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INTERNATIONAL ADDRESS:

Balancing decarbonisation and the need for gas in a modern industrialised country

Mitsubishi Research Institute

Ryusuke Shida

Research Director, PhD

Group Lead, Energy and Sustainability Division

Mitsubishi Research Institute (MRI)

- A comprehensive **think tank** in Japan, founded in 1970
- One of the “Mitsubishi” group, but independent
- Government is our stable customer base, also providing services to private sector
- >1000 diverse and highly-skilled professionals

About me

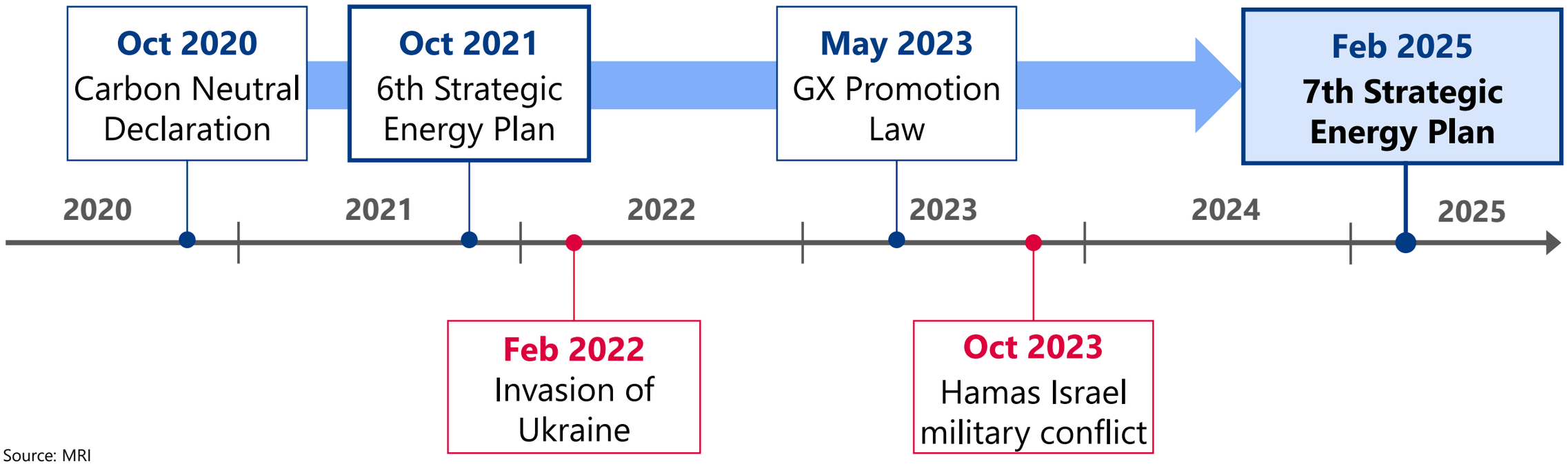
Ryusuke Shida, PhD (Eng)

- Research Director / Group Lead of Energy and Sustainability Division at MRI
- A temporary member of Industrial Structure Council in Japan, where recent NDC was discussed
- Main field: Energy transition and modelling

7th Strategic Energy Plan

Japan's 7th Strategic Energy Plan (SEP)

- Japan's decarbonization policies advance despite global disruptions
- The 7th Strategic Energy Plan, approved in February 2025, outlines Japan's comprehensive energy strategy



Source: MRI

Key Differences from the 6th Strategic Energy Plan

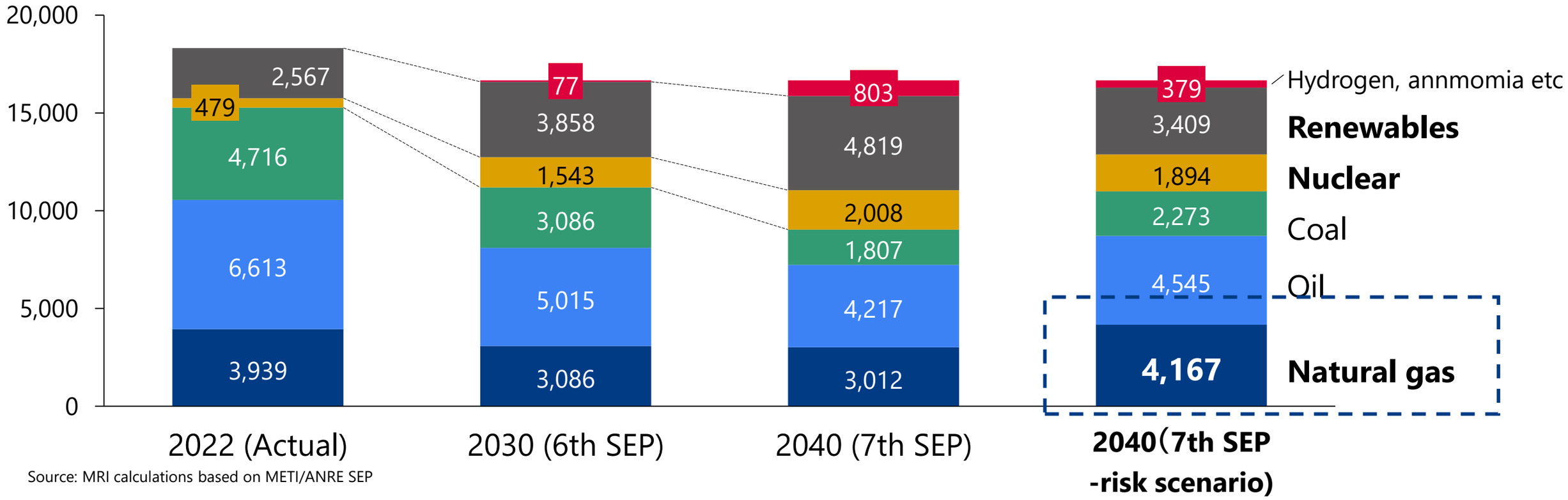
	6th Strategic Energy Plan (SEP)	7th Strategic Energy Plan (SEP)
Key concept	**Carbon Neutrality by 2050**	**Emphasis on energy and economic security** alongside ambitious climate goal
Energy supply	**Maximizing renewables**	Both **renewables and nuclear** as crucial decarbonization sources
Electricity demand	**Decline** due to population decrease and improved EE	**Possible increase** due to ICT sector growth

Source: MRI

7th SEP's Base and Risk Scenarios – Role of Natural Gas

- The 7th SEP aims to significantly increase renewables and nuclear by 2040, yet uniquely introduces a "risk scenario" that anticipates higher natural gas demand.

Total Primary Energy Supply (PJ)

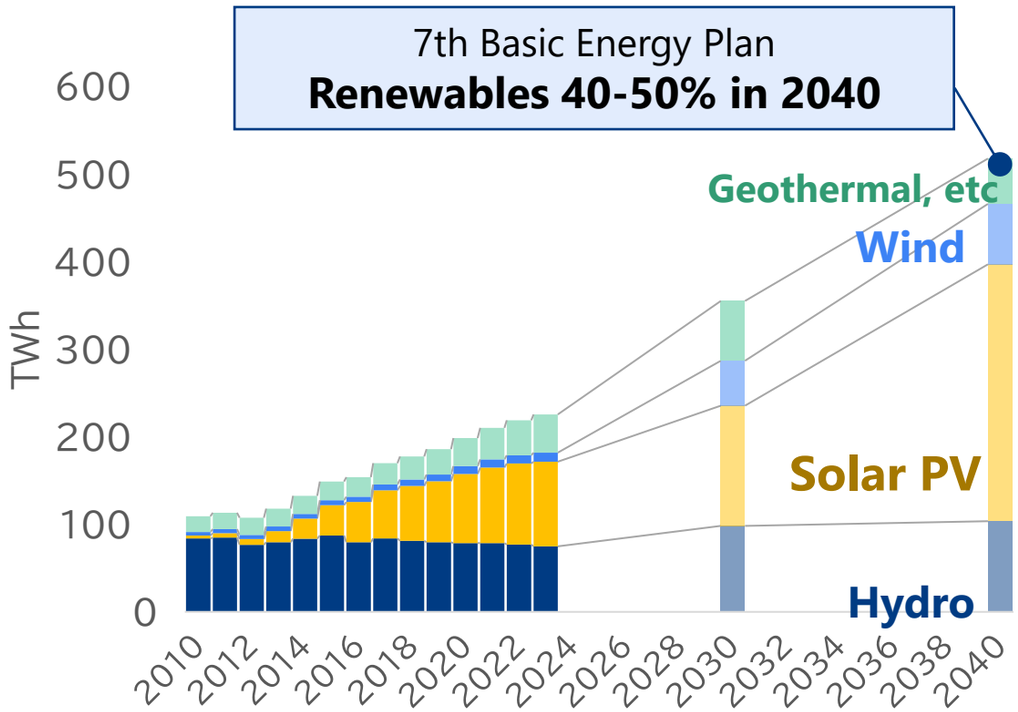


Source: MRI calculations based on METI/ANRE SEP

Slowdown in Renewable Deployment Underpins the Risk Scenario

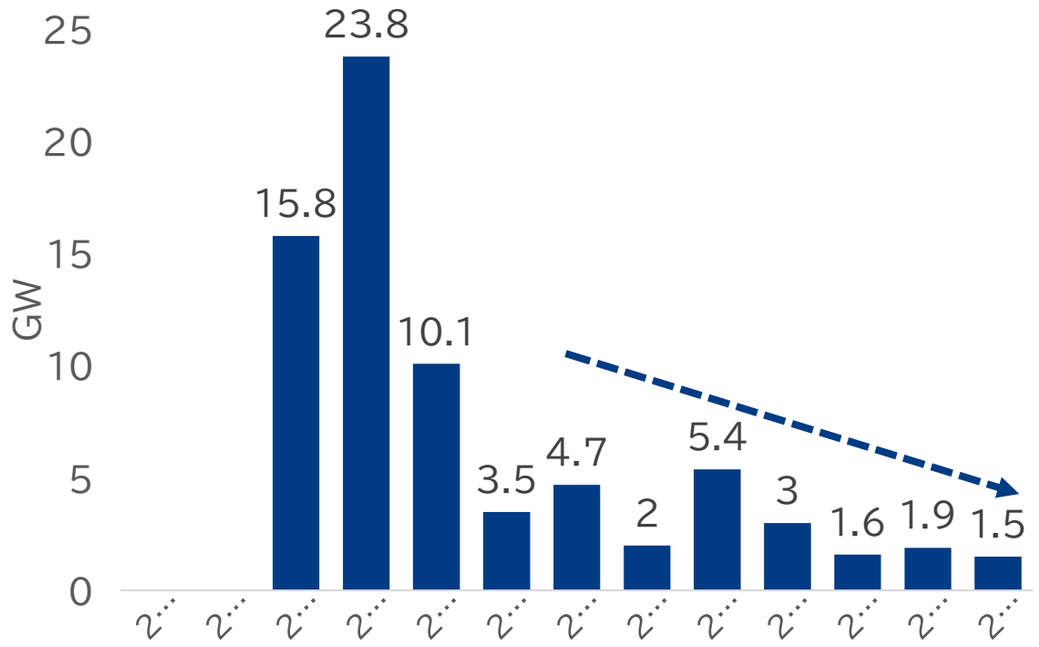
- Achieving the 7th SEP renewable targets requires a faster pace of deployment, but the actual progress has slowed.

Renewable Energy Generation Target



Source: MRI analysis based on METI/ANRE/OCCTO dataset

Trend in FIT/FIP Certification Volumes for Solar PV

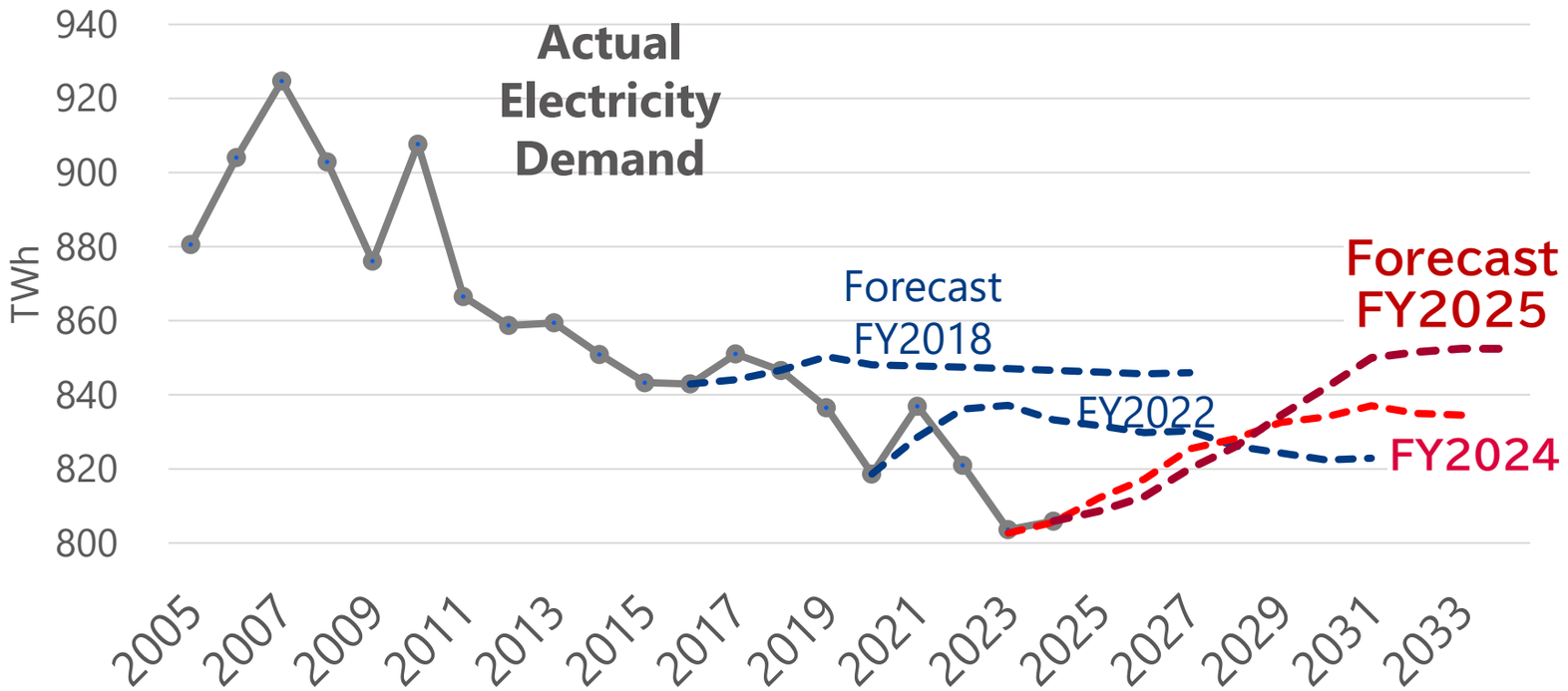


Source) MRI analysis based on METI dataset

Electricity Demand Growth Driven by ICT Sector, But Uncertainties Persist

- Actual electricity demand may be lower than forecast due to inflated connection requests.

Actual and forecast of electricity demand in grid (End-use)



Data Center

- ✓ Softbank (Japan)
- ✓ Google (US)
- ✓ Princeton Digital Group (Singapore)

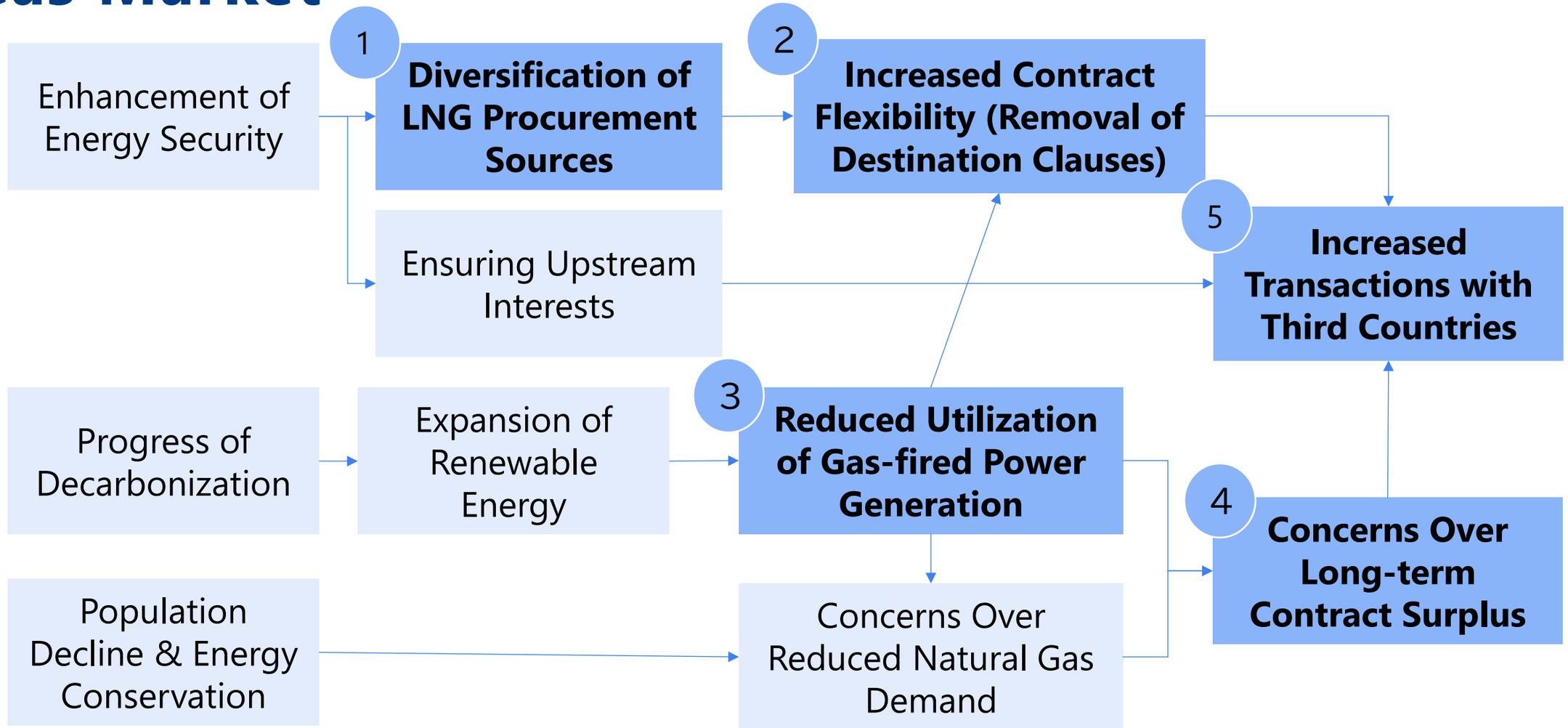
Semiconductor Factory

- ✓ Rapidus (Japan)
- ✓ TSMC (Taiwan)
- ✓ Micron Technology (US)

Source: MRI analysis based on OCCTO dataset

Transition in Japan's LNG Market

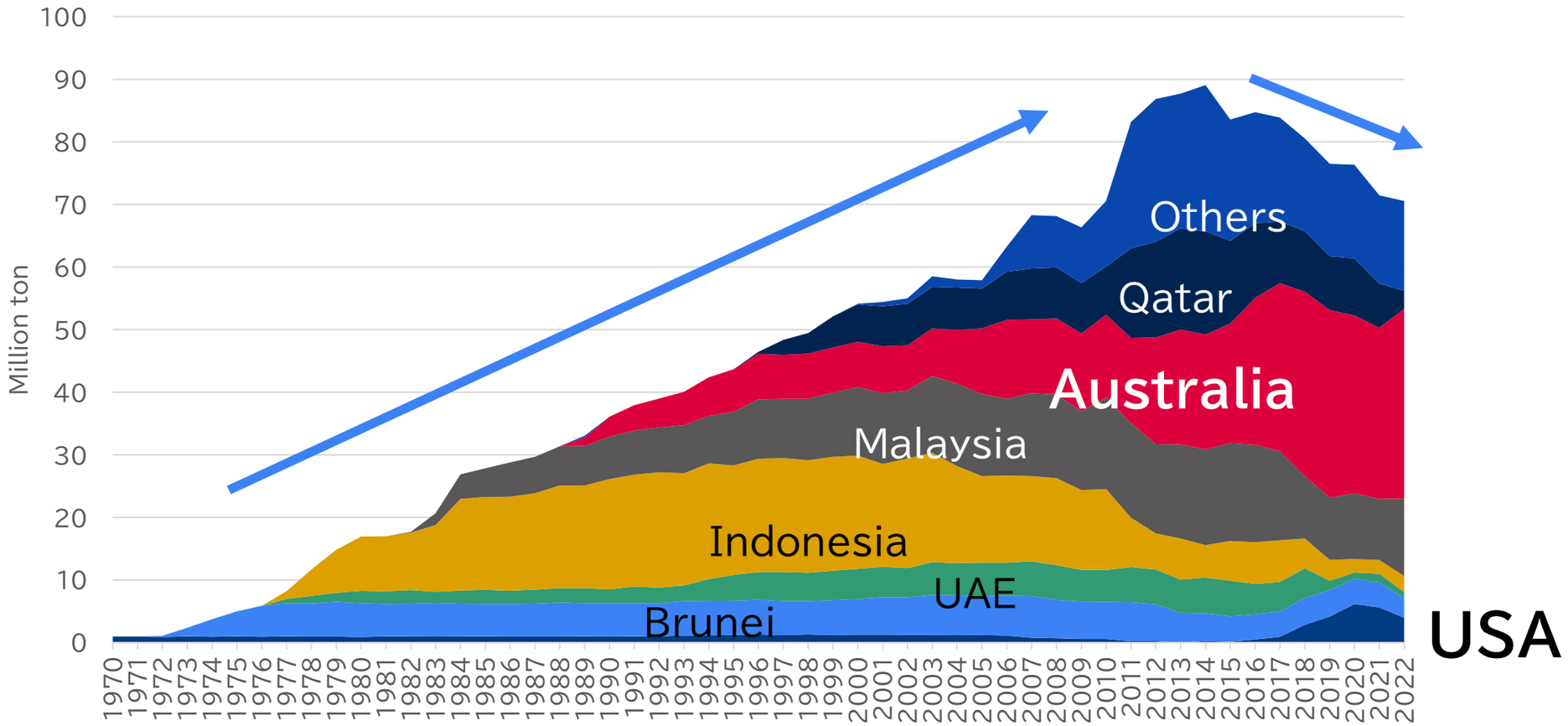
Changing Environment Surrounding Japan's Natural Gas Market



Source: MRI analysis

1 Diversification of LNG Sources: Significant Increase in US LNG Imports

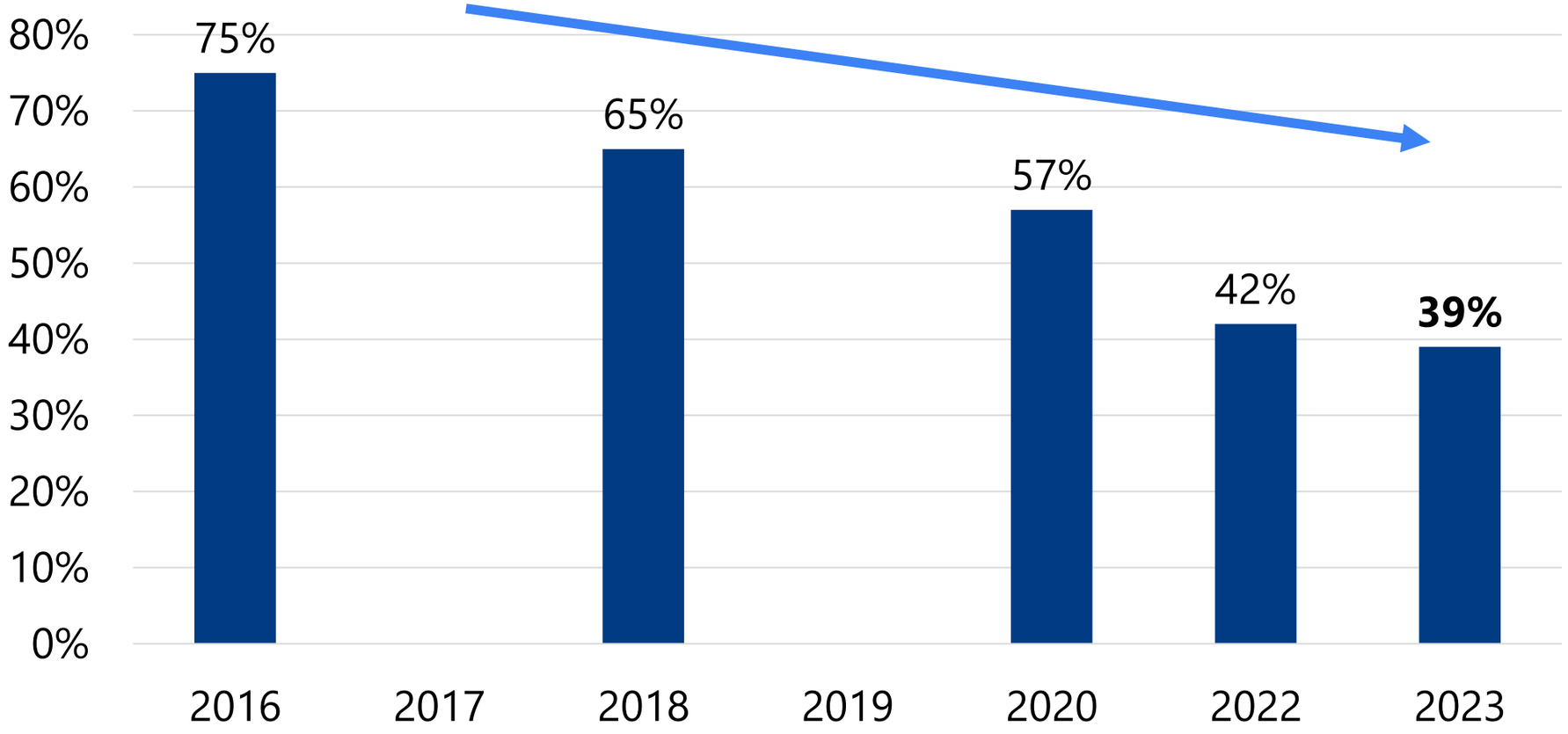
Long-term trend of Japan's LNG Imports by Supplier Country



Source: Created by MRI based on METI dataset

2 Increased Contract Flexibility: Significant Decline in LNG Contracts with Destination Clauses

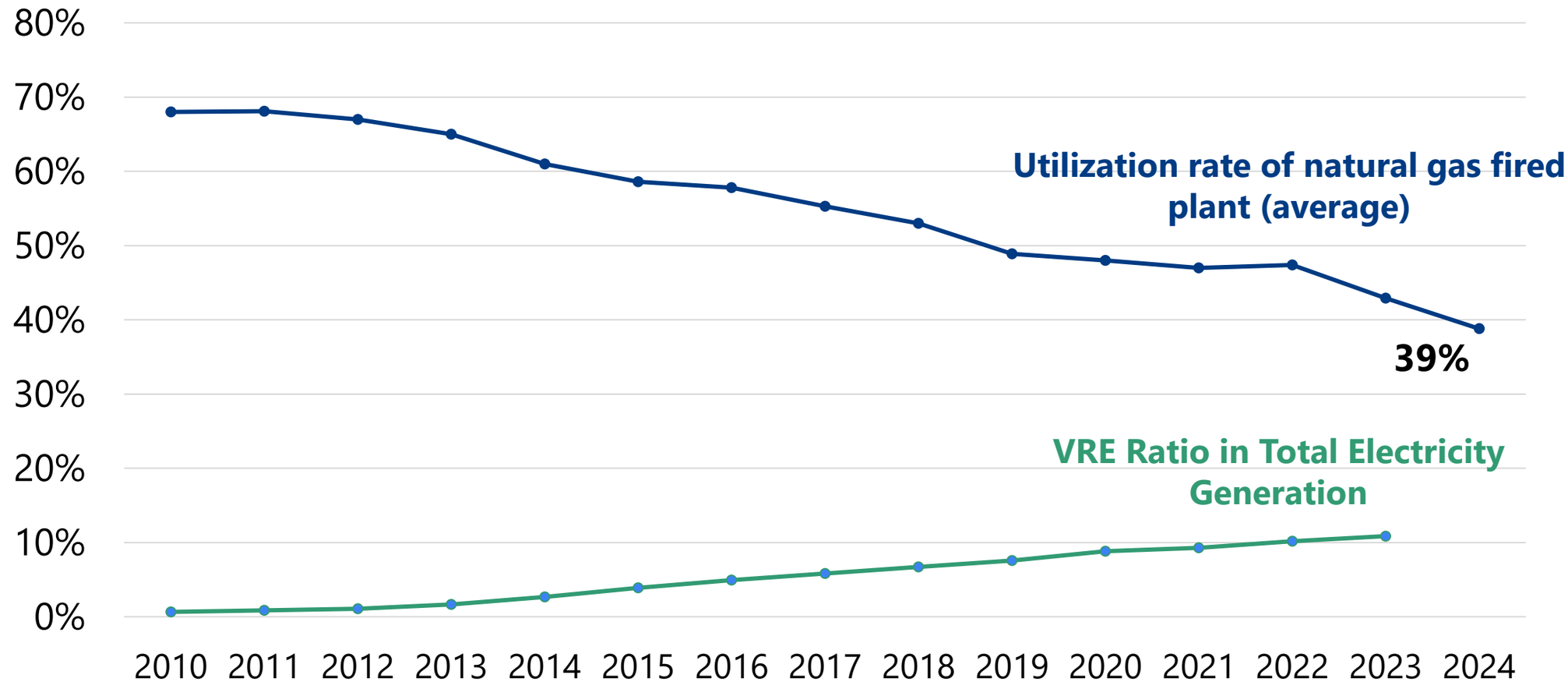
Proportion of LNG Contracts with Destination Clauses



Source: Created by MRI based on METI dataset

3 Reduced Utilization of Gas-fired Power Generation: Capacity Factor Declines Below 40% Due to Increasing VRE

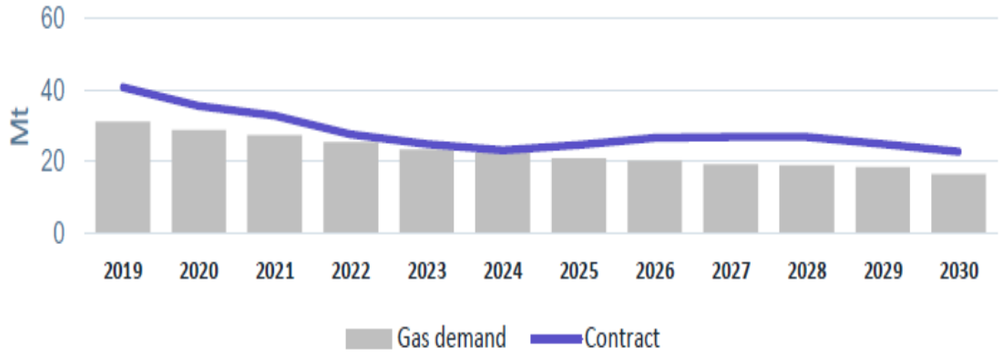
Utilization rate and VRE ratio



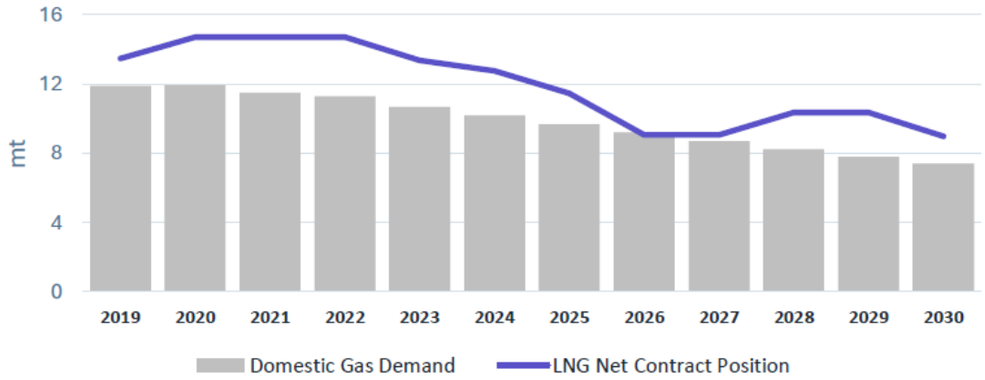
Source: Created by MRI based on METI dataset

4 Concerns Over Surplus from Long-term Contracts: Major Japanese Energy Companies Face Potential LNG Surpluses

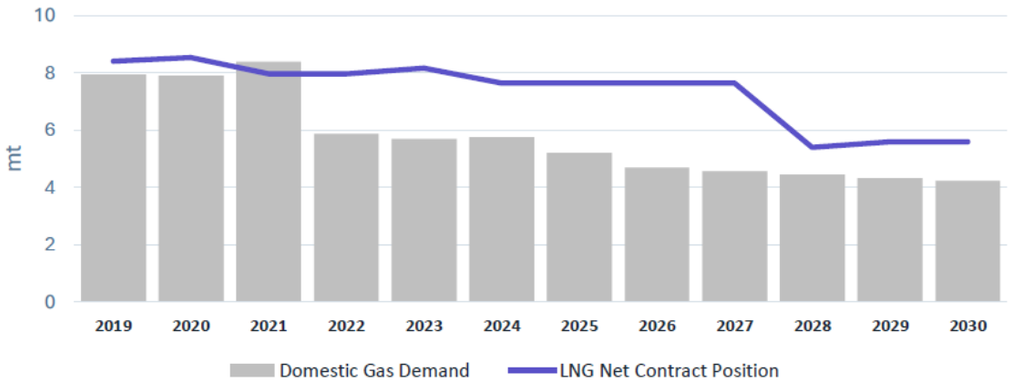
JERA



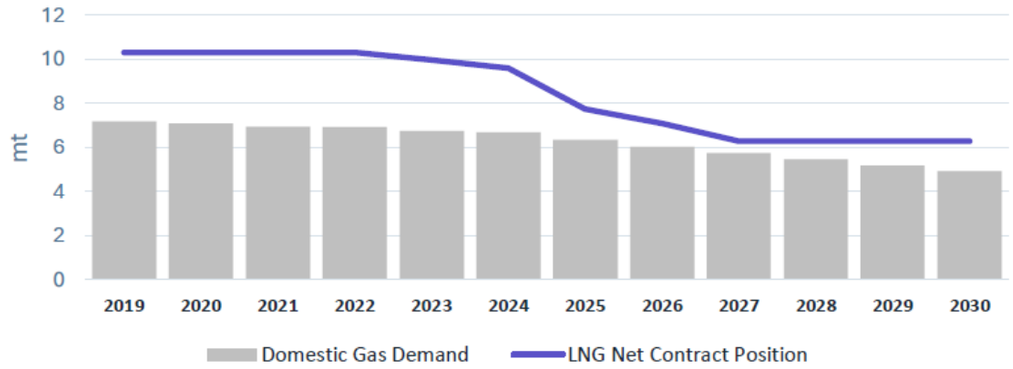
Tokyo gas



Kansai Electric



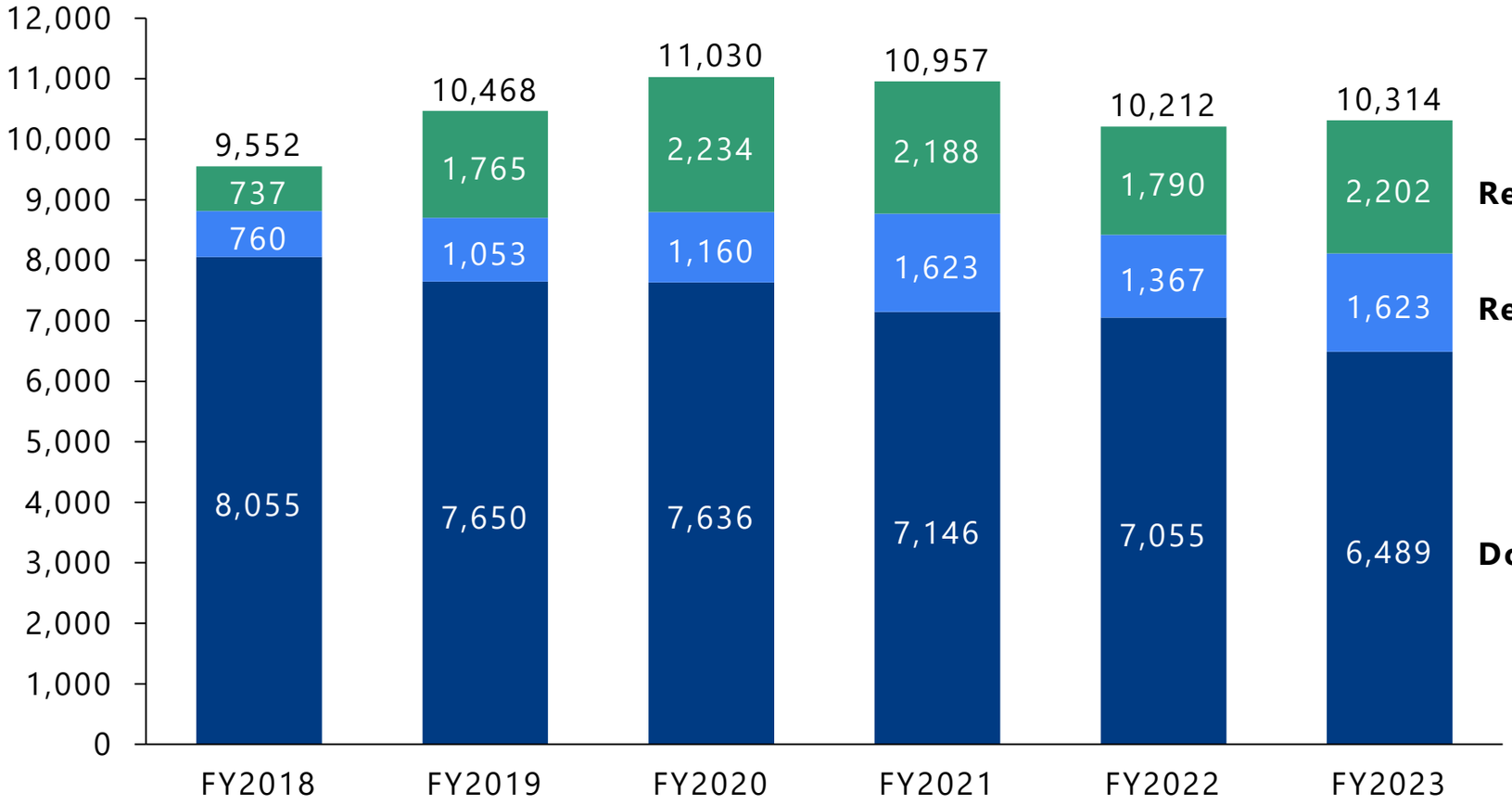
Osaka gas



Source: IEEFA , Japan's largest LNG buyers have a surplus problem, https://ieefa.org/resources/japans-largest-lng-buyers-have-surplus-problem (March 11, 2024)

5 Increasing Transactions to Third Countries: LNG Resale Volumes Growing Due to Reduced Domestic Demand

The LNG volume handled by Japanese companies



Resale (B) Japanese companies procure LNG through sales and purchase agreements (LTC and spot).

Resale (A) Japanese companies hold offtake rights through upstream interests and tolling agreements.

Domestic Consumption

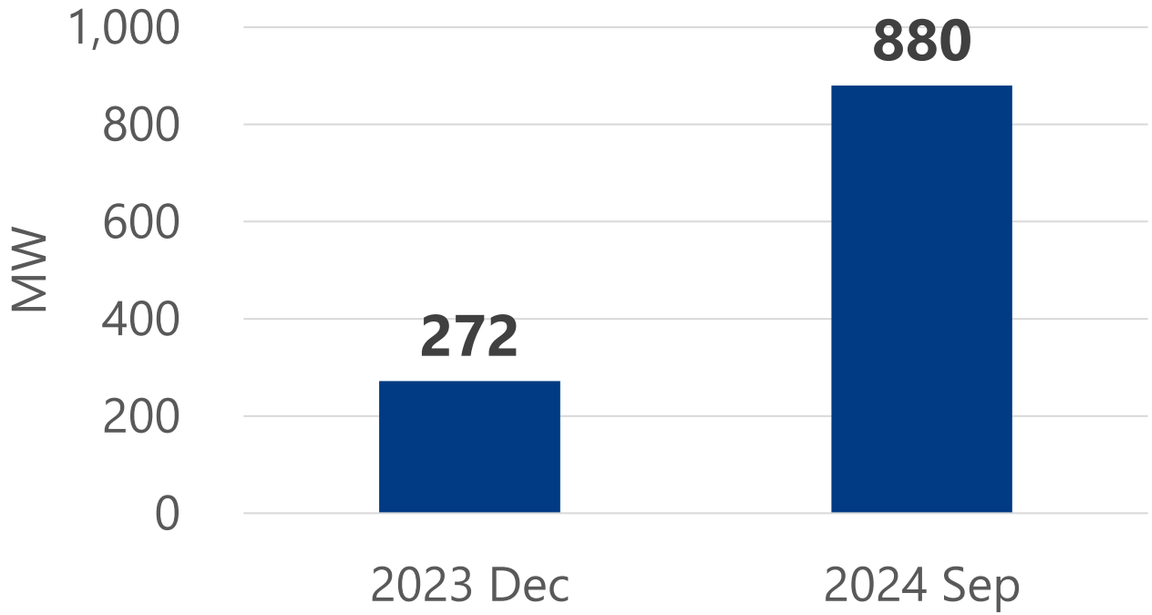
Source: Created by MRI based on JOGMEC dataset

New Developments Toward Decarbonization

Rapid Growth of Grid-Scale Battery Storage

- Japan's grid-scale battery storage capacity is expanding rapidly, driven by high prices in the supply-demand adjustment market.
- Emerging business models combining battery storage with gas-fired power plants reflect new strategies for managing grid stability.

Number of Connection Applications for Grid-Scale Battery Storage



Source: Created by MRI based on METI data

In the 2023 Decarbonization Power Auction (Round 1), bids **exceeded the expected maximum**, with a 24% winning rate, highlighting increased competition.

Subsidies from the national and Tokyo Metropolitan governments will continue past 2024.

Hydrogen Supported by Multiple Government Incentives

- A budget of ¥3 trillion over 15 years is planned for price-difference support to promote hydrogen adoption, though substantial cost reductions are critical for widespread deployment.

Price Gap Support	Support for the price difference between hydrogen and conventional fuels (fossil fuels) for a period of 15 years, targeting pilot supply chains that begin operation by 2030.
Hub Development Support	Approximately eight regions across Japan will be selected for the development of infrastructure to efficiently utilize hydrogen and ammonia.
Long-Term Decarbonized Power Auction	A bidding system for new investments in decarbonized power sources. Successful bidders will receive capacity payments for 20 years, equivalent to fixed costs

Source: MRI

Key Takeaways

- Japan adopted its 7th SEP in February 2025, featuring ambitious renewable energy targets; however, **natural gas is expected to remain crucial given practical constraints**. Uncertainties remain significant, requiring realistic assessments.
- **Japan's LNG market is transforming** through diversification of supply sources and increased contract flexibility, driven by energy security and decarbonization objectives. Rising LNG resale activities enhance collaboration and connectivity with East and Southeast Asian markets.
- **Emerging market trends may influence gas-fired power business models**. Continued government incentives for hydrogen indicate strong expectations for international cooperation towards affordable, reliable hydrogen supply.

Envisioning the future, leading change

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