to-power units.
Philippines	Power generation, distribution and retail sales	JERA acquired a 27% stake in Aboitiz Power Corporation in 2021, which is targeting an increase in thermal capacity to complement renewable capacity. Both companies have agreed to collaborate on fuel sourcing and managing LNG for potential LNG power plants.
	Power generation	Inherited from TEPCO, JERA and Marubeni purchased TeaM Energy Corporation in 2007, an IPP which accounts for 10% of the generation in Luzon, Philippines.
	LNG Supply	In late 2023, JERA concluded an agreement with the Association for Overseas Technical Cooperation and Sustainable Partnerships (AOTS) in support of fostering the full-scale adoption of LNG in the Philippines. JERA aims to help assess demand prospects, conduct environmental assessments, design regulatory systems for the development of LNG infrastructure and share knowledge about LNG and natural gas with stakeholders in the Philippines.
Singapore	LNG supply	JERA Asia Pte. Ltd. provides project development in energy related fields of business in Asia, and JERA LNG Portfolio Strategy Pte. Ltd. ("JERA LPS") aims to optimize JERA's LNG portfolio.
	LNG supply, trading and optimization	JERA Global Markets Pte. Ltd. is JERA's global trading apparatus, responsible for optimizing JERA's large coal and LNG supply portfolio into Japan, the Pacific and Europe.
Taiwan	Power generation	JERA participates in three IPP CCGT projects totaling 1.96 GW in Taiwan.
Thailand	Power generation	Inherited from CEPCO, the JERA Power (Thailand) Co., Ltd. (JERAPT) provides financial, operational and engineering services for power generation in Thailand, and aims to expand via investment opportunities in power projects across Southeast Asia.
	Power generation	Together with Mitsubishi, JERA invests in Thailand's EGCO, which owns 4.2 GW of power across Southeast Asia.
	Power generation	Chubu's first overseas power project, the Ratchaburi Gas Thermal IPP project, is a 1.4 GW combined-cycle power plant.

Vietnam	Power generation	TEPCO, EDG and Sumitomo Corporation jointly built a 715 MW CCGT power project, which has been supplying power since 2005.
	LNG supply	In 2022, JERA set up JERA Energy Vietnam Co., Ltd. ("JERA EV") in Hanoi to facilitate the development of electricity and infrastructure projects, including LNG-to-Power projects, in Vietnam.
	Power generation	In 2020, ERA, ExxonMobil, and Hai Phong City signed an MOU to develop a 4.5 GW LNG-to-power project in Vietnam and bid to develop a 1.5 GW project in Ca Na. JERA is also involved in the development of LNG import terminals in the area.

Source: Company reports, various media reports.

Appendix 2: Summary of Tokyo Gas's Business Activities in Southeast Asia

Country	Area	Description
Thailand	Power Generation	In 2016, Tokyo Gas purchased a 28% stake in the operating company of the 350-MW Bang Bo power plant, the company's first investment in power generation in Southeast Asia.
	Gas Supply	In 2019, Tokyo Gas launched Thailand first fully private gas distribution utility, called Gulf WHA MT Natural Gas Distribution Company Limited. The company supplies gas to industrial estates in Thailand's Eastern Economic Corridor.
	Gas Supply	Tokyo Gas formed a JV with a PTT subsidiary to supply small-scale LNG to industrial users, small power producers, and utilities in Thailand.
	LNG Import Terminal	In 2018, Tokyo Gas was selected to conduct initial FEED studies for the Nong Fab LNG terminal. The company was selected again in 2022 to update FEED studies and manage EPC tendering.
	LNG Import Terminal	In 2014, Tokyo Gas was selected as project management contractor for the Map Ta Phut LNG terminal expansion.
Vietnam	Gas Supply	In 2017, Tokyo Gas acquired a 24.9% stake in gas distribution company PetroVietnam Low Pressure Gas Distribution JSC.
	Gas Supply	In 2016, Tokyo Gas formed LNG Vietnam JSC with PV Gas and Bitexco Group to import and distribute LNG.
	Power Generation / LNG Import Terminal	Tokyo Gas, Marubeni, and PetroVietnam established a joint venture in November 2022 to conduct a feasibility study for a 1.5GW LNG-fired power plant and onshore LNG terminal in Quang Ninh province.
	Power Generation	Vietnam awarded Tokyo Gas and consortium partners an investment license to construct the 1.5GW Thai Binh LNG-fired power plant in December 2023.
	LNG Import Terminal	Tokyo Gas conducted the initial FEED studies for Vietnam's first LNG project, the Thi Vai import terminal. The terminal began operations in November 2023.
Indonesia	Gas Supply	In 2017, Tokyo Gas acquired 33% of gas distributor PT Raya Alamindo.
	Gas Supply	In November 2020, Tokyo Gas acquired 18% of city gas distributor PT Energy Mina Abadi. The same month, Tokyo Gas also acquired 33.4% of another gas distribution company, PT Super Energy Tbk, to encourage industrial consumers to switch fuel consumption to natural gas.
	LNG Import Terminal	Tokyo Gas and Pertamina established a joint venture in 2015 to develop a 4-mtpa onshore LNG import terminal. The project was later shelved due to uncertain gas demand.
Philippines	LNG Import Terminal	Tokyo Gas took a 20% stake in the First Gen LNG import terminal in 2018. The project became operational in November 2023.
Malaysia	Gas Supply	Tokyo Gas, along with Mitsui, owns 18.5% of Gas Malaysia, a gas distribution company. The company also provides gas cogeneration systems to industrial parks through Gas Malaysia Energy Advance.

Source: Company reports, various media reports.

Appendix 3: Summary of Osaka Gas's Business Activities in Southeast Asia

Country	Area	Description
Singapore	Gas Supply	In 2013, Osaka Gas and Singapore's City Energy formed a joint venture, City-OG Gas Energy Services, to market and sell gas to industrial users.
Thailand	Gas Supply	The company established Osaka Gas Thailand in 2013 to offer energy solution services to industrial customers.
	Gas Supply / Power Generation	Under NS-OG Energy Solutions, established in 2014, Osaka Gas procures gas, constructs and operates power facilities, and provides demand management services.
	Gas Supply	Osaka Gas established OGP Energy Solutions in partnership with PTT in 2015, providing fuel conversion services to industrial consumers in Thailand.
Indonesia	Gas Supply	In 2018, Osaka Gas launched a natural gas joint marketing business in partnership with Pertamina.
Vietnam	Gas Supply	In 2019, Osaka Gas formed a joint venture with Sojitz Corporation to supply natural gas to the Phu My 3 industrial park. They aim to expand to other major industrial parks throughout the country.
Philippines	LNG Import Terminal	In 2019, Osaka Gas and JBIC invested in Singaporean LNG developer AG&P. The company completed an LNG import terminal in the Philippines in 2023.

Source: Company reports, various media reports.

Appendix 4: Summary of Kansai Electric's Business Activities in Southeast Asia⁹⁸

Country	Area	Description
Bangladesh	Consulting, engineering and training	Provide training for the operation and maintenance of thermal power plants jointly with the Japan International Cooperation Agency.
Indonesia	Consulting, engineering and training	Kansai Electric and its subsidiary Kanden Power-Tech (KPT) aim to provide expertise to PT Medco Power Indonesia (MPI) to develop gas-fired power projects in Indonesia. Both also provided training to operators of the Tanjung Jati B coal-fired power station, and Kansai Electric also provided construction support and operations preparation services for the project.
	Power generation	Owns a minority stake in the 202 MW Medco-Kansai JV gas-fired plant.
Pakistan	Consulting, engineering and training	Provide training for the operation and maintenance of thermal power plants jointly with the Japan International Cooperation Agency.
Philippines	Electricity distribution and retail	Kansai Electric has a 9% stake in the Power Distribution and Retail Sales in the New Clark City project.
Singapore	Power generation	Owns a 15% stake in the 2.6 GW Senoko gas-fired power station.
	LNG trading	Established KE Fuel Trading Singapore Pte. Ltd in Singapore in 2017 as its LNG trading arm to connect the company across Asia and, recently, to the growing Atlantic market.
Taiwan	Power generation	Owns a minority stake in the 480 MW Kuo Kuang gas-fired power plant.
Thailand	Demand-side initiatives, energy services	Established Kansai Energy Solutions (Thailand) Co. Ltd (K-EST) in 2018 to provide onsite service solutions, including co-generation.
Vietnam	Demand-side initiatives, energy services	Established Kansai Energy Solutions (Vietnam) Co. Ltd (K-ESV) in 2018 to provide onsite service solutions, including co-generation.

Source: Company reports, various media reports.

⁹⁸ Not an exhaustive table. For example, the Kansai Electric subsidiary NEWJEC provides consulting services to aid in the development, planning, designing, construction and maintenance of large-scale power supply and substations across southeast Asia. NEWJEC, [Services and Activities](#)

About IEEFA

The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

About the Authors

Sam Reynolds

Sam Reynolds, a Research Lead with the Institute for Energy Economics and Financial Analysis (IEEFA), focuses on the economic, financial, and climate risks associated with natural gas and liquefied natural gas (LNG) infrastructure developments in emerging Asia.

He is the author of several studies concerning the region's transition to renewable energy, stranded asset risk in the natural gas sector, and the macroeconomic risks associated with a greater regional dependence on imported LNG. sreynolds@ieefa.org

Christopher Doleman

Christopher Doleman is an LNG/Gas Specialist, Asia, focusing on the economic, financial and climate implications of developing the natural gas value chain throughout Asia. As a former market analyst and energy modeller, he analyzed how developments in policy, energy markets and technology shape energy systems and affect energy security. cdoleman@ieefa.org

This report is for information and educational purposes only. The Institute for Energy Economics and Financial Analysis ("IEEFA") does not provide tax, legal, investment, financial product or accounting advice. This report is not intended to provide, and should not be relied on for, tax, legal, investment, financial product or accounting advice. Nothing in this report is intended as investment or financial product advice, as an offer or solicitation of an offer to buy or sell, or as a recommendation, opinion, endorsement, or sponsorship of any financial product, class of financial products, security, company, or fund. IEEFA is not responsible for any investment or other decision made by you. You are responsible for your own investment research and investment decisions. This report is not meant as a general guide to investing, nor as a source of any specific or general recommendation or opinion in relation to any financial products. Unless attributed to others, any opinions expressed are our current opinions only. Certain information presented may have been provided by third parties. IEEFA believes that such third-party information is reliable, and has checked public records to verify it where possible, but does not guarantee its accuracy, timeliness or completeness; and it is subject to change without notice.