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Commodity Insights

# Securing Energy by Responding to Climate Change

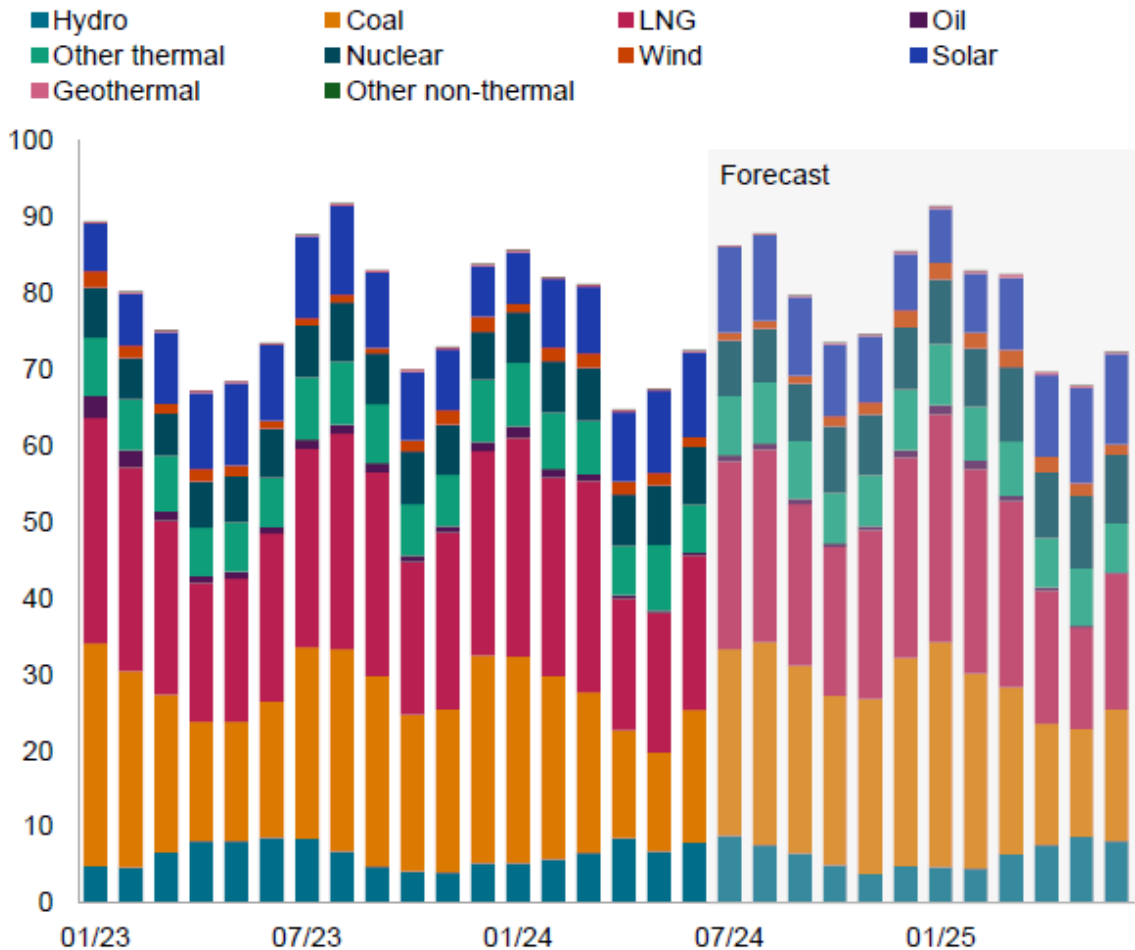
Christopher Elsner, Director, Executive Briefings

October 21, 2024

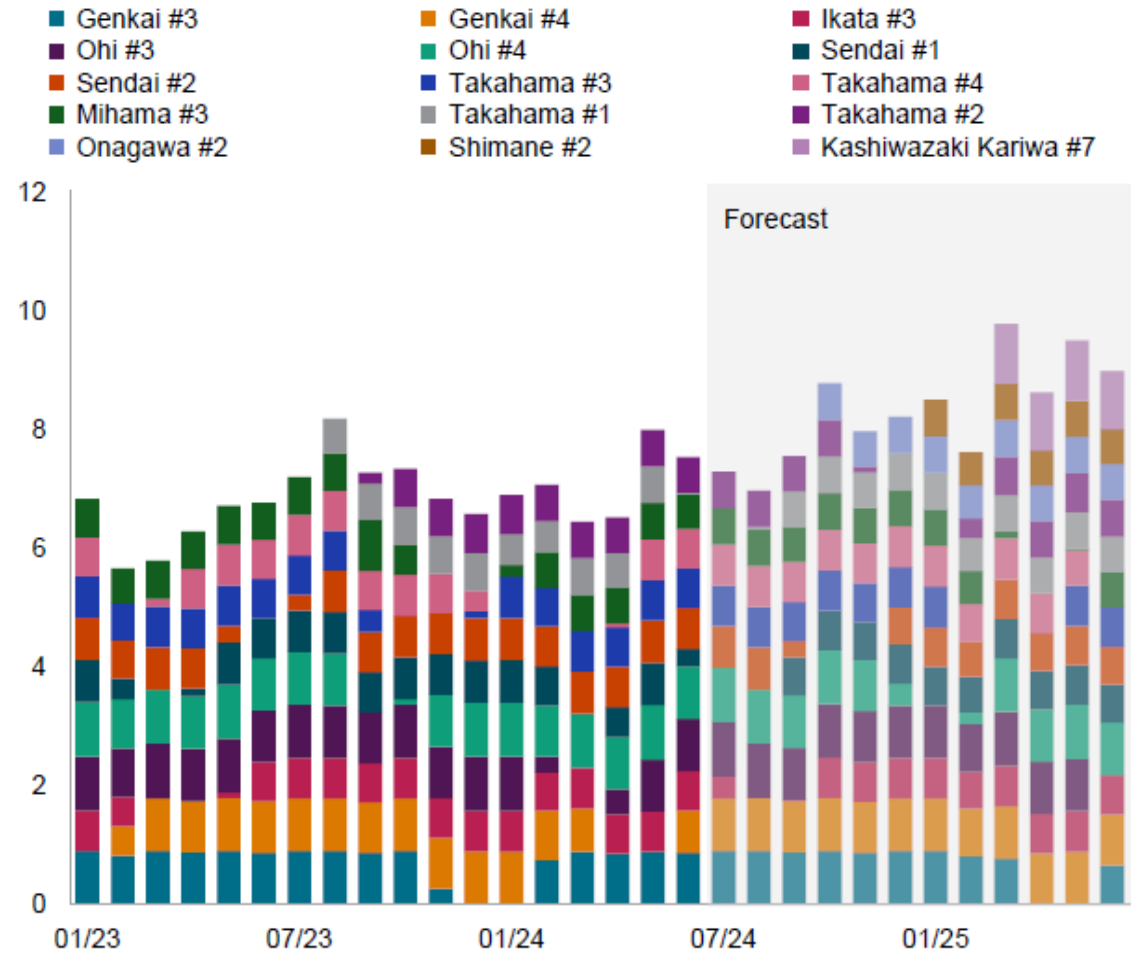


# The pace and location of returning nuclear generation will largely dictate the marginal amount of thermal in the power stack, yet gas and coal remain prominent

Japan power generation per fuel (TWh)

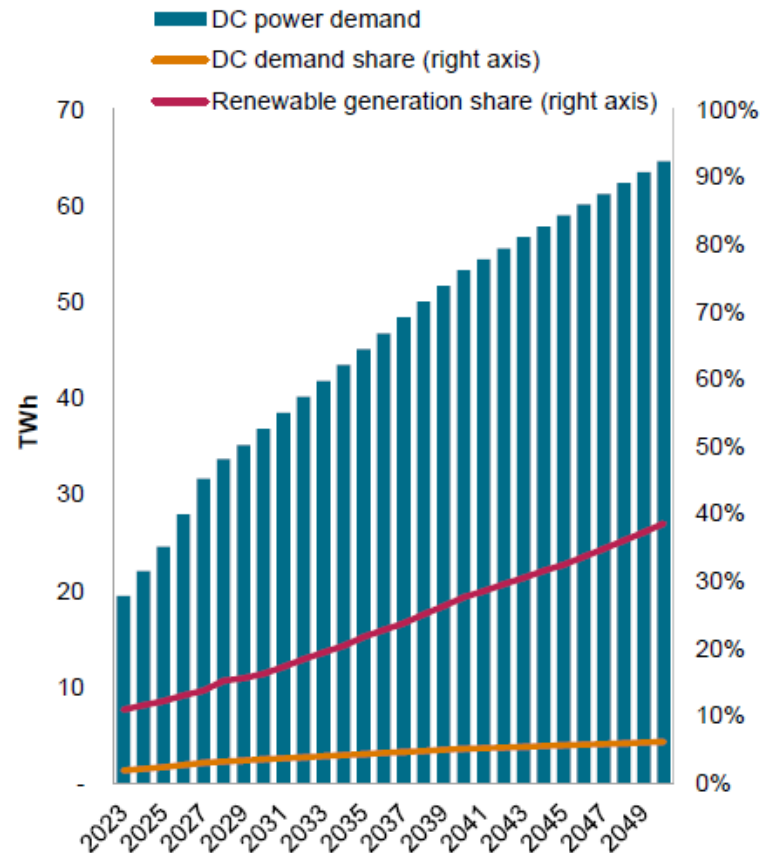


Japanese nuclear generation (TWh)



# Power demand from data centers will buoy overall decline from other sectors, while geographical concentration will make sourcing renewables a challenge

## Japan DC power demand



Data compiled: September 2024.  
Source: S&P Global Commodity Insights.

## What is the government's latest forecast and local policy trend on DC development?

- Japan does not have a specific DC capacity target, but government projections indicate that peak power demand from DCs will increase by 4 GW from 2023 to 2030, with consumption reaching 50 TWh by 2030. Long-term estimates place DC power demand at under 100 TWh by 2050, or 10% of national demand.
- Japan has strict data protection and privacy regulations, including the requirement for certain sensitive data to be stored within the country. This creates demand for domestic data centers to meet regulatory compliance and ensure data localization, especially for sectors such as finance, healthcare and government services.

## How will DC impact power demand?

- DC will become a key growth point of power demand, helping to counter declines from other sectors.
- However, even with DC factored in, Japan's overall power demand will likely remain flat or only slightly higher than its current level by 2050, as incremental DC demand will be largely offset by reductions in other sectors.

## How will DC impact power supply?

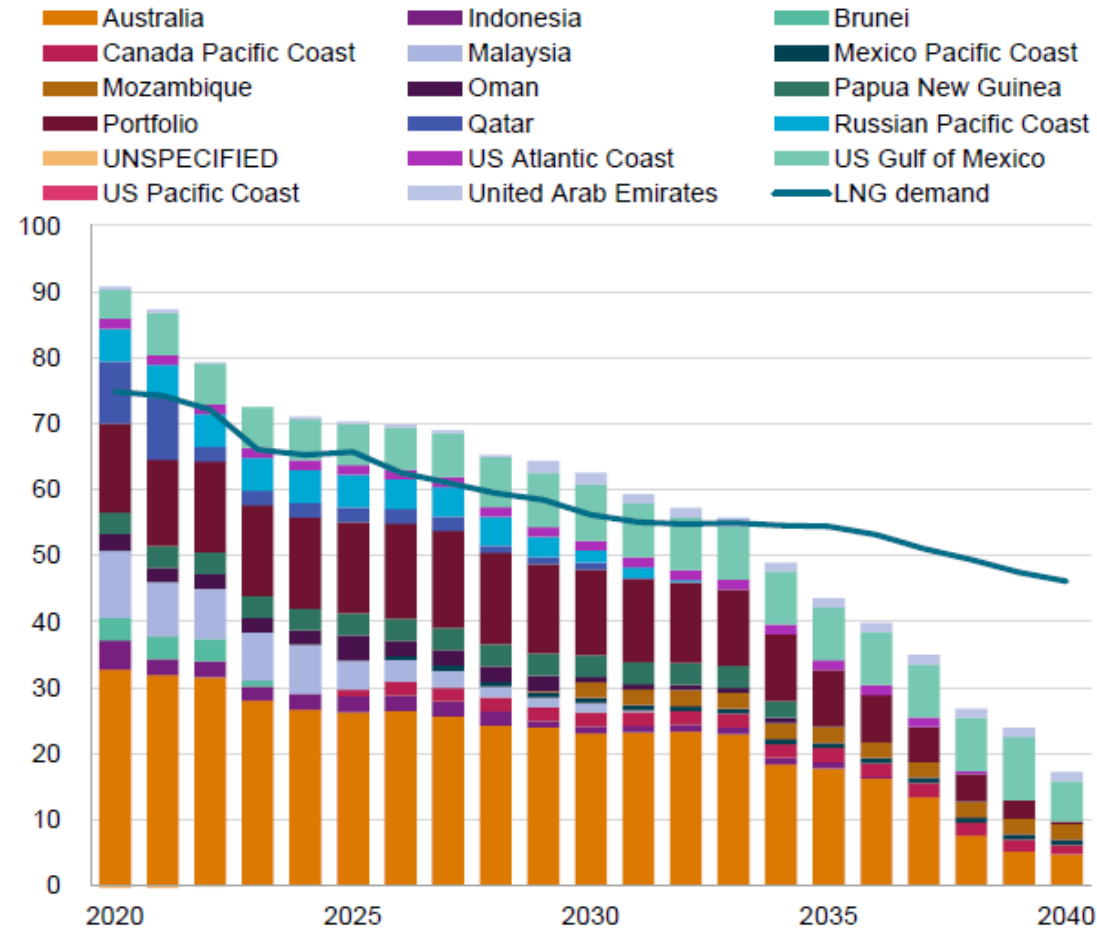
- While diversification of DC locations is encouraged, most new DCs remain clustered around Tokyo and Kansai. This will put additional pressure on local grids, particularly in the Greater Tokyo region, which is already running on single-digit reserve margins during peak times. Although nuclear restarts in various regions will help to fill part of the gap and boost supply availability in Tokyo, new LNG-fueled CCGTs will still be needed to meet most of this upcoming demand. In addition, the local distribution infrastructure will need to be upgraded and expanded to accommodate new DC connections, particularly in concentrated clusters such as the Inzai city.

## Will there be enough green power to meet DC demand?

- Japan is expected to add an average of 5 GW of solar and wind capacity every year from now to 2050, which should be able to inject enough green power into the generation mix from a volume perspective. However, not all of this green power can be easily accessible by DCs owing to locational and timing mismatch, as well as the additional complexities and costs involved with direct procurement of green power.

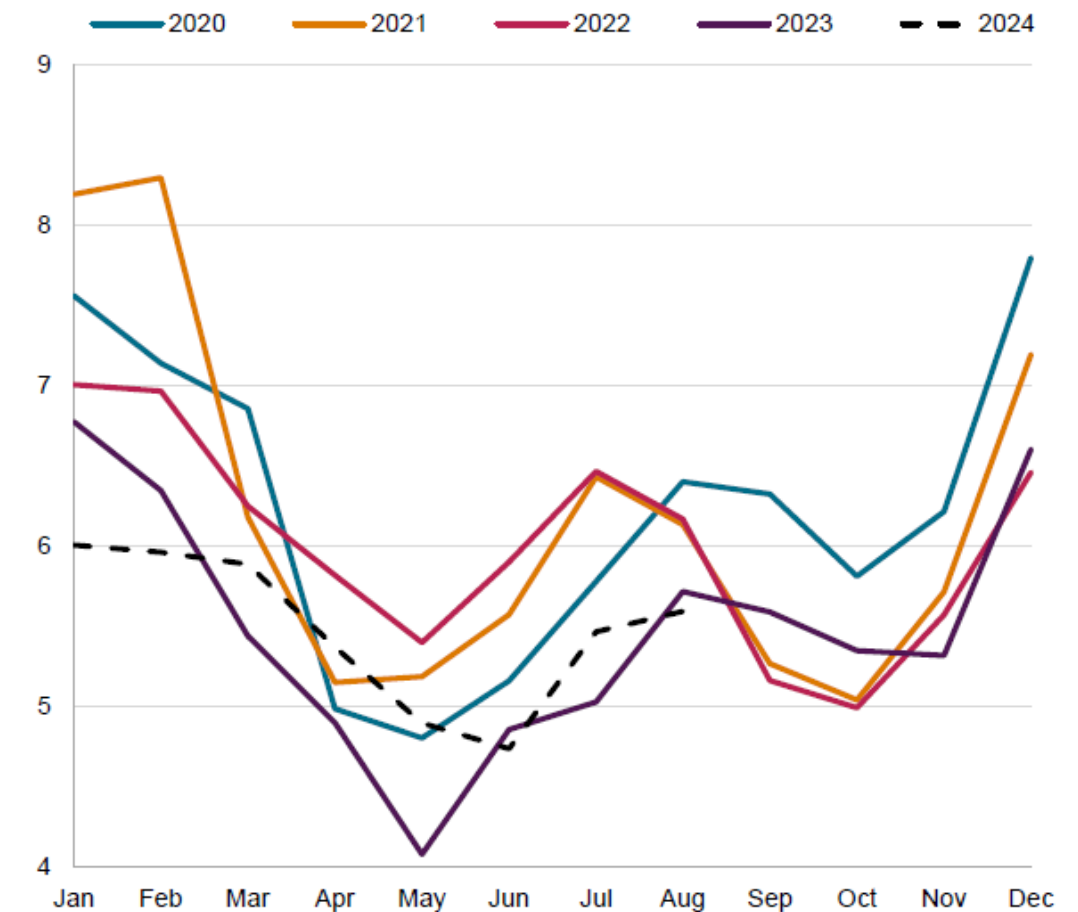
# The US will play a leading role in supplying Japan with natural gas as progress towards decarbonizing the electric grid – while maintaining reliability – advances

Japan: Contracted LNG supply by source vs. LNG demand (MMtpa)



Data compiled Sep. 10, 2024.  
Source: S&P Global Commodity Insights.  
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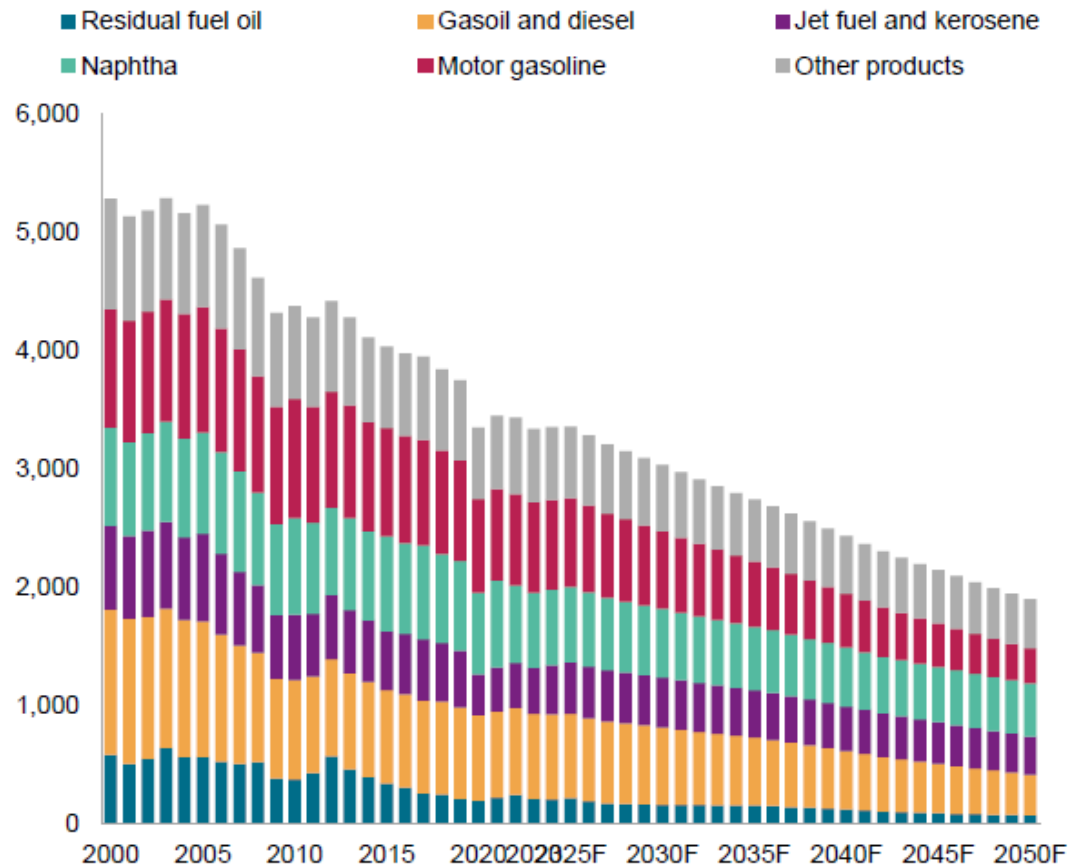
Japan: LNG imports by month (MMt)



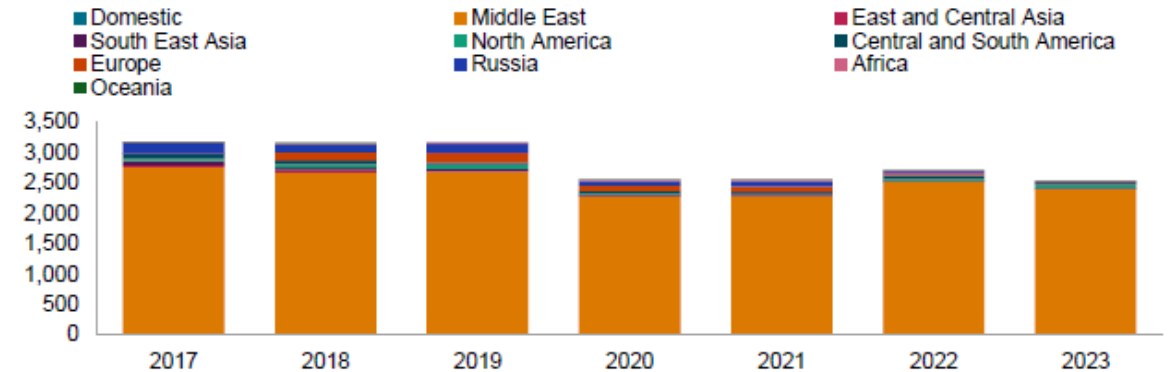
Data compiled Sep. 13, 2024.  
Source: S&P Global Commodity Insights.  
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One area that could see growing trade between Japan and the US is in crude and refined product imports, potentially giving way to hydrogen on the margin

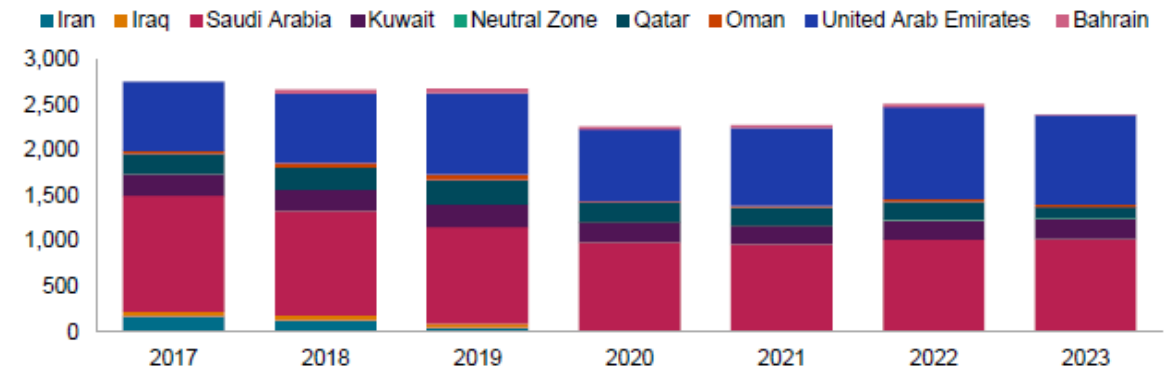
Oil product demand forecasts — Japan (thousand b/d)



Japan crude oil supply by source (thousand b/d)



Japan Middle Eastern crude oil imports by source (thousand b/d)



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