Global LNG Outlook 2017

BNEF's long-term forecast of LNG markets to 2030

**Executive Summary
September 2017**
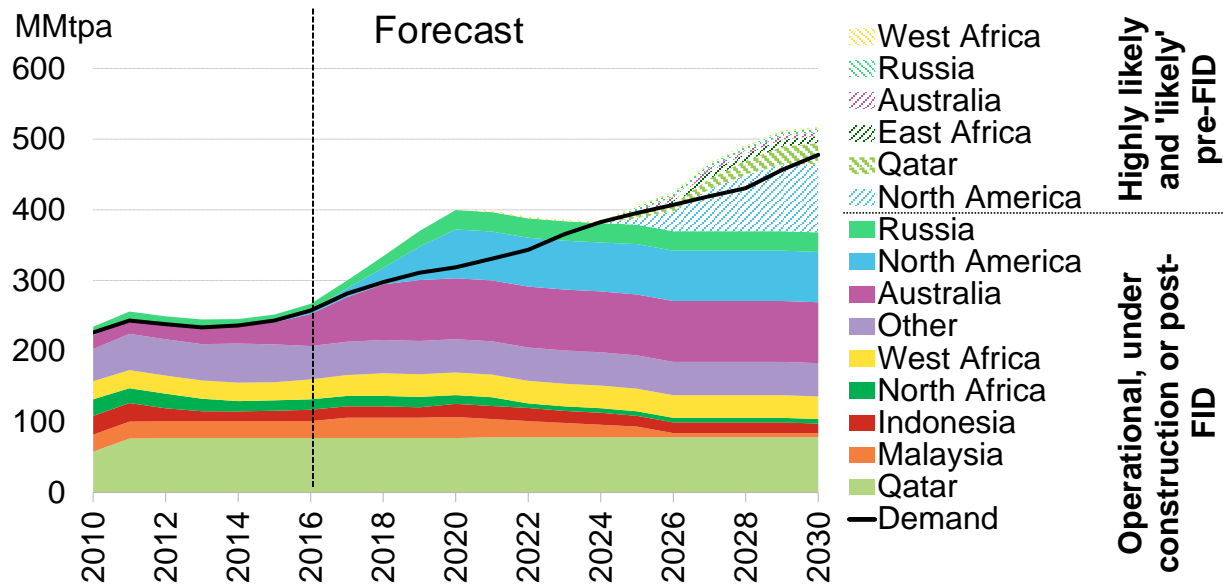
#BNEFLNG

Global LNG demand/supply-capacity balance

MMtpa

Legend (Highly likely and 'likely' pre-FID):
- West Africa
- Russia
- Australia
- East Africa
- Qatar
- North America

Legend (Operational, under construction or post-FID):
- Russia
- North America
- Australia
- Other
- West Africa
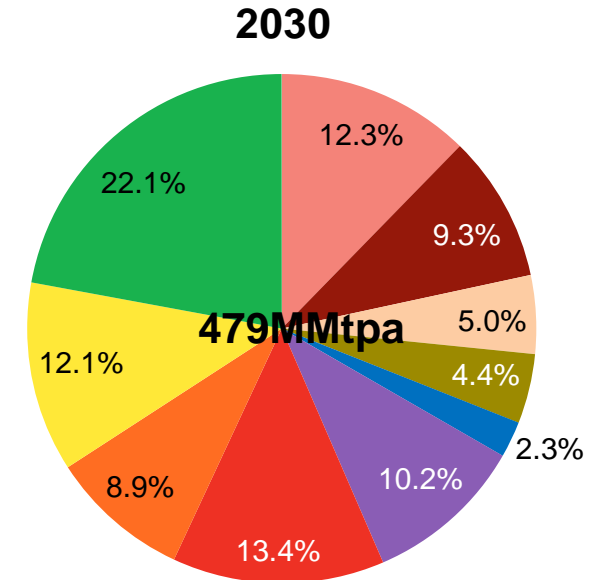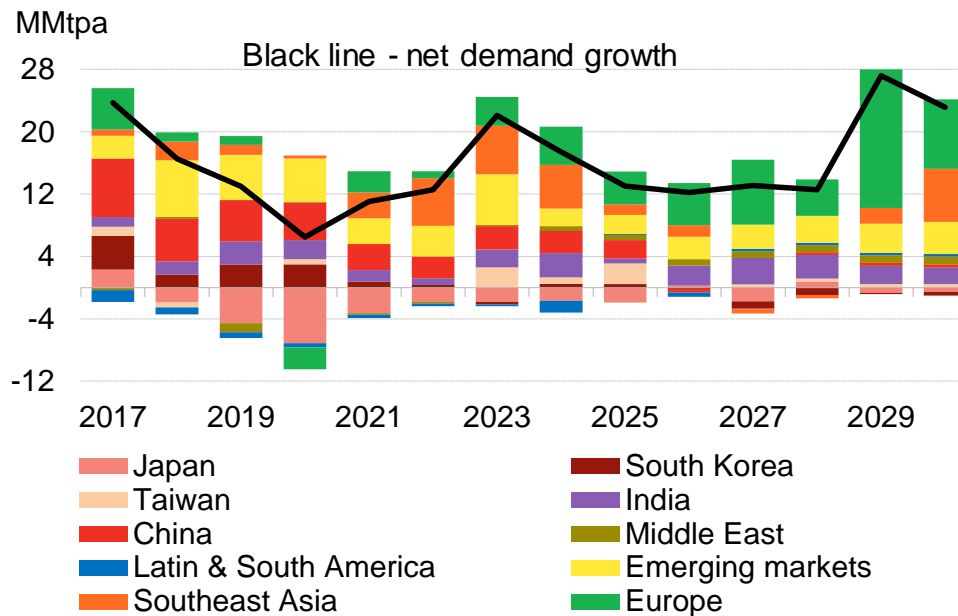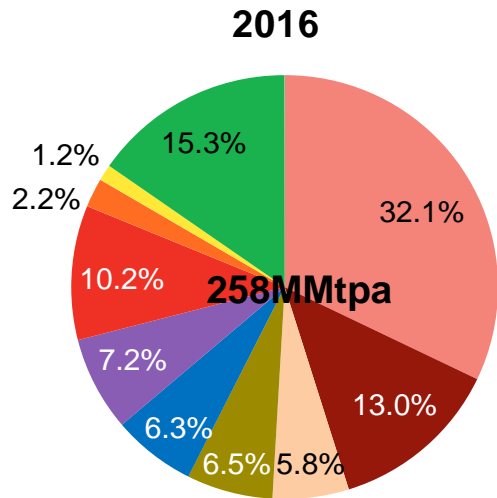- North Africa
- Indonesia
- Malaysia
- Qatar
- Demand

Source: Bloomberg New Energy Finance, Poten & Partners, Customs. Note: 'Highly-likely' and 'likely' pre-FID projects are included on this chart. The likelihood of a project being built by 2030 is assessed based on the project's regulatory stage, project size, infrastructures, developers' financial strength, offtake contracts, and sovereign risks. Clients can access data on individual projects and country-level demand figures here: web/ terminal .

- **Medium-term (2017-20)**: Strong growth is expected to push total global LNG demand to 314MMtpa by 2020. This will be driven by energy policies favoring gas, structural changes in power markets, and concerns over nuclear. LNG supply is set for a more striking rise and production capacity will reach 400MMtpa by 2020 as the U.S. and Australia complete export terminals currently under construction. Oversupply continues to look inevitable over the next several years, despite strong demand growth, but won't be as serious as previously expected.

- **Longer-term (2020-30)**: Demand will continue to grow and reach 479MMtpa by 2030 as large opportunities in new markets materialize. These include the development of new power markets, greater use of gas in renewables integration, and the opportunity to use gas as a replacement fuel as coal and nuclear plants retire. Supply will peak in 2020, and no new projects are expected on line during 2020-24. As a result, the global LNG market will become supply-tight around 2023-24 and face a potential supply shortage from 2025.

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Global LNG demand, 2017-30

Incremental changes in LNG demand

2016

258MMtpa

32.1%
13.0%
5.8%
6.5%
6.3%
7.2%
10.2%
2.2%
1.2%
15.3%

2030

479MMtpa

12.3%
9.3%
5.0%
4.4%
2.3%
10.2%
13.4%
8.9%
12.1%
22.1%

Black line - net demand growth

MMtpa

28
20
12
4
-4
-12

2017 2019 2021 2023 2025 2027 2029

Japan — South Korea
Taiwan — India
China — Middle East
Latin & South America — Emerging markets
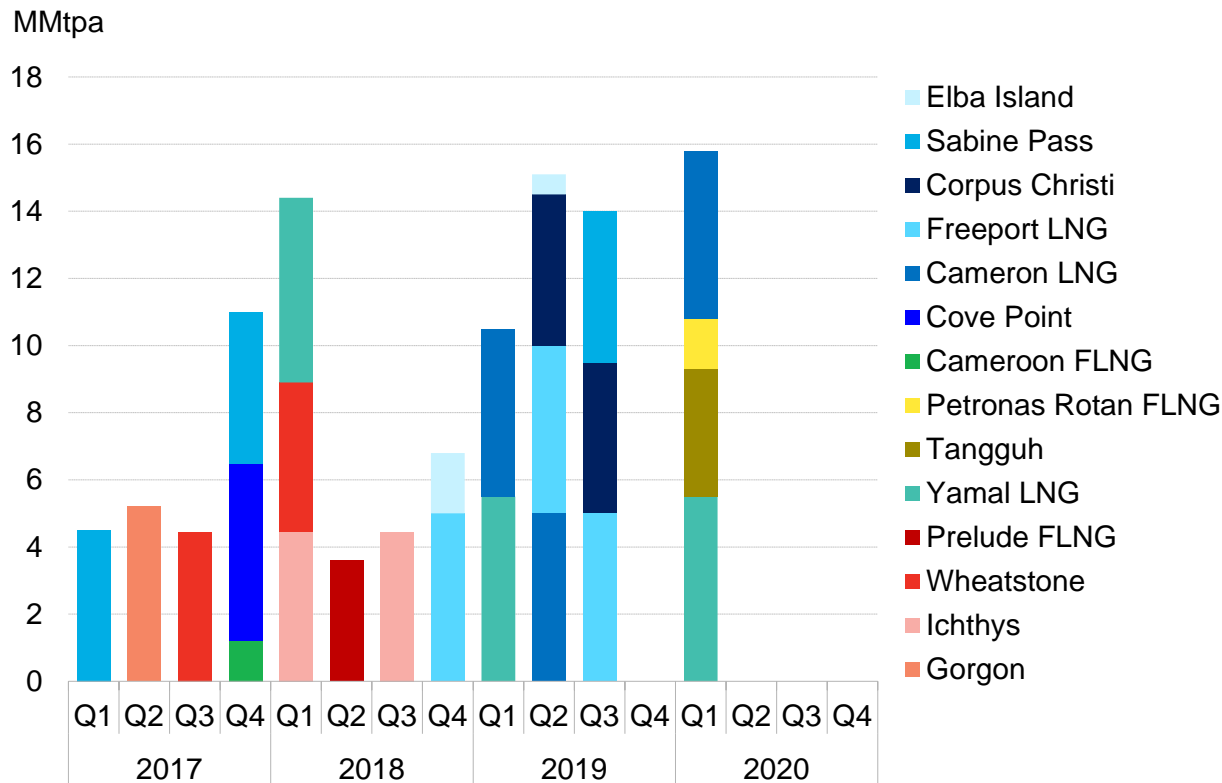Southeast Asia — Europe

Source: Bloomberg New Energy Finance, Poten & Partners, Customs. Note: Re-exporting countries are excluded. Emerging markets include Pakistan, Bangladesh.

- Global LNG demand will likely reach 280MMtpa in 2017, up 22MMtpa from last year. The 8.8% jump represents the largest year-on-year growth since the 2011 Fukushima disaster. Future net annual demand growth is expected to follow a seven-year cycle. By 2030, world LNG demand is projected to reach 479MMtpa, rising at a compound annual growth rate of 4.5%.

- China, along with emerging markets such as Pakistan, Bangladesh and new small LNG importing countries will drive the demand growth primarily through 2020. After that, Southeast Asia demand will surge as the region's pipeline gas supply falls. Europe is expected to buoy global LNG demand from 2026 throughout to 2030.

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Strong growth in supply until 2020

26 projects totaling 110MMtpa coming online during 2017-20

MMtpa

Legend:
- Elba Island
- Sabine Pass
- Corpus Christi
- Freeport LNG
- Cameron LNG
- Cove Point
- Cameroon FLNG
- Petronas Rotan FLNG
- Tangguh
- Yamal LNG
- Prelude FLNG
- Wheatstone
- Ichthys
- Gorgon

Source: Bloomberg New Energy Finance. Note: Reddish colors represent Australian projects, bluish colors represent US projects, other colors represent the rest of the world (Russia, Malaysia and Indonesia). Clients can access detailed information on individual projects here: __web__/ __terminal__.

- In 1H 2017, two projects were commissioned – Cheniere's Sabine Pass train 3 (4.5MMtpa) and Chevron's Gorgon train 3 (5.2MMtpa), with a combined capacity of 9.7MMtpa.

- Four projects totalling 15.5MMtpa are expected to come online during 2H 2017, including Chevron's Wheatstone train 1, Cheniere's Sabine Pass 4, Dominion Resources' Cove Point 1 and Golar LNG's Cameroon FLNG.

- A further 20 projects totalling 84.7MMtpa are scheduled to start operation over 2018-20. Of this, 45.9MMtpa will be from the U.S., 17MMtpa from Australia, 16.5MMtpa from Russia and 5.3MMtpa from Malaysia and Indonesia.

- Australia will complete the construction of four remaining trains by Q3 2018.

- Russia's Novatek is likely to see the first train of the Yamal LNG project come online in early 2018.
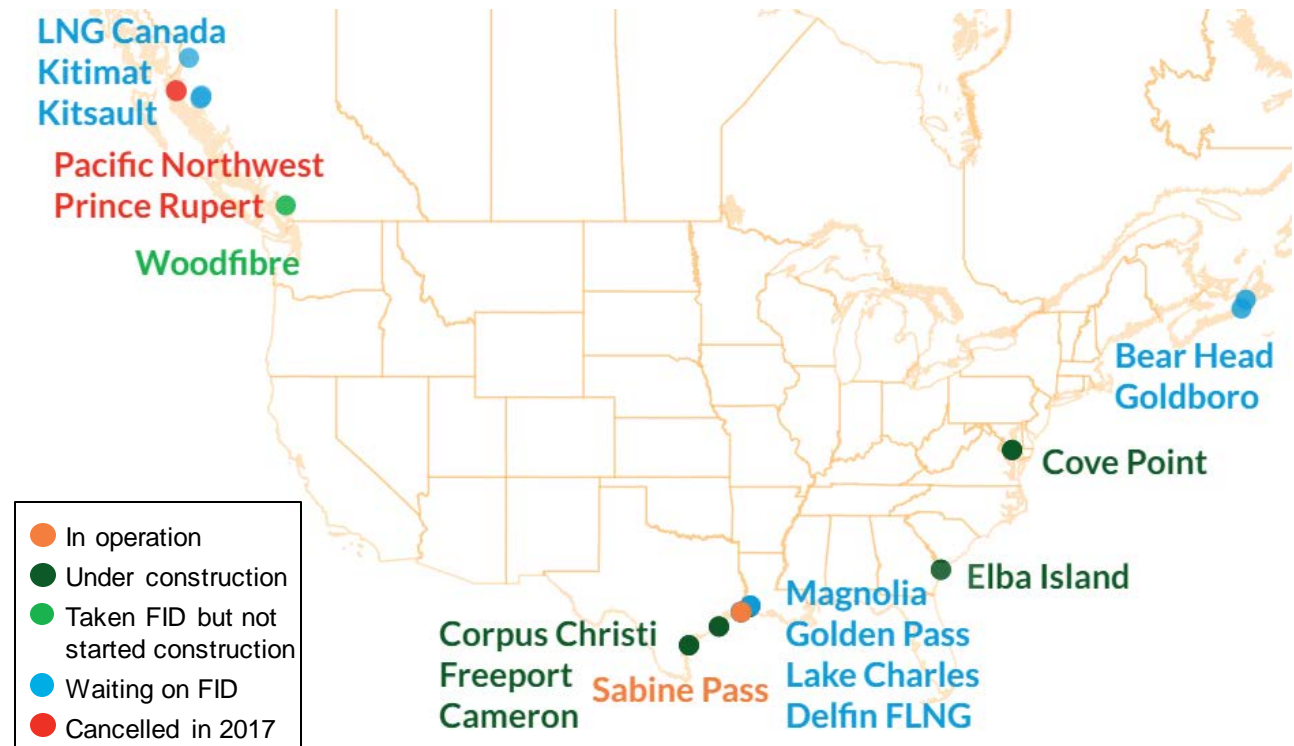
- The next slew of U.S. LNG projects will flood the market from 4Q 2018 with Freeport LNG and Kinder Morgan's Elba Island Phase I. These are quickly followed by Sempra Energy's Cameron LNG and Cheniere's Corpus Christi.

- In the rest of the world, only Indonesia and Malaysia will add more supply capacity in the next few years. By early 2020, BP's Tangguh train 3 is likely to be brought online, while Petronas will commission its second floating project Rotan FLNG.

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North American LNG projects see mixed success in 2017

- **Exports:** Sabine Pass brought Train 3 in-service in January 2017, and Train 4 will begin exports in the next few months. Cove Point in Maryland will also come into service by the end of the year. This will bring total export capacity to 22.5MMtpa.

- **Regulatory approvals:** Golden Pass and Delfin received their final regulatory approvals and both projects are now waiting for final investment decision (FID). Over 146MMtpa of capacity across North America is currently waiting on FID as the projects line up offtake agreements and assess the future market for global LNG.

Status of select North American LNG export terminals

LNG Canada
Kitimat
Kitsault
Pacific Northwest
Prince Rupert
Woodfibre

Bear Head
Goldboro
Cove Point
Elba Island

Corpus Christi
Freeport
Cameron
Sabine Pass
Magnolia
Golden Pass
Lake Charles
Delfin FLNG

- In operation
- Under construction
- Taken FID but not started construction
- Waiting on FID
- Cancelled in 2017
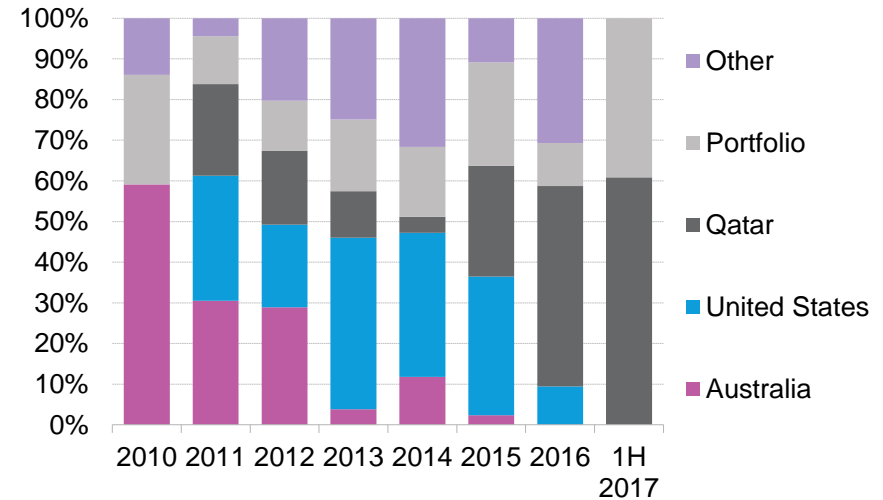
Source: Bloomberg New Energy Finance.

- **Cancellations:** Two Canadian export projects totaling 39MMtpa have been cancelled so far this year. Shell pulled out of the BG-initiated Prince Rupert project in March, and Petronas abandoned the Pacific Northwest project in July. These cancellations are mostly attributed to market conditions such as low oil and gas prices and large quantities of global LNG supply, which make the projects uneconomic.

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Qatar and portfolio suppliers winning LNG contract sales

LNG contracts signed each year by tenure

MMtpa

- >20 years
- 11-20 years
- 5-10 years
- 1-4 years
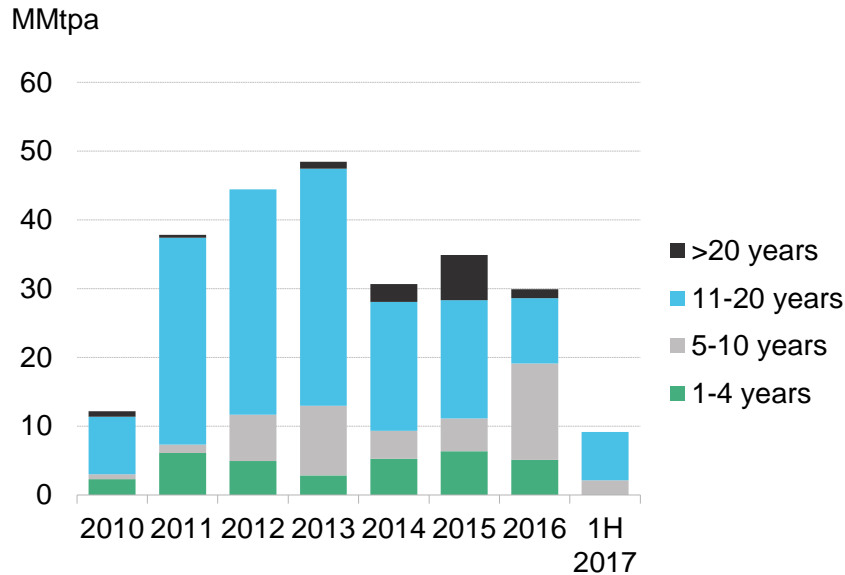
Leading LNG sellers' shares in total contract sales

- Other
- Portfolio
- Qatar
- United States
- Australia

*Source: Bloomberg New Energy Finance. Note: *does not include Bangladesh's 2.5MMt contract with Qatar signed in August 2017.*

- LNG contract sales declined to 5.7MMt* in 1H 2017, a new record low in the past eight years. It was less than half of the volumes sold over the same period in 2016, indicating a very challenging market for LNG sellers.

- Interests in short-term contracts (1-4 years) diminished as buyers expect abundant availability of cheap spot LNG cargos over the next few years due to imminent oversupply and soft oil prices.

- Qatar and portfolio suppliers managed to seal long-term sales contracts, beating their rivals in the global market.

- Portfolio suppliers are those that buy LNG volumes from various projects and combine them together to sell to end-users. By optimizing their LNG supply portfolios, portfolio suppliers are able to offer flexible and competitive terms in their sales contracts and win over their rivals.

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Long-term price scenario in Asia

$/MMBtu

Future scenario

JKM

SLInG

A 13% JCC-linked contract price

Average of JCC-linked contract price and low end of US LNG price (dashed line)

Price range for US LNG to Asia
(short-run vs long-run cost)
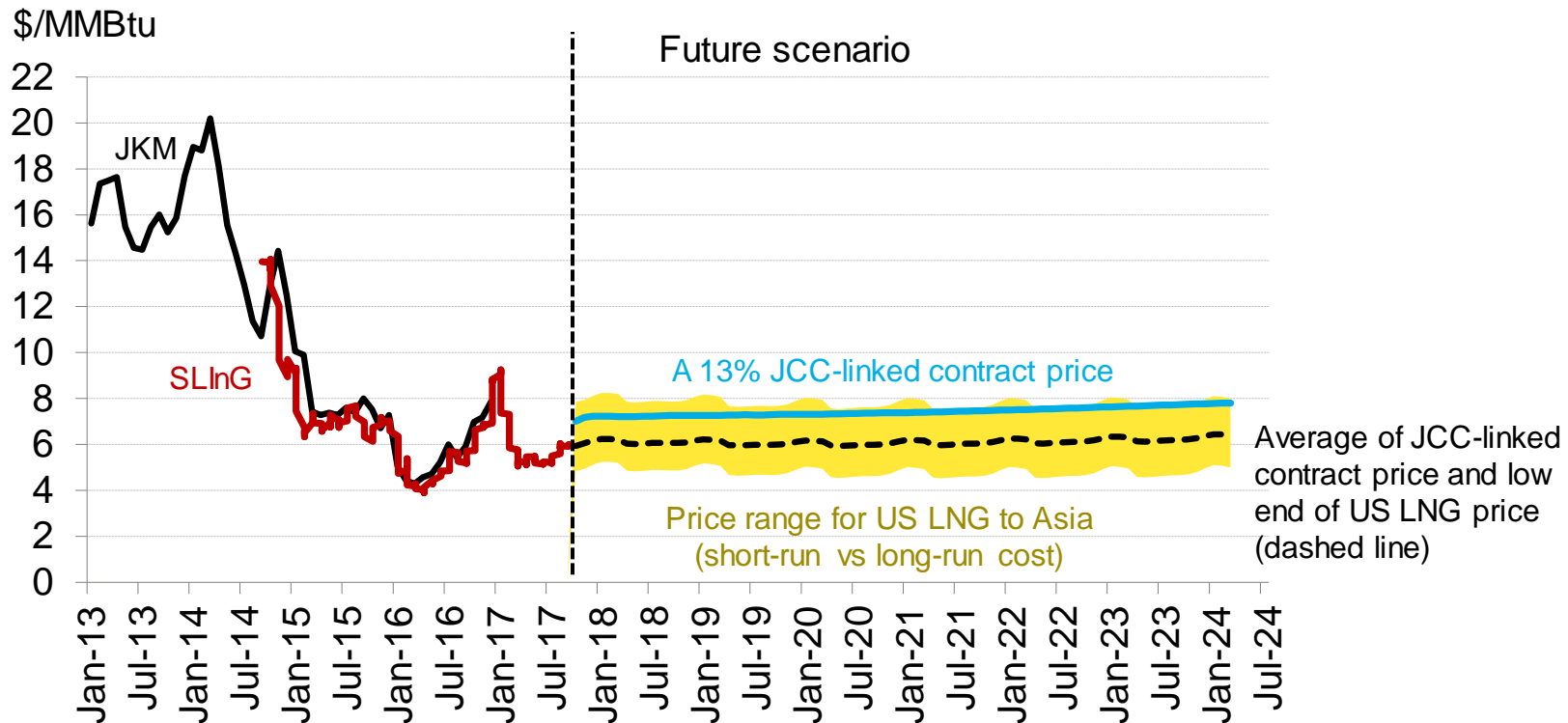
Source: Bloomberg New Energy Finance, CME, Singapore Exchange. Note: Brent and Henry Hub futures {CMBQ <GO>} on 8 September 2017 were used in calculations. A $3/MMBtu fixed charge and $1.5/MMBtu shipping cost are assumed in the U.S. LNG price scenario. The JCC forecast is built on the correlation between JCC and Brent.

- By 2025, demand will catch up with supply overcapacity. A chance of experiencing the previously-expected supply shortage post-2025 is fading as Qatar has decided to add 30MMtpa of supply in the market by then. That will balance the market and prevent spot LNG prices from going very high.

- If oil prices stay close to the current futures, spot LNG prices should stay close to $6/MMBtu until mid 2020s.

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