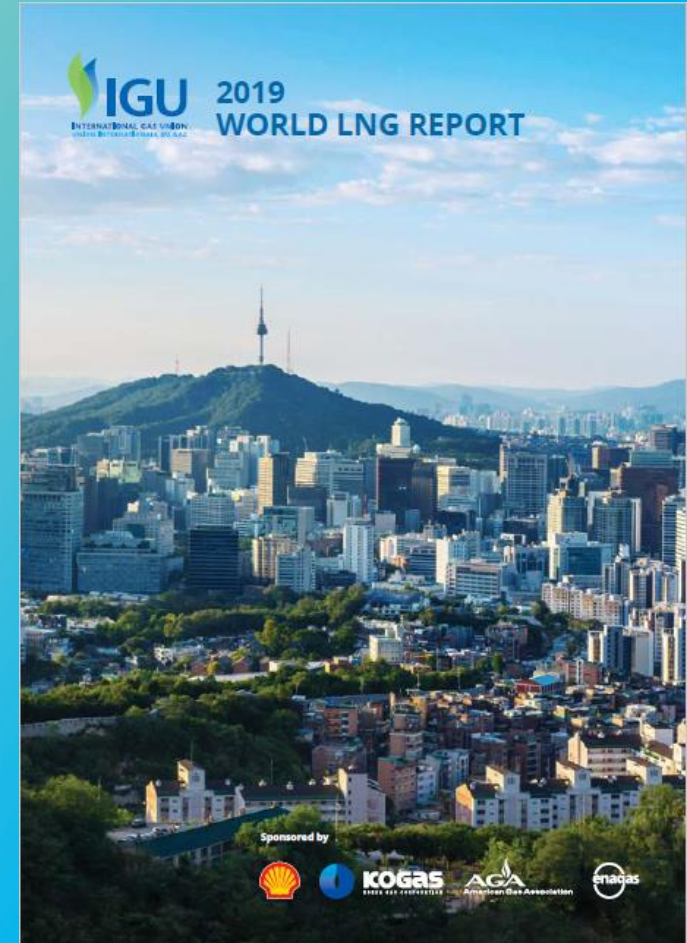




IGU
WGC 2021
28th WORLD GAS CONFERENCE
DAEGU, KOREA 21-25 JUNE

2019 IGU World LNG Report



LNG Committee Meeting
Gyeongju, Sept 2019

2019 IGU World LNG Report

- Data in the 2019 World LNG Report is sourced from a variety of public and private domains, including the BP Statistical Review of World Energy, Cedigaz, the International Energy Agency (IEA), the Oxford Institute for Energy Studies (OIES), the US Energy Information Agency (EIA), the US Department of Energy (DOE), GIIGNL, IHS Markit and company reports and announcements.
- No representations or warranties, express or implied, are made by the sponsors concerning the accuracy or completeness of the data and forecasts supplied under the report.
- The IGU wishes to thank the following organisations and Task Force members entrusted to oversee the preparation and publication of this report:
 - American Gas Association (AGA), USA: Ted Williams
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Agenda

- 2018 in Numbers
- Global Trade
- Prices
- Liquefaction
- Regasification
- Shipping

2018 in numbers

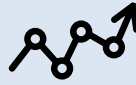
316.5 MT

Global LNG trade



22% by 2024

Expected growth in global nominal liquefaction capacity (as of Feb 2019)



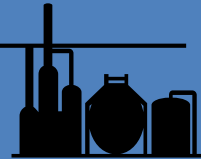
US\$9.78/MMBtu

Average Northeast Asian spot price



393 MTPA

Global nomination liquefaction capacity (as of Feb 2019)



525 Vessels

LNG fleet



824 MTPA

Global nominal regasification capacity (as of Feb 2019)

80.1 MTPA

FSRU Capacity (as of Feb 2019)

843 MTPA

Proposed liquefaction capacity (as of Feb 2019)

21.5 MTPA

Liquefaction capacity sanctioned



37

Importing markets



6.4%

Average yearly growth rate of LNG demand since 2000



843 MTPA

Proposed liquefaction capacity (as of Feb 2019)



101.3 MTPA

Global liquefaction capacity under construction (as of Feb 2019)

LNG Trade

Global LNG trade increased sharply in 2018



LNG import growth in 2018 was driven by China and South Korea, the world's second- and third-largest LNG importers.

Represented nearly **80%** of the increase in net trade

Combined incremental growth of **22.2MT**



Increased by **28.2MT**



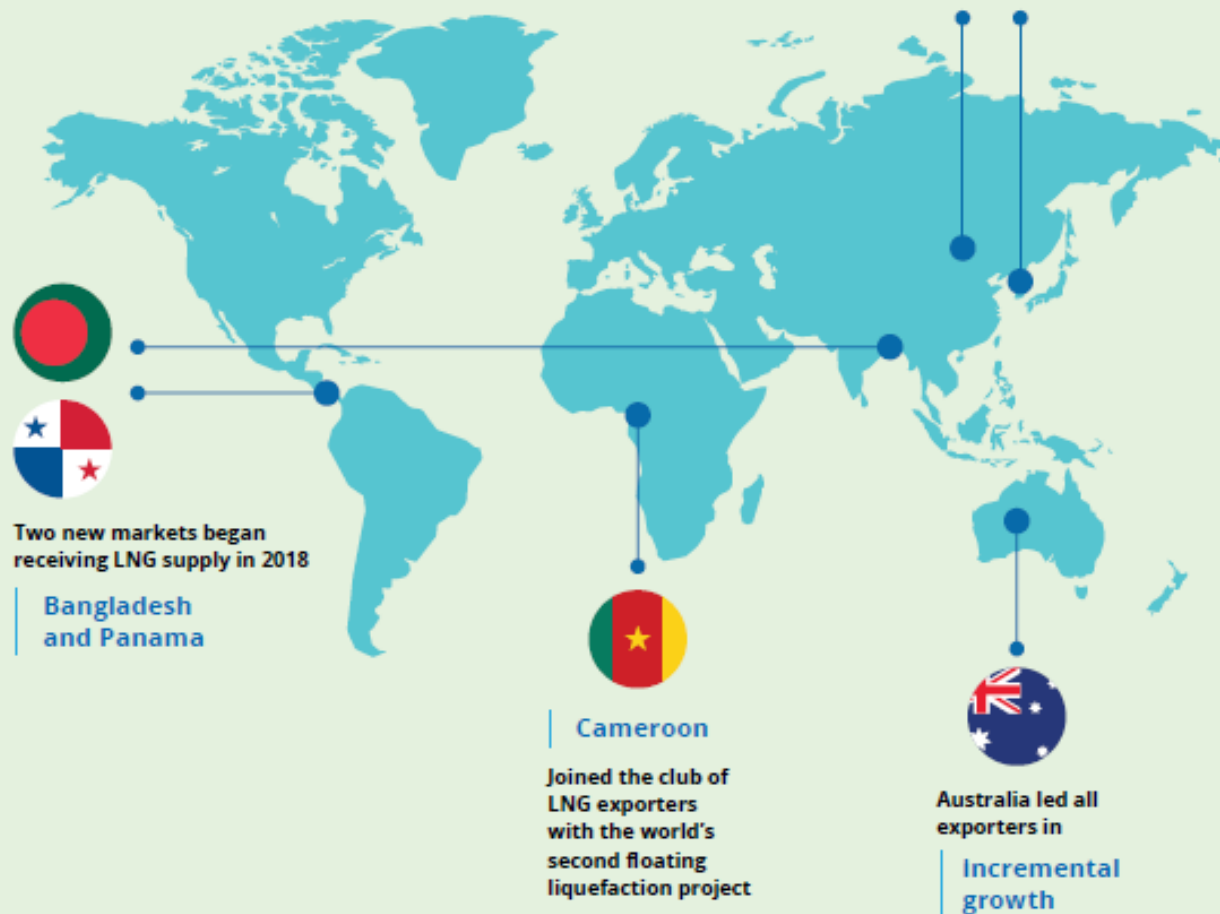
Setting a new annual record of **316.5MT**



5th consecutive year of incremental growth

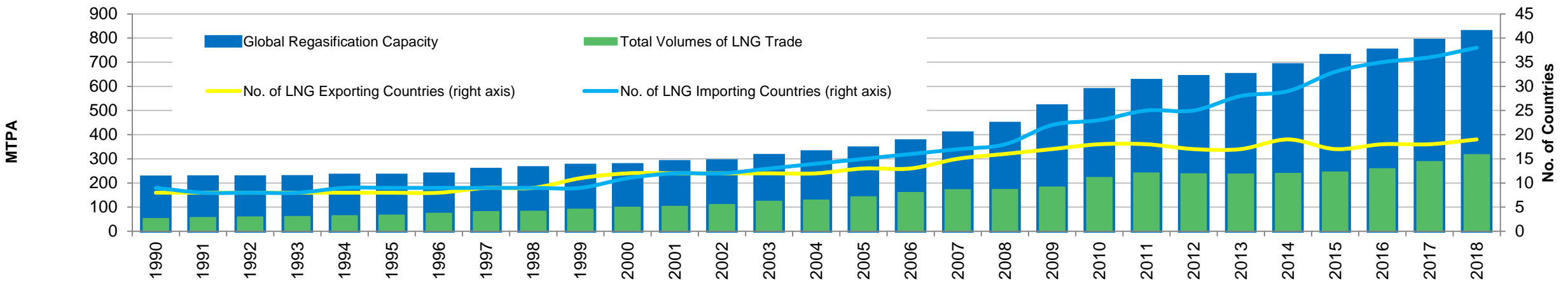


3rd largest annual increase ever (behind only 2010 and 2017)



Key Changes in Global Trade in 2018

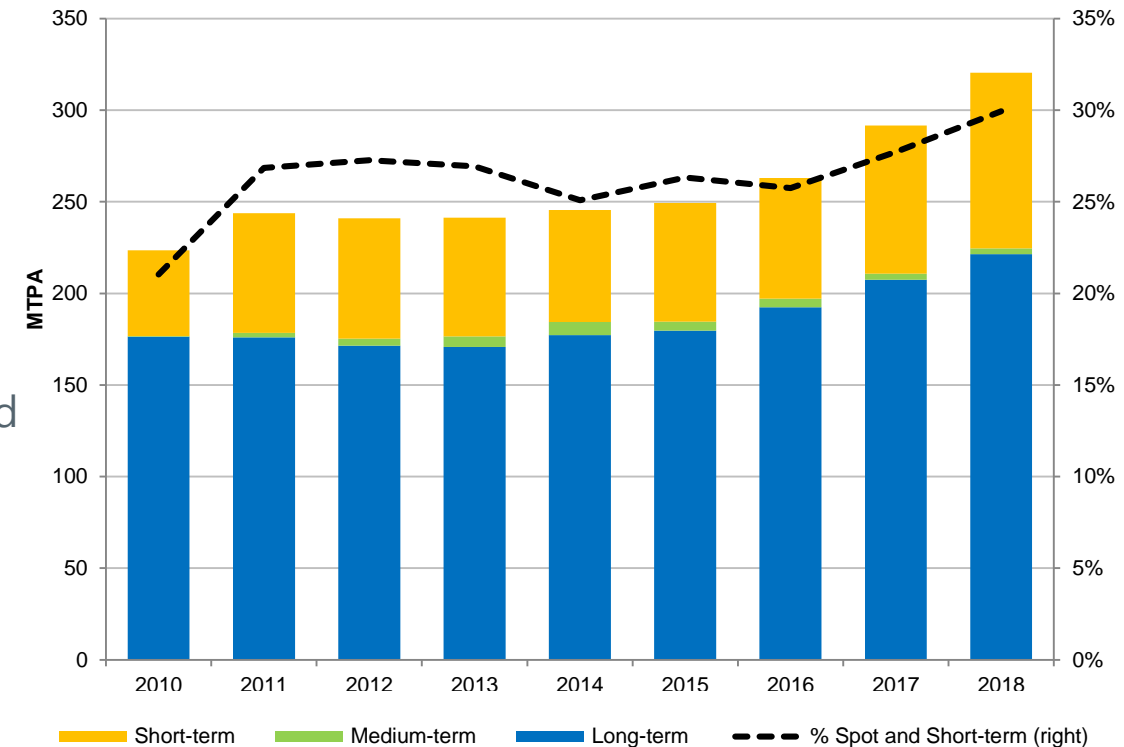
- Global trade increase driven by higher production at new liquefaction plants in Australia, the United States, and Russia.
- Beyond large exporters adding new liquefaction trains, Cameroon joined the club of LNG exporters - world's second floating liquefaction project
- As in 2017, LNG import growth in 2018 driven by China and South Korea, with growth of 15.8 and 6.4 MT. This was nearly 80% of the increase in net trade.
- The 15.8 MT of incremental import growth in China was the largest ever for a single market
- Two new markets began receiving LNG supply in 2018: Bangladesh and Panama.
- LNG imports declined by 3.7 MT in Egypt - domestic gas production from the Zohr field and the West Nile Delta region surged. Egypt had previously been a key driver of LNG demand growth, rising to 7.3 MT of imports in 2016 despite only receiving its first cargo during 2015.



Source: IHS Markit, IEA, IGU

Short-, Medium-, and Long-term LNG Trade in 2018

- Non-long-term LNG trade reached 99 MT in 2018, increase of 14.5 MT YOY, accounting for 31% of total gross LNG trade.
- Short-term supply and demand growth was strongest in the Pacific Basin.
- New liquefaction capacity added during the year was contracted mostly to aggregators with diverse LNG trading portfolios.
- Particularly notable was the increase in short-term supply from Australia, which had the largest increase in non-long-term exports (+6.4 MT) despite holding long-term contracts directly with many end-markets.
- The largest growth in non-long-term imports was in China, which took in an additional 10 MT YOY from the short-term market as buyers relied heavily on the spot market to satisfy their strong demand growth.

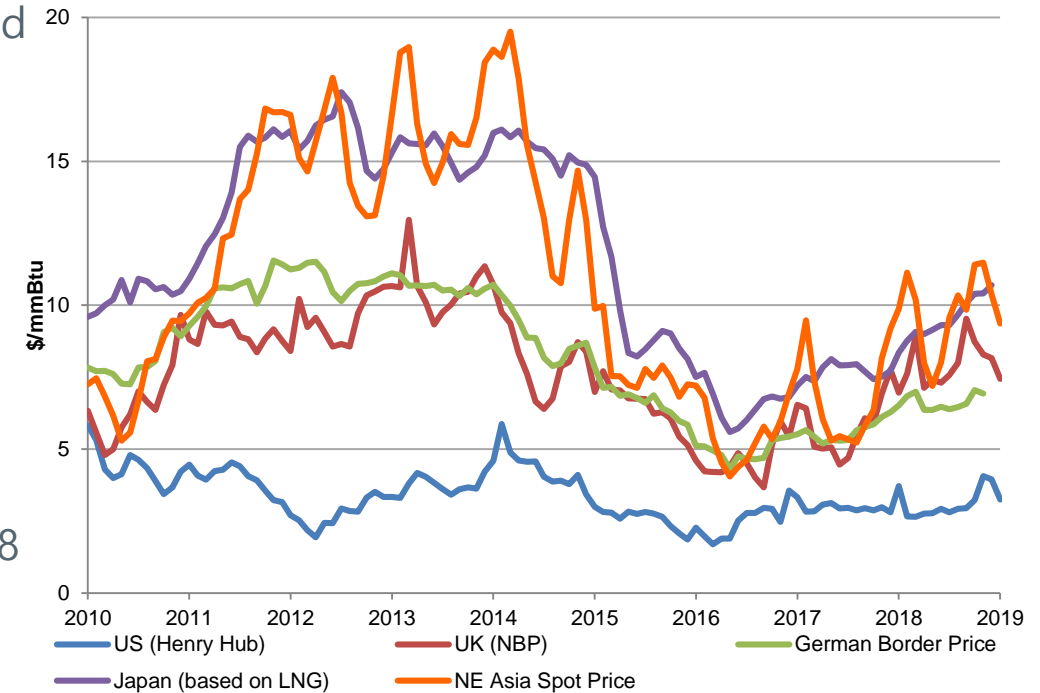


Sources: IHS Markit, IGU

Global Prices in 2018

- Most LNG-related prices around the world followed an upward trend in 2018
- Several price markers experienced some volatility in the spring and summer months
- Northeast Asian spot prices fell from an average \$9.88/MMBtu in January 2018 to a low of \$7.20/MMBtu in May 2018.
- Spot prices showed some signs of weakness toward the end of 2018
- European spot prices climbed for most of the year, though a large influx of LNG in the fourth quarter of the year began to place some downward pressure on market prices

Monthly Average Regional Gas Prices, 2010 – January 2019



Sources: IHS Markit, Cedigaz, US Department of Energy (DOE)

Liquefaction Plants

The substantial expansion of global liquefaction capacity that began in 2016 continued through 2018



Led by additions in
Russia & Australia



Capacity has reached
392.9 MTPA
as of February 2019



Total nominal liquefaction capacity increased by
30.6 MTPA
since the end of 2017



A further
101.3 MTPA
has been sanctioned for development, the majority of which is under construction in the United States



A total of
21.5 MTPA
of liquefaction projects reached FID in 2018 — nearly as much as in the previous three years combined

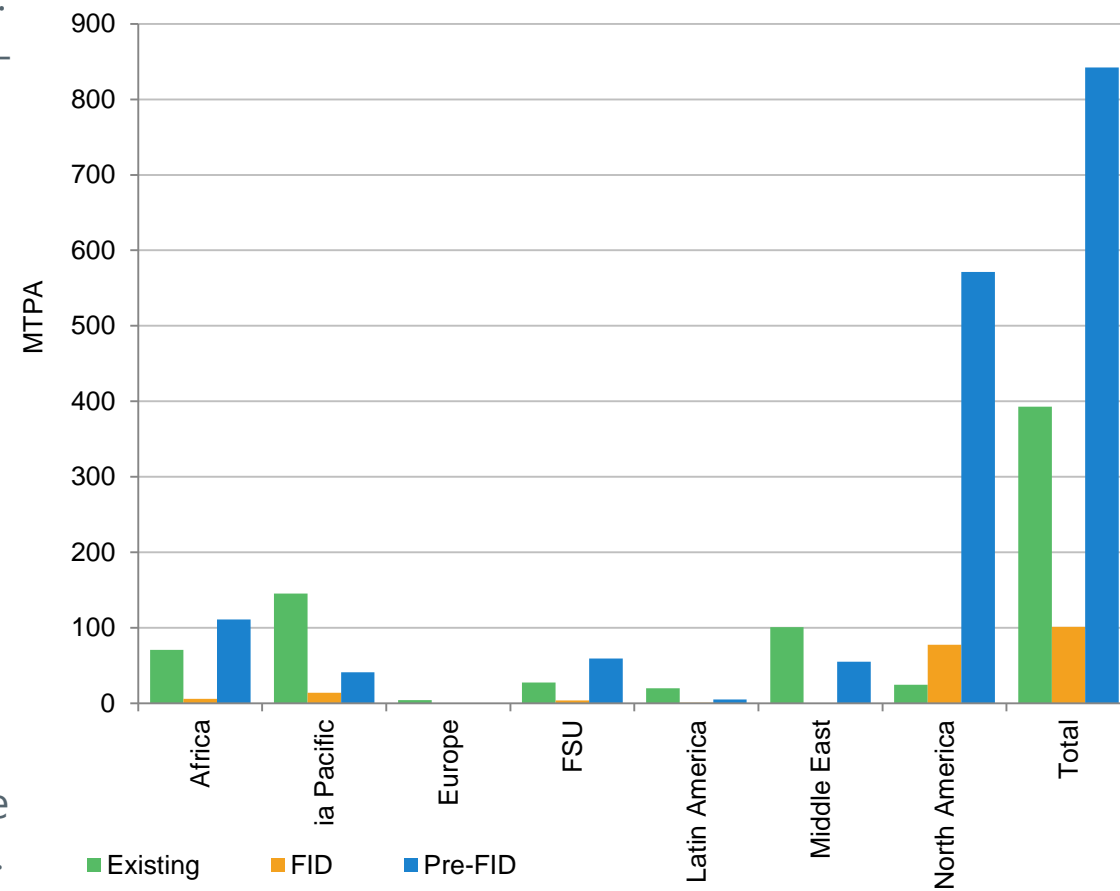
Significant additional FIDs are expected in 2019 starting with the **15.6 MTPA** Golden Pass LNG project in February.

A growth of **22%** is expected by 2024 in global nominal liquefaction capacity from February 2019

Liquefaction project developers are poised to drive a wave of new capacity with approximately
843 MTPA
in proposed capacity seeking to come online by 2025

Liquefaction Developments in 2018

- The present state of under-construction liquefaction projects means that a rapid rise in capacity over the next two years will be followed by a period of lower capacity additions in 2021-22.
- This is the result of low investment in recent years, particularly 2016 and 2017 owing to factors like low energy prices, demand uncertainty, and some expectations of surplus LNG supply.
- A total of 21.5 MTPA of liquefaction projects reached FID in 2018—nearly as much as in the previous three years combined—followed by an FID at the 15.6 MTPA Golden Pass LNG project in February 2019.
- Significant additional FIDs are expected in 2019.
- Throughout 2018, proposed projects signed a number of long-term LNG contracts to advance their prospects for FID, while some project sponsors committed to taking on their projects' marketing risk themselves to accelerate development and meet expected growth in LNG demand by the mid-2020s.
- Liquefaction project developers are poised to drive a wave of new capacity with a total of approximately 843 MTPA in proposed capacity seeking to come online by the middle of the next decade. However, many of these projects will likely need to sign long-term offtake contracts to enable FID and will be competing for the same set of buyers, making it unlikely that all projects will move forward.



Sources: IHS Markit, Company Announcements

LNG Receiving Terminals



Global LNG regasification capacity reached a high of **824 MTPA** as of February 2019



New terminals and expansion projects added **22.8 MTPA** of regasification capacity to the global LNG market in 2018



+6.2 MTPA Net growth of global LNG receiving capacity



+5 New LNG onshore import terminals



+2 New LNG Offshore terminals



+2 Regasification markets



Argentina, Brazil, Egypt, and United Arab Emirates

had their chartered FSRU's leave port in 2018 removing 16.6 MTPA from the market and resulting in only 6.2 MTPA of net regasification capacity growth.



New markets including Bahrain, Croatia, El Salvador, Ghana, and the Philippines

are in the process of constructing their first regasification terminals



Multiple new regasification terminals and expansion projects were set to begin operations in early 2019, including Thailand, India, China, Jamaica, Russia (Kaliningrad), Bahrain, and Bangladesh

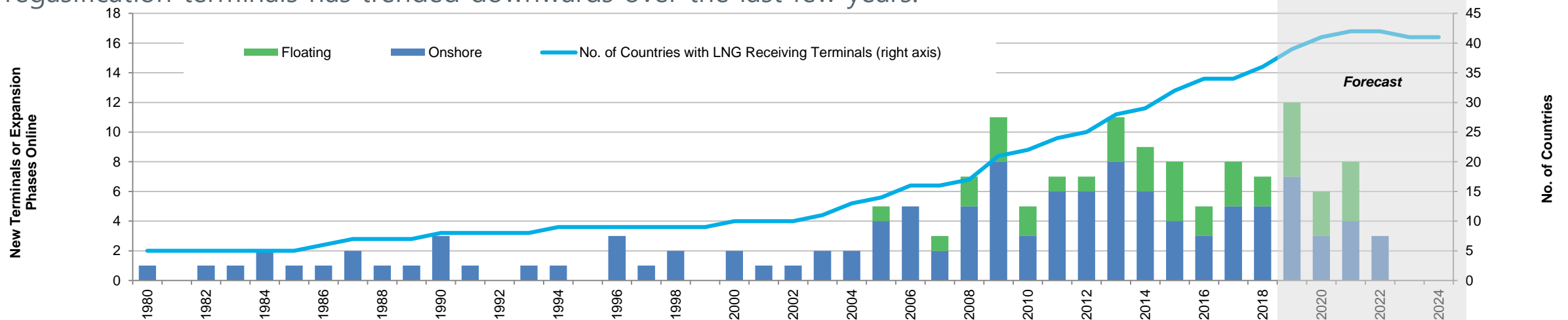


China

was a particular source of growth, completing three new terminals in 2018 and an expansion of an existing terminal.

Regasification Developments in 2018

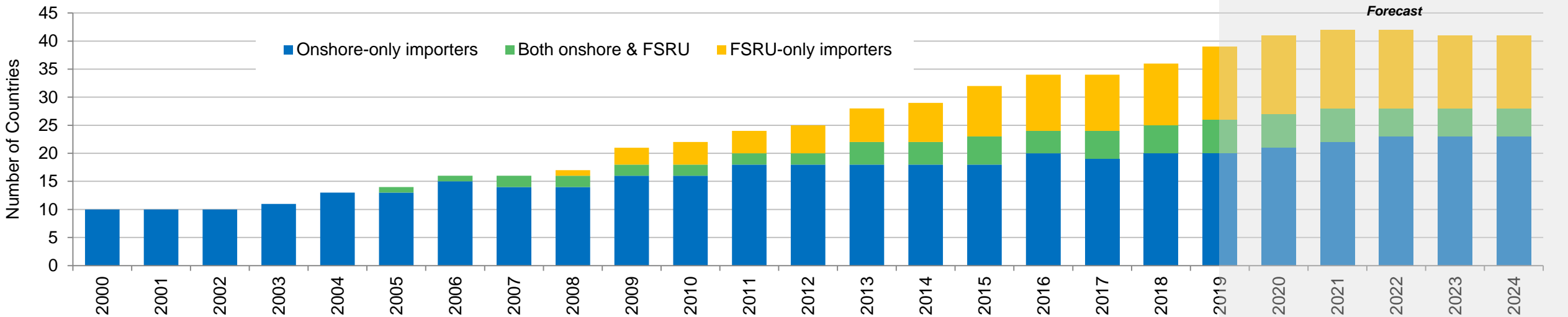
- Two new markets, Bangladesh and Panama, added LNG regasification capacity in 2018.
- New terminals were constructed in China, Japan, and Turkey, all of which were existing LNG markets. China and Greece also completed regasification capacity expansion projects at existing plants. Furthermore, one expansion project in Thailand came online in January 2019.
- These additions brought total LNG regasification capacity in the global market to 824 MTPA across 36 markets as of February 2019.
- Average regasification utilisation levels across the global LNG market reached 39% in 2018. Due to the requirement to meet peak seasonal demand and ensure security of supply, regasification terminal capacity far exceeds liquefaction capacity.
- Due to multiple small- to medium-sized terminals in smaller markets beginning operations, average send-out capacity at regasification terminals has trended downwards over the last few years.



Sources: IHS Markit, Company Announcements

Floating Regasification in 2018

- Total regasification capacity at operational offshore terminals decreased to 80.1 MTPA.
- Charters of two FSRUs ended as well, in Kuwait and at Tianjin, China.
- As of February 2019, twelve offshore projects were under construction. These terminals are spread between new markets, such as Ghana and Russia (Kaliningrad) and more mature markets, such as India and Brazil.
- Projects have even been proposed in Australia, a major LNG exporter, with one project signing a time charter for an FSRU in December 2018 to meet periodic surges in gas demand.
- As of February 2019, twelve FSRUs (including conversions) were on the order book of shipbuilding yards.



Sources: IHS Markit, Company Announcements

LNG Carriers



525
LNG Vessels
At end-2018



5,119
Trade voyages
In 2018



Spot charter rates for a modern fuel-efficient tanker averaged \$76,000/day for the first two months of the year, an **81% YOY increase**



Spot charter rates tapered off during the spring and summer months, averaging **\$56,000/day**



Spot charter rates in Q4 2018 peaked at an all-time high of **\$195,500/day** and averaged **\$150,000/day**



This was short-lived and spot charter rates had returned to around **\$74,000/day** by January 2019



Global LNG Fleet

+53

Conventional carriers added to the global fleet in 2018



Propulsion systems

41%

Active vessels with DFDE/TFDE, ME-GI, or XDF propulsion systems



Charter Market

Steam \$53,400
TFDE/DFDE \$85,500

Average spot charter rate per day in 2018



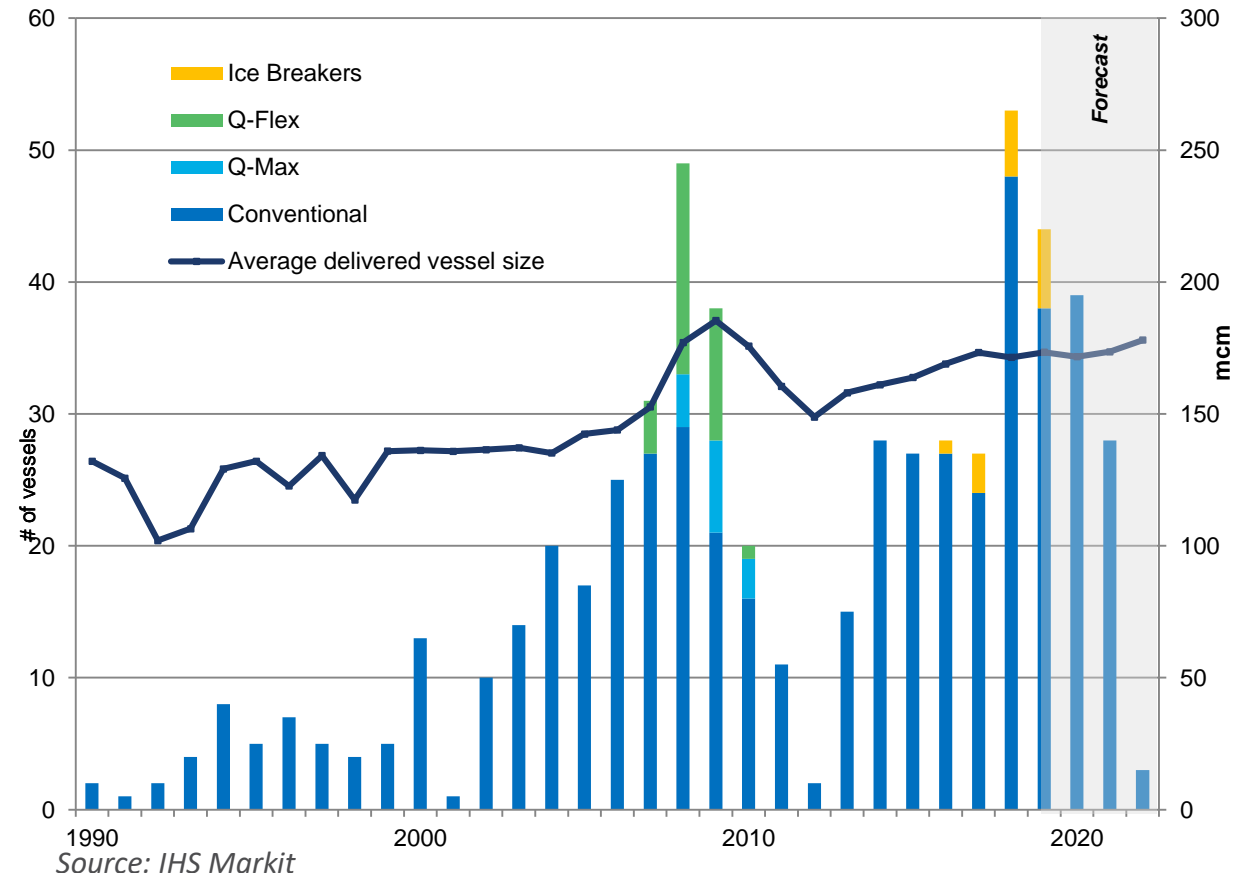
Orderbook Growth

+52

Conventional carriers ordered in 2017

Shipping Developments in 2018

- Even with the decline from end-2018 it is unlikely that charter rates will return to their 2017 levels as 51.8 MTPA of new liquefaction capacity is expected to start up in 2019, which will help keep rates higher. This liquefaction capacity will be met by only 43 newbuild deliveries. There were a total of 525 vessels in the LNG fleet by the end of 2018, including those vessels actively trading, sitting idle available for work, and acting as FSRUs.
- The large jump in newbuild orders is caused both by LNG offtakers ordering ships for new liquefaction capacity and speculative orders by shipowners. With the growing participation of short-term traders and the increasing unpopularity of destination clauses in LNG contracts, LNG trade is becoming more dynamic and will require more tonnage to service deliveries. At the end of 2018, around 52% of the orderbook was tied to a specific project or charterer, leaving 56 carriers available for the spot market or to be chartered out on term business.
- The Panama Canal has continued to play significant role in 2018, as exports from Sabine Pass, Cove Point, and Atlantic LNG have turned toward Asian markets in search of higher returns. A total of 12.6 MT of LNG made the transit through the Panama Canal in 2018. When compared to 2017, the number of laden voyages through the Panama Canal increased by 78%.



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