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LNG Industry and Market Overview

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Volatility, uncertain demand and rising costs pose global concerns

- ◆ Global LNG prices continue to be elevated despite new supply
 - Volatility has diminished over the past six months as new supply has come on line
 - Growing view that forward curve is misvalued
- ◆ Global supply set to grow by more than 50% over the next 5-7 years amid uncertain demand outlook
- ◆ Rising questions about balances between 2027 and 2030 or after
- ◆ US projects are progressing despite some concerns
 - Higher costs are affecting US competitiveness
 - Projects are reopening price discussions
 - Growing talk about the impact of exports on natural gas prices
- ◆ We are running out of shovel-ready US projects
- ◆ US liquefaction prices have been rising as global prices have softened

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LNG in World Markets

Intelligence on Markets, Contracts and the LNG Industry

Chinese Buyers Advance Term Contracting

Chinese buyers – both the state-run majors and non-state firms – continue to advance LNG long-term contract discussions, as they eye volumes for projected domestic demand as well as trading and optimization purposes.

Several Chinese firms are also re-evaluating LNG supply – mostly on short to mid-term structures to other domestic companies.

Japan Soaks Up More Term Supply

Japanese buyers continue to soak up term supply with JERA signing a 20-year supply deal for 1.5MMcy with Yamasa Global from CPT LNG to join venture trading subsidiary with JDE, Jergas and Tokai Electric have bought short-term supply while smaller Japanese buyers (Induka Gas and Matsuda Gas) are seeking mid-to-long term supply to replace their expiring contracts.

US Developers Face New Hurdles from Federal Regulators

A planned crackdown on extensions for permits to export LNG to non-free trade agreement (FTA) nations and a protracted review of emissions and environmental justice issues for a pair of projects show US regulators are being tougher with the industry.

The Biden administration is pitching US LNG to allies in Europe and Asia as an ideological and physical alternative to Russian energy but regulators have indicated they will be stricter on emissions and environmental justice issues.

Spot LNG Prices Slide Further

Spot LNG and gas prices in Asia declined and markets remained bearish since second half April, as they continued to be weighed down by high inventories in Northeast Asia, stable supply and weak global demand. European prices have also fallen slightly, placing more downward pressure on JKM.

Global LNG supply remains secure with more projects reaching commission in 2022 during the same time period. Although contracting momentum is expected to continue into 2023, it is possible that contracting activity will slow as European buyers continue to be

Contract Durations Fall in 2023

Contracting activity has slowed in the first half of 2023 after hitting record highs last year amid tight markets and extreme price volatility due in part to the lingering effects of the COVID pandemic and the war in Ukraine. Since the start of the year, a little more than 10 MMcy of volume has been agreed to. The total volume of sales and purchase agreements (SPAs) signed thus far amounts to 13.28 MMcy, with some pending, along with almost 7 MMcy from heads of agreements (HOAs). The average volume of SPAs signed year to date is about 1 MMcy, with the smallest being 0.24 MMcy for 8 years and the largest being 2 MMcy for 20 years.

Contract durations, on average, are mostly indexed to Brent, except for one contract each done against Asian spot benchmark JKM and as a JKM/Brent hybrid.

Buyers from key Northeast Asian markets have also been more active this year, accounting for more than 50% of total volumes purchased, with Chinese and Japanese buyers securing 23% and 24% of total volumes, respectively. With renewed interest from these markets, there might be an increase in competition for cargoes if European and Asian buyers come out to buy LNG later this year.

While the total volumes of SPAs signed in 2022 greatly surpassed that of previous years, it has slowed in 2023, as seen in Figure 1 (see p. 3). In the first four and a half months of 2023, almost 14 MMcy of SPAs were signed, slightly lower than the volume of contracts signed in 2022 during the same time period. Although contracting momentum is expected to continue into 2023, it is possible that contracting activity will slow as European buyers continue to be

Global LNG Export and Import Monthly Averages

Global LNG exports have not been deterred by lower prices, yet. Given the rate of exports and the factors affecting demand, a scenario where prices must fall further to incentivize additional demand and draw on stocks is looking increasingly likely. Inventory levels in Northeast Asia and Europe are above levels typically seen for this time of year. If exports do not slow, floating storage may become necessary.

European Import Forecast Lower on High Storage

European inventory levels finished the winter at healthy levels due to steady supply from the US and a mild winter. As a result, the European import forecast has been revised to reflect this dynamic. With more gas in storage heading into the shoulder season, Europe will need to import less LNG than last year. However, this will lead to a rise in imports by 2024.

US Exports Steady Despite Lower Demand

US exports in March 2023 nearly hit the monthly export record and are on a similar pace in April. However, exports are forecast to slow in the near term as demand remains soft in much of the world. US exporters have been operating at an average of 100% thus far in 2023 but will most likely dial back operating rates over the spring and summer.

Forecast Trends at a Glance

Country/Region	Signs	Change	Trend	Forecast Outlook
Global/Thematic	LNG Exports	Lower	Steady	Exports will need to trend lower to avoid the possibility of floating storage
Europe	LNG Imports	Lower	High	High storage levels post-winter have led to a revision in the forecast
India	LNG Imports	Increasing	Higher	Lower prices and a clear need have led to greater demand
China	LNG Imports	Increasing	Higher	Chinese imports are forecast to increase but downside risk period
US	LNG Exports	Decreasing	Higher	US exports continue at high levels but will decrease over the spring/summer

LNG Contract Intelligence Service

Uniquely Detailed LNG Contract Data and Analytics

Contract Durations Fall in 2023

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Global LNG Market Outlook

Short-Term Forecast and Analysis

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Global LNG Outlook

A 10-Year Supply, Demand and Price Forecast

Global Recession Woes, Industrial Downturn Impact Demand Outlook

It is a world determined to reach decarbonization targets, economic pressures may exert downward pressure on LNG demand, potentially hampering some short to mid-term demand growth. Global concerns of recession are mounting, and the war in Ukraine, once called a "quick conflict", reached its one-year mark in February.

Many European countries, once highly dependent on Russian natural gas, are seeking alternatives, which include LNG, but also other long-term options as well as renewables. European gas importers seeking security of supply last year scrambled to supplement winter storage inventories through heavy spot buying and only to be met with mild winter and early spring temperatures and full inventories.

European natural gas prices have since fallen from record highs seen in 2022, when the northwest European benchmark TTF traded at around \$180/MMBtu, and the Asia Pacific spot LNG benchmark JKM was around \$70/MMBtu. The goal of the purchasing initiative is to help influence downward pressure on prices by utilizing existing energy infrastructure more efficiently and strengthening its collective member buying position. Parties will use the platform to aggregate demand for volumes of gas equivalent to 10% of their respective gas storage filling obligations for 2023.

Now is the shoulder months, Europe is awash with gas in storage (at present, close to 55-56% full at 56 Bcm overall in the continent) and there are rising concerns that there will not be enough room in storage to accommodate contracted volumes. Nevertheless, European markets face risks this coming winter if the continent experiences a colder winter and/or Asia Pacific demand rises, forcing importers to pay for high-priced spot cargoes.

These two most powerful warriors, patience and time, proved to be the rewards for European buyers hesitant to sign long-term LNG contracts. Though some European buyers did sign long-term supply deals, the volumes needed to totally replace Russian pipeline gas. This implies that the continent will remain very much dependent on spot and short-term supply, and

Short-term EU

The EU has made several shifts in policy and market structure that could have material impact on how demand and price are addressed in the winter of 2023-2024.

One such measure, the capacity platform PRISMA, was recently launched with the intention of avoiding the necessity of costly seasonal spot purchases of LNG. The EU launched its capacity platform PRISMA - via its AggregaEU service - for the joint purchase and tendering of natural gas in late April. The platform will include not only EU member states but also contracting parties from the EU energy community.

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- SHIPPING: Carbon emissions reduction efforts will impact some shipping availability. An estimated 180 ships are expected to serve new liquefied gas projects due to start up between Q2 2022 and the end of 2026. 26

Insight on LNG markets, projects, trade and shipping

Uniquely detailed data on LNG contracts and pricing

Actionable market intelligence and 2-year forecast

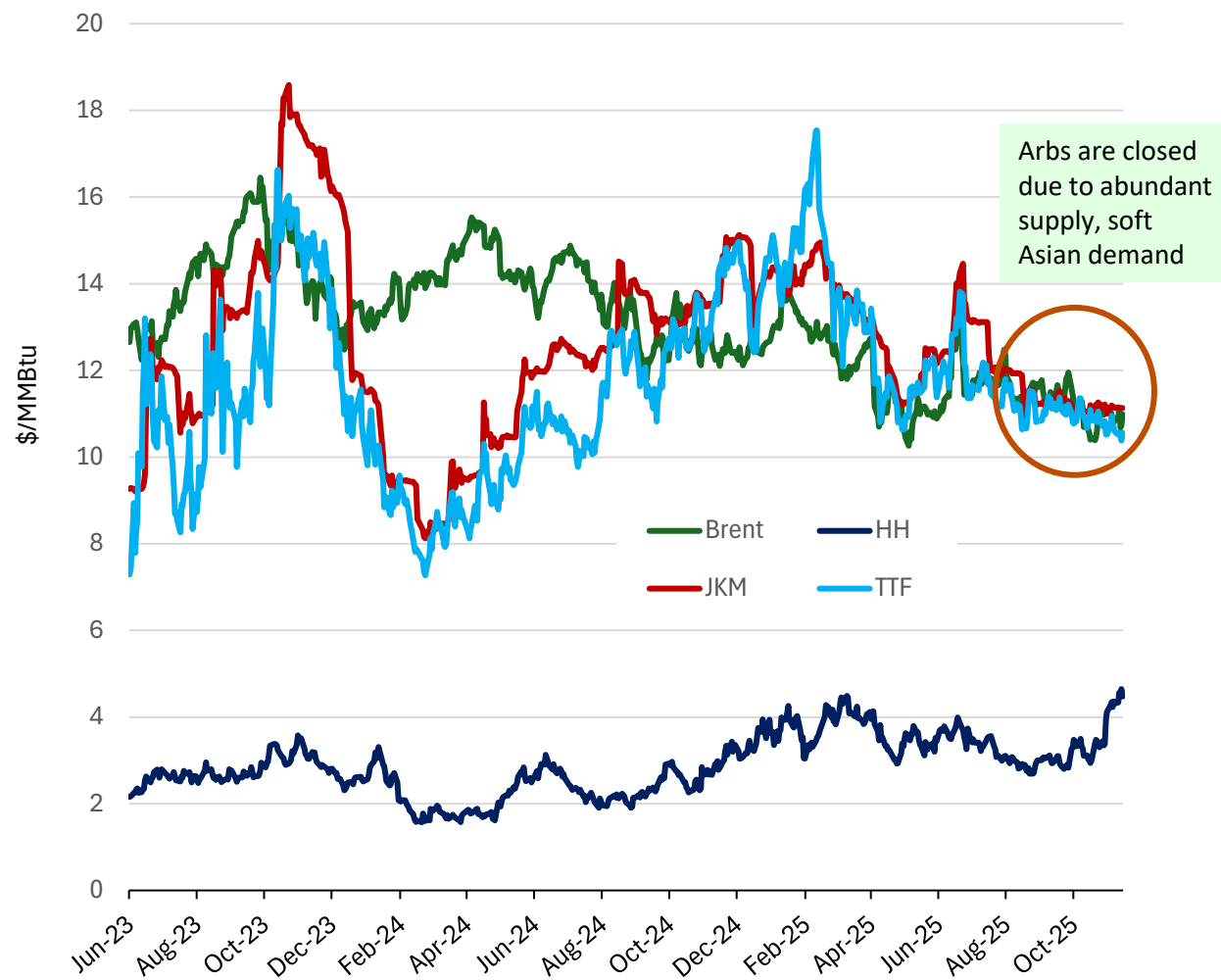
20-year price, supply and demand forecast



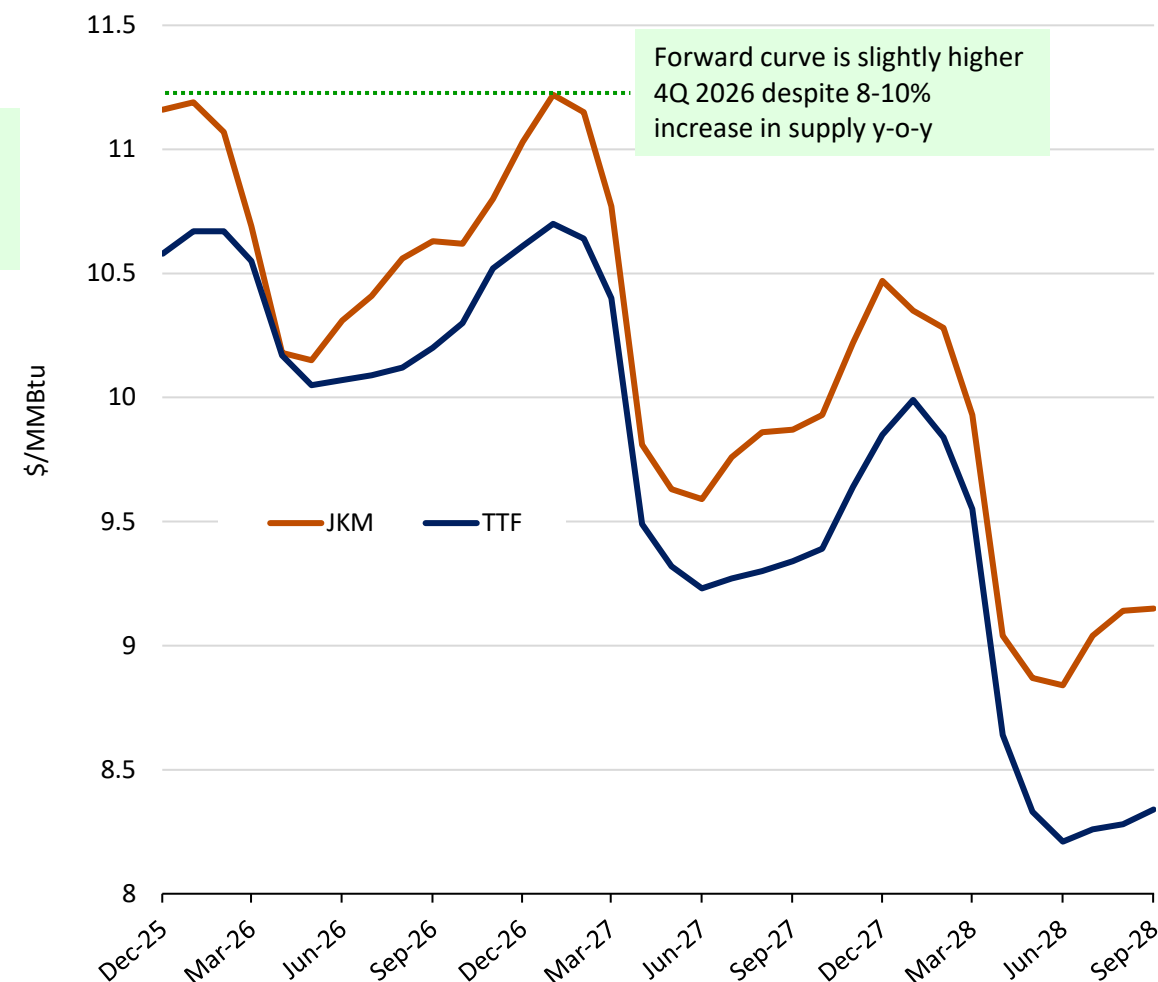
Trusted advisors to the LNG industry for more than 40 years

Volatility has dropped but prices remain high and arbs are closed

LNG and Natural Gas Prices



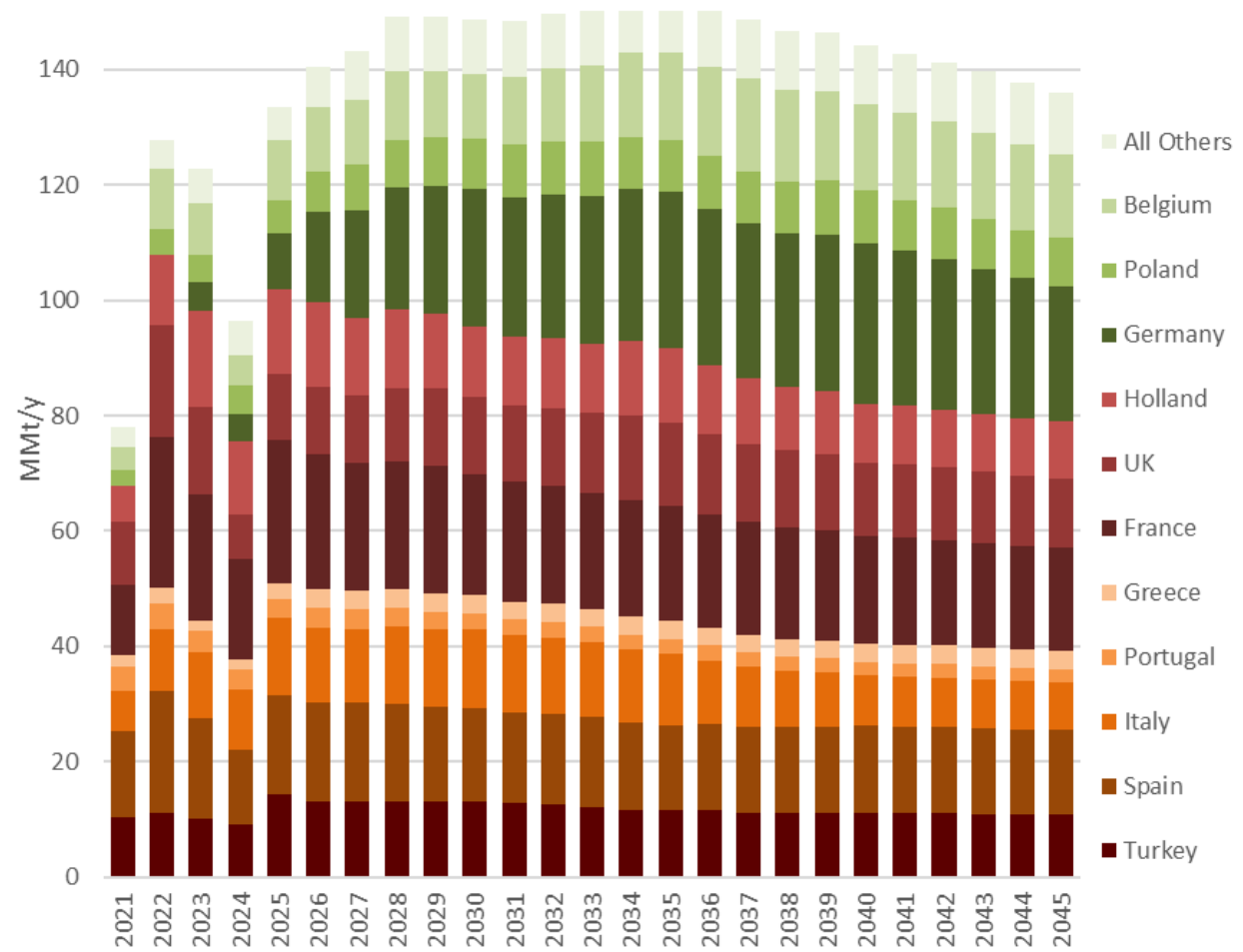
Global LNG/Natural Gas Forward Curves



European LNG demand growth to peak by 2028 and then flatten out

- ◆ There are two 'Europe's'
 - Germany, central Europe, the Baltic and Balkans will boost overall demand
 - Belgium, Poland, Baltics, E. Europe and some Southern European countries to see growth (30 MMt over 10 years)
 - Most of the rest of Europe will see falling demand (decline of 10 MMt through 2035)
 - The EU is taking a hard look at carbon plans and we could see additional demand
 - US LNG could fill the gap if the EU sticks with plans to ban Russian LNG by 2027
 - This could support demand after mid 2030s
- ◆ The \$750 bn US-EU trade deal is unrealistic
 - Europe imported just over \$51 bn of US LNG
 - Hard to boost that with lower prices
 - Higher volumes would force Europe to move away from traditional suppliers and rely almost exclusively on the US

European LNG Import Forecast

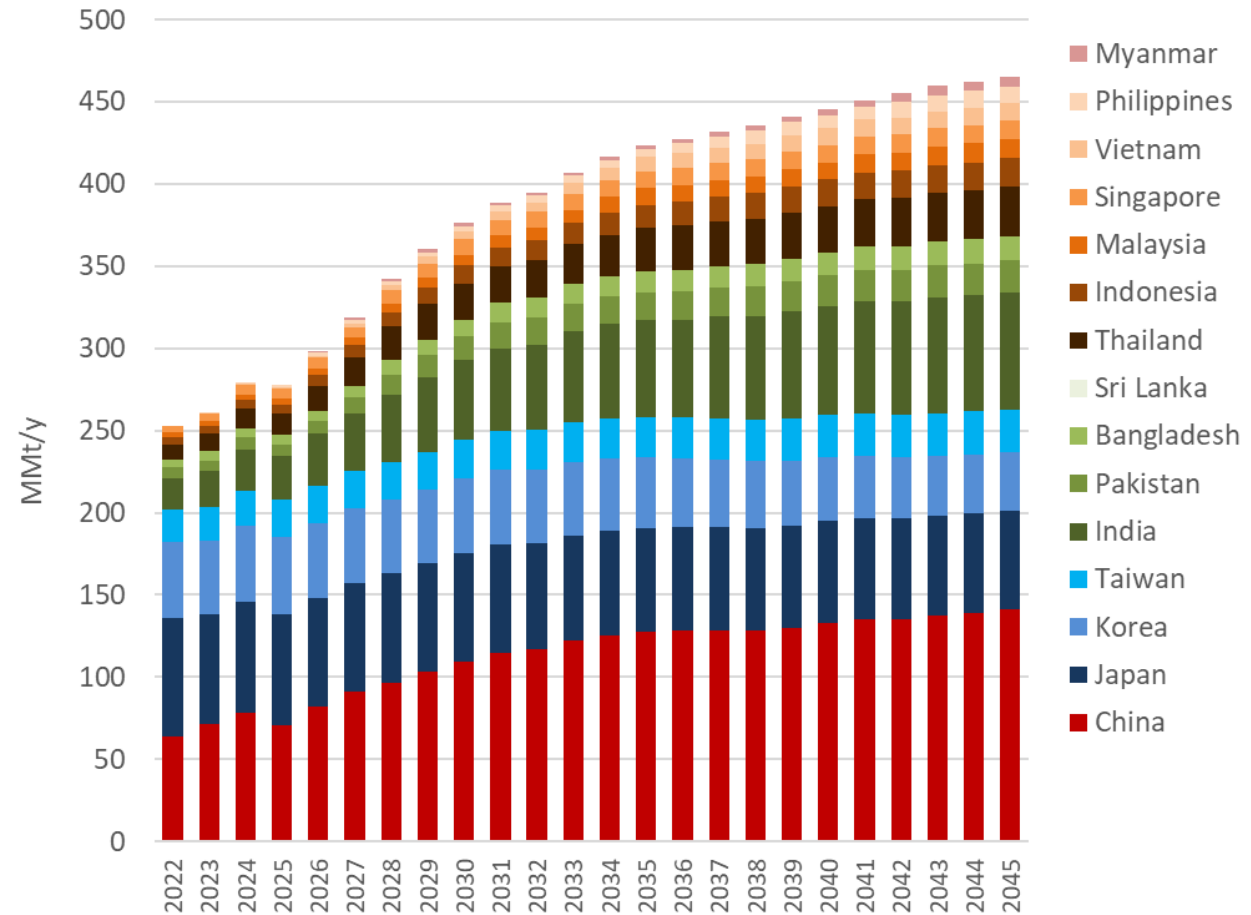


Source: Poten & Partners Global LNG Outlook

Asia Pac will drive sustained global demand growth

- ◆ Southeast Asia, South Asia and China will drive long-term demand growth
 - SE Asian demand to rise from 30.1 MMt in 2025 to 77 MMt in 2035
 - More than half of this growth is due to depleting domestic gas reserves
 - South Asia also grows rapidly, from 39.4 MMt in 2025 to 89.6 MMt in 2035
 - Chinese demand to rise from 71 MMt to 128 MMt
 - Traditional JKT consumers flat to lower
- ◆ There are downside risks to the forecasts
 - Growing support for nuclear restarts could affect Japanese LNG demand
 - China is growing more slowly than expected and will likely take more pipeline gas from Russia

Asia Pac Import Forecast

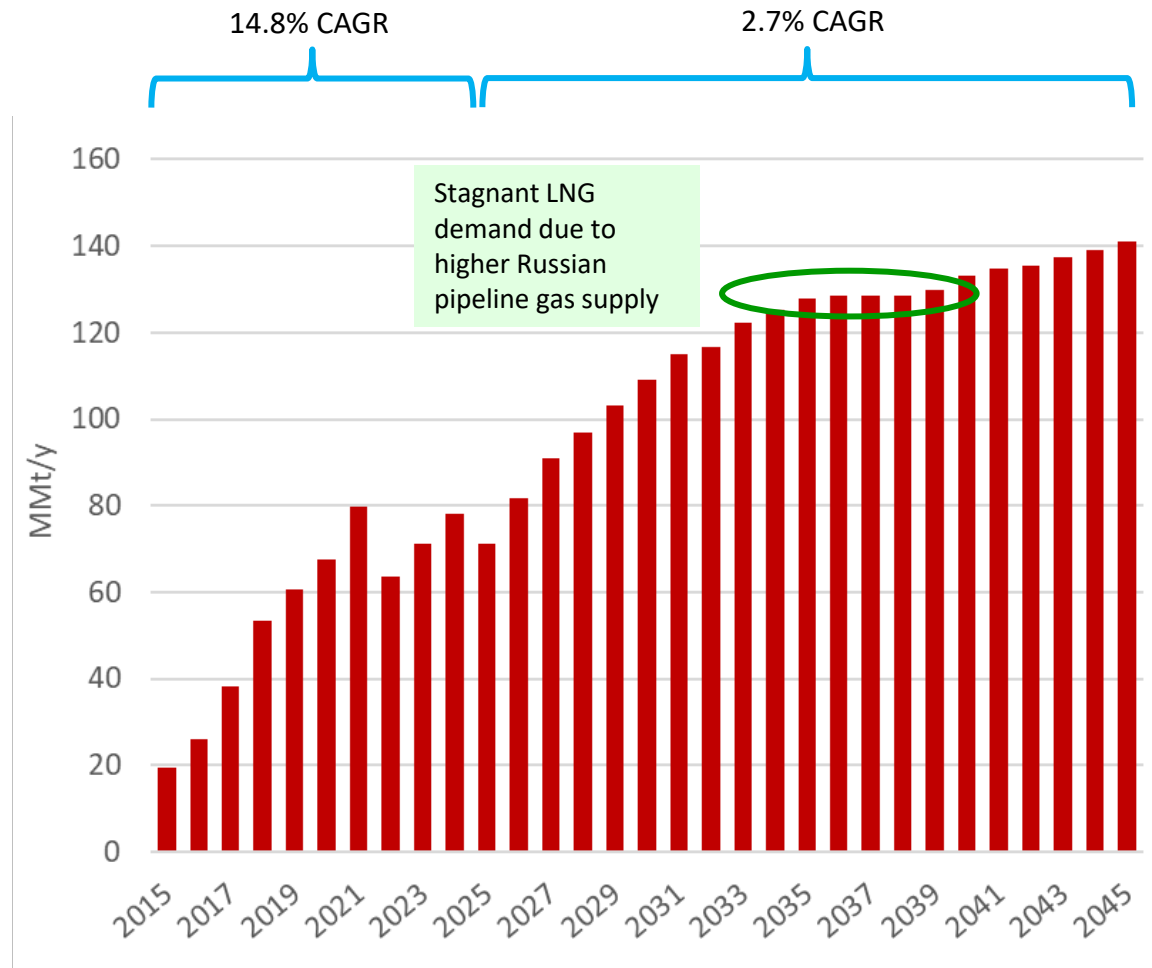


Source: Poten & Partners Global LNG Outlook

Chinese demand will grow, but at slower rates than over the past decade

- ◆ China is unlikely to be the strong driver of global demand growth
 - The economy is maturing so economic growth will moderate
 - The effects of the real estate crisis remain
 - Renewables, nuclear and additional pipeline gas will slow LNG demand growth
 - Labor costs are rising and the population is shrinking
 - Manufacturing is becoming less competitive
- ◆ Best hope for stronger growth is mandated shift from coal to natural gas
 - But this is unlikely:
 - Hundreds of thousands of jobs depend on the domestic coal industry
 - Switching to gas would make China more dependent on imported LNG indefinitely

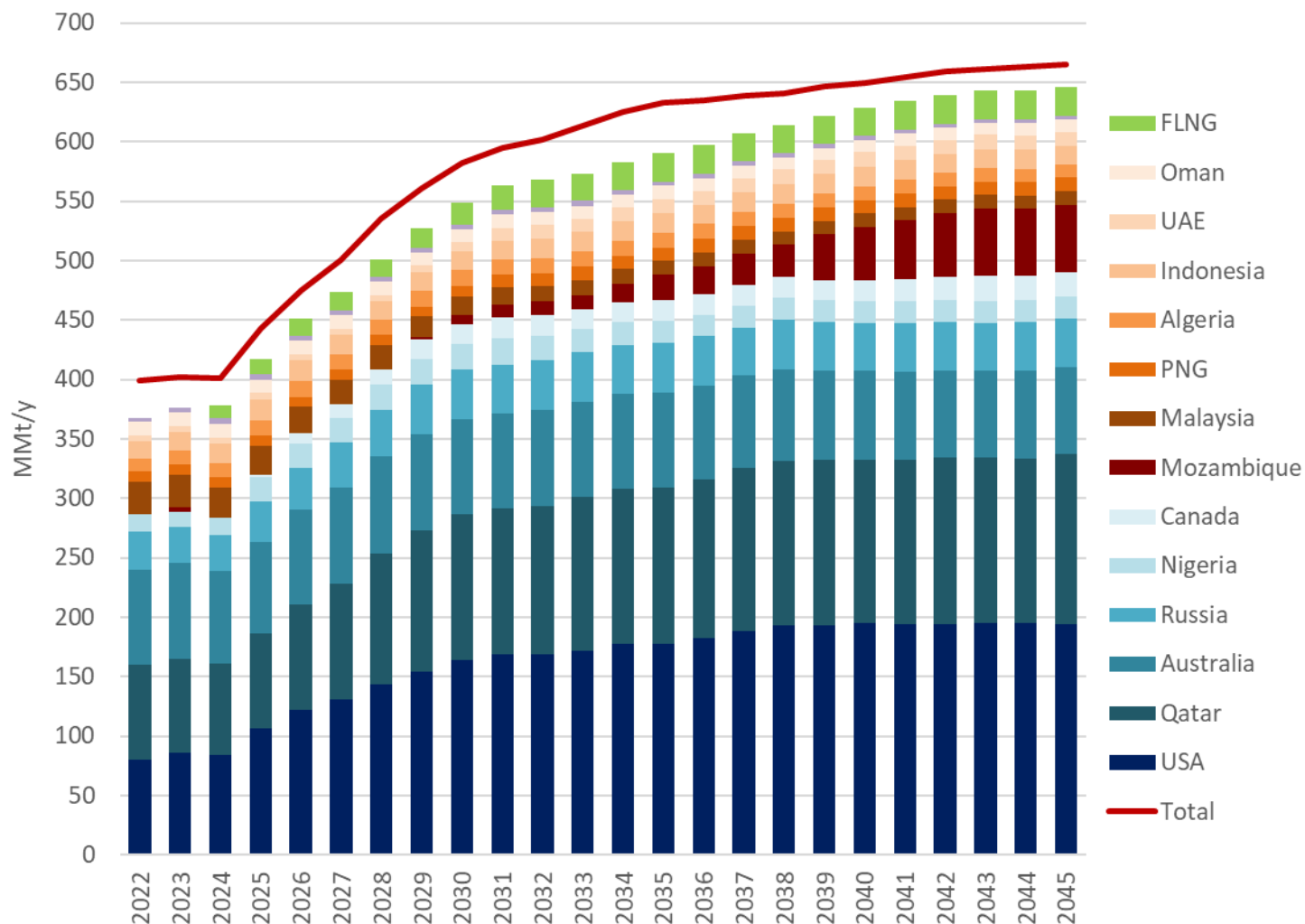
Chinese LNG demand



Source: Poten & Partners Global LNG Outlook

Vast new supplies of LNG are coming

LNG Supply Forecast



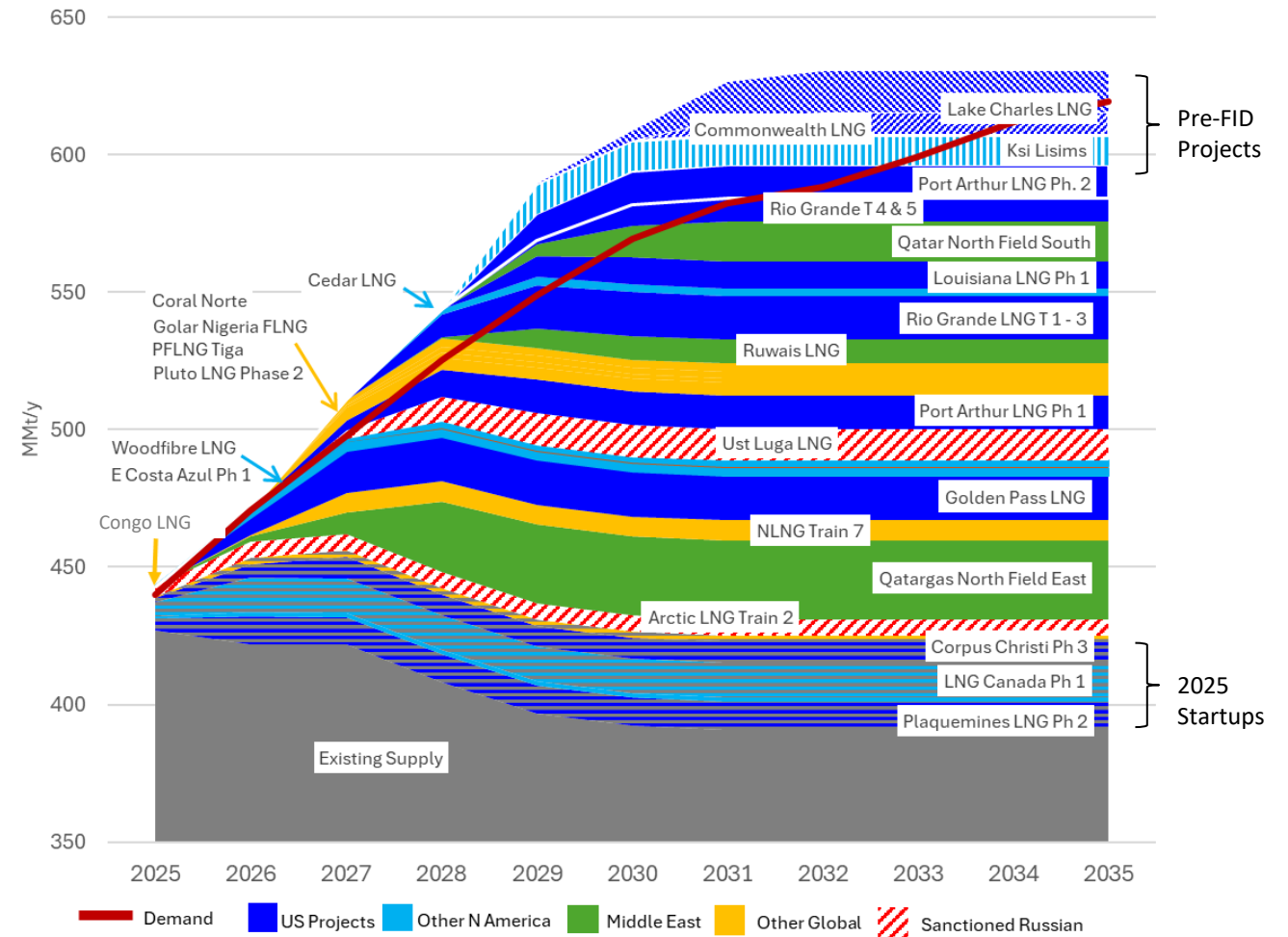
Source: Poten & Partners Global LNG Outlook

- ◆ 222 MMt of net growth over the next 20 years, probably if a few additional FIDs are announced
- ◆ Top 7 producers account for nearly all of increase
- ◆ Market share of top 10 producers will rise from 84% now to 89%
 - US to rise from 21% share to 27% by 2035
- ◆ Including huge portfolios held by majors and state oil companies, the LNG market is the most highly concentrated commodity market
- ◆ FLNG is starting to come into its own
 - Volume from FLNG will replace declining output from small legacy producers

Rapid US capacity build may produce seasonal surpluses

- ◆ Current FIDs ensure adequate supply through 2032
 - Some seasonal cancellations in the US possible 2028-2030
 - Prices likely to be lower than current levels for 4-6 years
- ◆ More FIDs could add to surpluses through mid 2030s
 - Does not include Mozambique projects, LNG Canada Ph. 2, many US projects
- ◆ Main question is level of price sensitive demand
 - China, India, Pakistan, Bangladesh and SE Asia all might take more
 - But there are infrastructure constraints and questions about depth of market and ability to pay

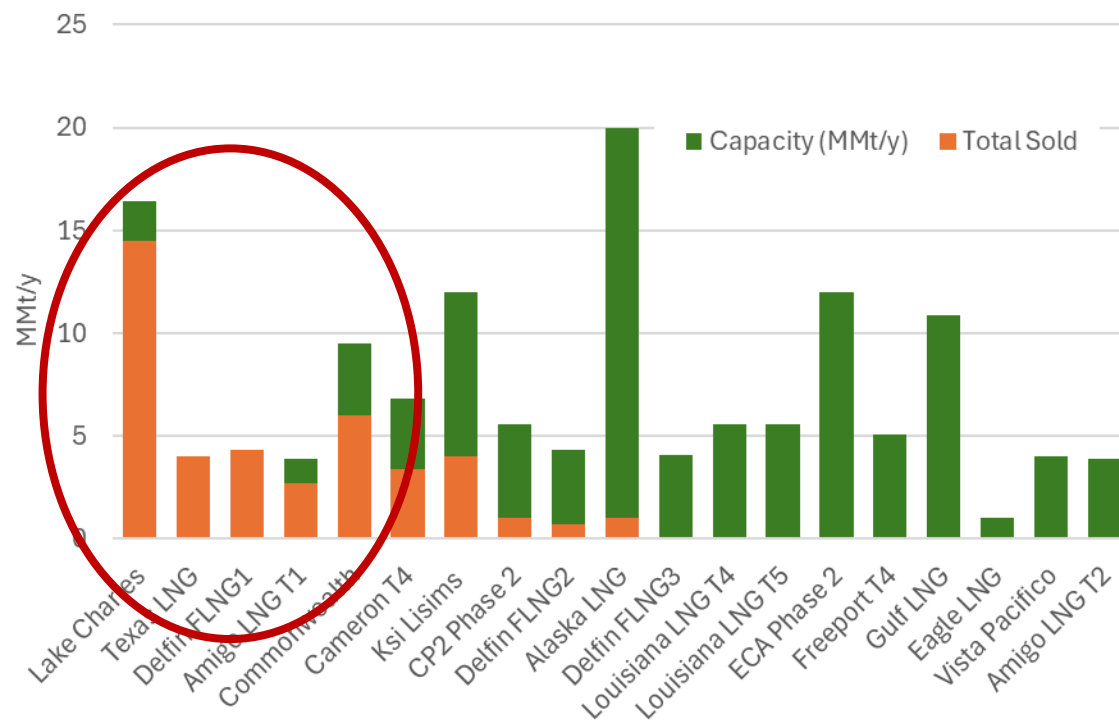
LNG Project Pipeline



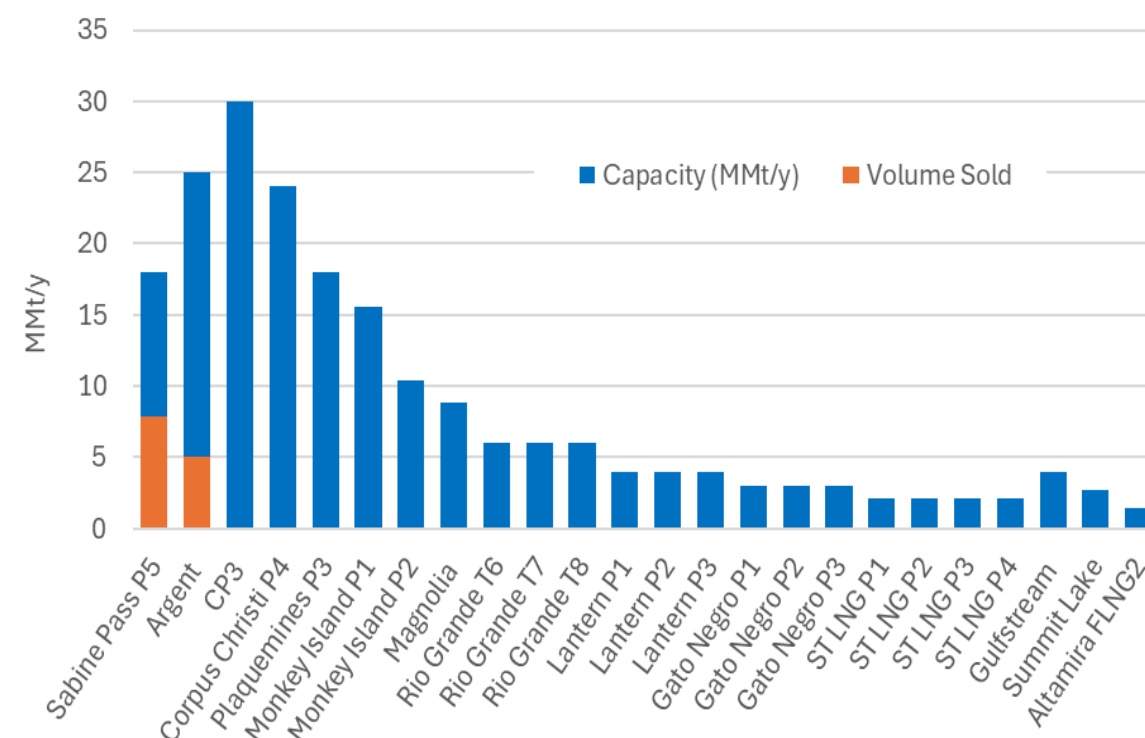
Source: Poten & Partners Global LNG Outlook

We are running out of shovel-ready North American projects

Fully permitted North American LNG projects



Unpermitted North American projects

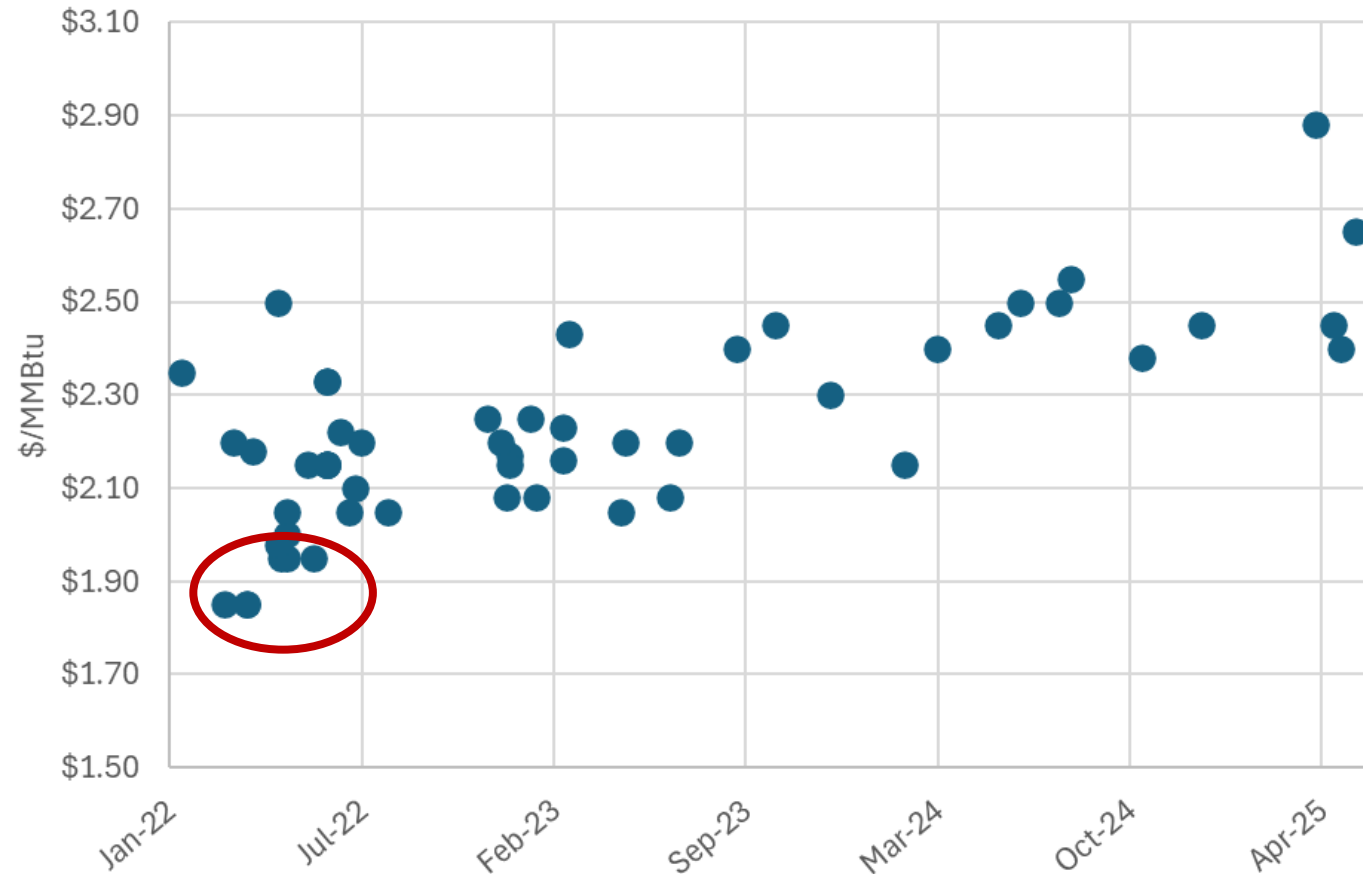


- ◆ There are five projects with about 36 MMt of capacity that could go to FID soon
 - After that, there are very few North American projects that have sold much volume and that have permits
 - It is likely the US will need a couple of years to rebuild the project pipeline

Source: Poten & Partners LNG Contract Intelligence Service

Base US liquefaction fees are rising

Pricing for selected 2022 - 2025 ytd US SPAs



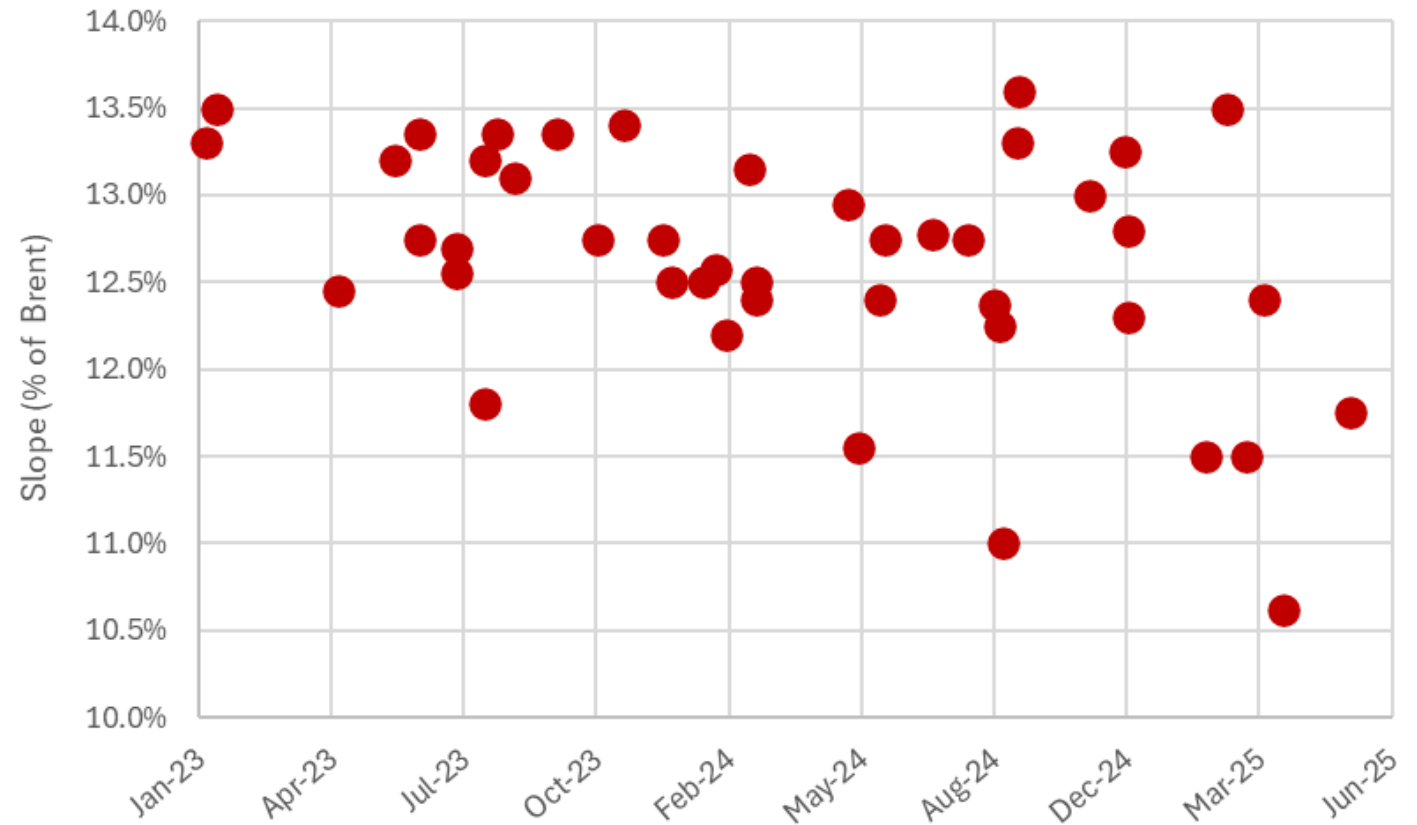
Source: Poten & Partners LNG Contract Intelligence Service

- ◆ Typical US deals
 - 1 MMt/y or more for 15+ years
 - 115% of HH
- ◆ Current offers for FOB supply are \$2.25-\$2.60/MMBtu
- The lowest priced deals have been raised 25-35 cents recently
- ◆ Starting to see deals with prices tied to guaranteed start of supply and shorter cancellation periods in exchange for higher cancellation fees

Recent deals have seen an erosion of Brent pricing

- ◆ LNG imports in Asia have been softer this year
 - Most major markets are down or flat year-on-year
- ◆ Several of the most expensive deals include significant flexibility for buyers
- ◆ Expectations are that Brent-related pricing will continue to weaken
- ◆ They could go much lower – as Brent slopes did in 2019

Pricing for selected long-term, Brent-related SPAs 2023-2025 ytd



Source: Poten & Partners LNG Contract Intelligence Service

Main takeaways

- ◆ Markets remain uncertain in the short term
 - But prices will come down as new supply begins to ramp up
- ◆ The size of the market will grow rapidly over the next 20 years
 - Near term imbalances are likely as it will take time to absorb new supply
- ◆ US projects have been progressing rapidly
 - But we are running out of shovel-ready projects
 - There will be a lull in development
- ◆ Higher US liquefaction fees and falling Brent slopes highlight growing competition in global LNG markets



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