



THE NEW DRIVERS BEHIND SUPPLY AND DEMAND IN LNG SHIPPING

By Ludovic Aldersley

LNG SHIPPING

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Despite a surge in new LNG carriers entering service this year, spot charter rates soared to record levels in October – more than tripling levels seen only 12 months earlier. The number of vessels used to store LNG on the water played a critical role. How did we get here and what is in store for the next 24 months?

BY LUDOVIC ALDERSLEY DECEMBER 2018

The LNG industry is growing. It has finished 2018 with 40mtpa of new liquefaction capacity, 20mtpa new regasification capacity and in excess of 50 new ships. This follows strong LNG production growth in 2017 and prefaces the expected start of many more LNG facilities in the coming years.

Within this clear upward trend, shorter-term supply and demand dynamics are constantly changing, putting pressure on the prices of spot LNG, as well as the price of shipping LNG, around the world. The last quarter of 2018 has seen charter rates rocket to a near \$200,000/day peak in the Pacific basin, while east Asian spot LNG prices fell more than \$2.50/MMBtu into single digits.

Growth in LNG volumes goes hand in hand with growth in LNG shipping. More production requires more ships to transport more cargoes. However, the differing pace and occasional divergence between market values for LNG product and LNG shipping can surprise.

Shipping markets were expected to tighten this winter, as evidenced by several market participants securing tonnage for the season well in advance, but few, if no one, would have been able to forecast the extent to which prompt charter rates have risen.

The last surge in shipping markets above \$100,000/day in 2011 was driven by LNG demand with east Asian LNG spot prices above \$20/MMBtu. The current market is more complex but fundamentally it is driven by LNG supply with LNG spot prices under \$10/MMBtu for winter delivery.

Where that LNG supply is coming from and where it is going is critical in determining the demand for shipping. Certain aspects of supply and demand tend to repeat themselves in cyclical markets, but there are some unprecedented trends at play in today's market which this paper will touch on.

- Seasonal shipping logistics of Yamal LNG
- The responsiveness of US destination flexibility
- The commoditisation of LNG and its greater resemblance to the oil market

Each of these affect the number of ships required to bring volumes from one part of the globe to another. We will look at each in detail but focus on the third, and in particular, the cause and effect of more vessels waiting with cargo onboard before discharge. This will bring us onto the supply of ships, and in particular how technological improvements in the shipping fleet has helped allow LNG to stay on the water for so long.

Then we cast our eye at what the next 24 months are likely to bring in terms of supply and demand having factored in these three specific dynamics.

YAMAL LNG'S SHIPPING LOGISTICS

Yamal LNG surprised the LNG industry by not only shipping its first LNG on time at the end of 2017, but by ramping up all three of its 5.5mtpa trains to full capacity in the space of 12 months. It had originally planned for 12 month intervals between each train start up.

Furthermore, trains 1 and 2 have been operating above nameplate capacity over a sustained number of months in 2018. This has had two profound implications.

Firstly, volumes available on the spot market increased enormously as long-term contracts were agreed to start within a period following the planned start-up dates, and not the earlier than anticipated actual start-up.

Secondly, Yamal LNG became significantly short on shipping requiring them early on in the year to secure extra tonnage to plug the gap.

Much attention is given to Yamal LNG's specialised fleet that can travel through ice 2.1 metres thick, less attention has been given to the conventional fleet needed by Yamal.

The specialised fleet allows year-round access to the port of Sabetta, and seasonal access eastwards along the Northern Sea Route (NSR) to northeast Asia. However, use of the NSR, which was billed as a fundamental pillar of the project's strategy to reduce distance and time to Asian markets, has been limited.

This is partly down to production coming online much sooner and much stronger than had been planned. With only half its specialised fleet out of the shipyard and in service, it needed these vessels to perform quicker round trips, thereby exerting greater pressure on its conventional fleet.

Of the 101 loadings from Yamal LNG in Sabetta since train 1 started up, only four cargoes have crossed the NSR, each one going to China in 19-24 days. The rest have gone westwards with about half of those being trans-shipped at northwest European ports for onward transportation and the other half being discharged into European terminal tanks either for local consumption or re-export at a later date.

It has taken on average just under 10 days to bring volumes from Yamal to northwest Europe to be transhipped.

The average observed onward journey time from northwest Europe to China is 43 days. More globally the average onward journey is 22.4 days. Factoring in a day for the trans-shipment itself, a day for the initial load and a day for the final discharge and the average round trip for this operation becomes almost 70 days (22 for the specialised fleet, 47 for the conventional fleet). The shipping capacity needed to absorb these journeys is significant.

Destination flexibility is often associated with US volumes, but as so much LNG from Yamal has been sold on a spot basis, Yamal volumes, either trans-shipped in Europe or direct from Sabetta, have ended up in 36 terminals across 17 countries.

Price has been a key driver with Yamal volumes going to where the signals have been the strongest. About two thirds of trans-shipped Yamal volumes have ended in East Asia and the Middle East, India-Pakistan regions.

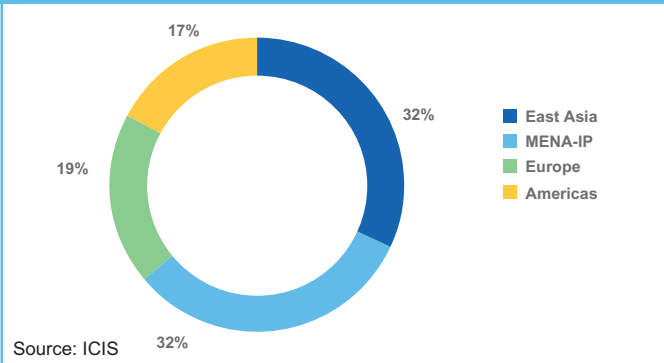
ROUTES CARRYING YAMAL VOLUMES FROM SABETTA AND TRANS-SHIPPED FROM NW EUROPE



Source: ICIS

Except for four China-bound laden transits of the Northern Sea Route, all Yamal volumes delivered outside of Europe have been either trans-shipped or reloaded from Europe.

ONWARD VOYAGES FROM YAMAL STS



The longest onward journey from a Yamal transshipment was almost four times the average – Kita LNG took 80 days, leaving Montoir, France, on 12 September and arriving at Naoetsu, Japan, on 1 December. The story behind that cargo, and others like it, is the subject of the floating length section.

VARIABLE US DISTANCE AND TIME TO MARKET

The rise of destination-flexible US volumes is not a particularly new trend given Sabine Pass started exports in March 2016 but the US has been, and will continue to be the biggest source of global LNG production growth over the coming 24 months. Analysing the variability in its shipping times over recent seasons can provide some guidance for the behaviour of destination-flexible LNG globally.

US volumes have travelled to 31 countries, and like Yamal even keeping destination constant there is often more than one route ships can take in order to make that destination.

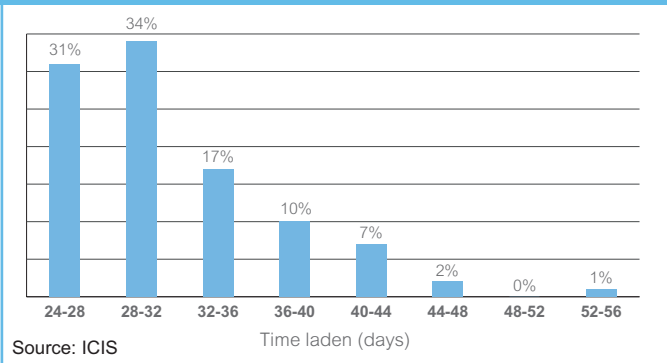
More broadly, whether US LNG heads to east Asia rather than Europe is important because it can take up to three times the amount of ships to transport the same volume to Asia as it does to Europe.

Europe is closer to the US Gulf than east Asia, so the time it takes to travel to Europe and back to the US to load is much shorter.

It takes 12 days to cross the Atlantic to western Europe, add a day to load and discharge, and a round trip becomes 26 days. This means a vessel can do 14 round trips in a year, and if it delivers 71,500 tonnes with every shipment (equivalent 165,000cbm), it will have delivered 1m tonnes.

It can take double this time for a round trip to east Asia although historical data shows it often takes nearer to triple this time. Of almost 200 deliveries from the US to east Asia, 31% took less than 28 days, 65% took less than 32 days, while 35% took more than 32 days.

DAYS TAKEN FROM US TO EAST ASIA

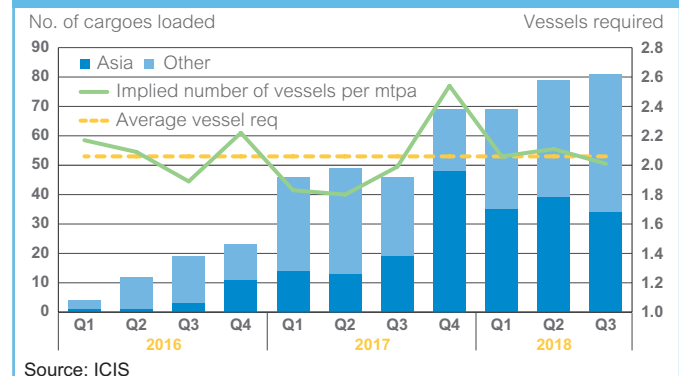


All voyages of less than 32 days took the Panama Canal route while most voyages of more than 36 days did not take the Panama Canal.

On average, since 2016 to the end of the third quarter of 2018, it has taken the equivalent of two vessels per mtpa to take US LNG to its end markets around the world. However, over time this number fluctuates from 1.8 to 2.5 depending on which end markets vessels take their cargoes.

Both of the past peaks in the US shipping requirement occurred in the fourth quarter of 2016 and 2017. In 2017, 70% of the approximately 70 cargoes loaded in that quarter ended in Asia. That was US LNG following where the highest price bids were coming from. As we entered March 2018, the Asian thirst for LNG started to come off. Demand in Asia typically subsides in the shoulder months so it then becomes how the wider LNG market chooses which supplies are the most competitive. Australian LNG is guaranteed market share in Asia given its long term contracts as well as its shorter shipping distance, but there has been room for US LNG to be priced competitively in Asia throughout the year, it is just comparatively less than during off-peak Asian demand seasons.

QUANTIFYING VARIABLE US SHIP DEMAND

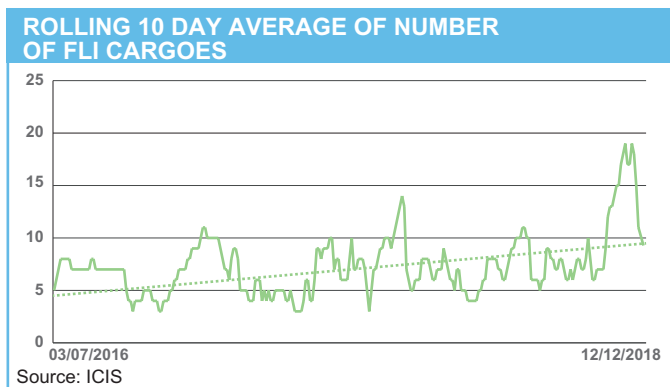


FLOATING LENGTH

There can be a number of reasons, both operational and commercial, why vessels take longer than usual to discharge. In some cases, it can simply be natural slack in a delivery program requiring vessels to wait before discharging.

However, since the end of September 2018 the LNG Edge floating length indicator has picked up its first sustained period of unusually high numbers of cargoes seemingly waiting without a firm destination.

The indicator has been scanning the fleet since the start of July 2016. The graph below plots a rolling 10 day average of the number of cargoes captured by the indicator.



The number mostly fluctuates between 5-10, rising above 10 only three times in October 2016, November 2017 and May 2018, all for relatively brief spells before a prolonged period above the 10 mark since the end of September until the beginning of December. The indicator reached a peak of 21 in mid-November and in the first half of December has seen the 10 day average mostly hover just under 10.

The recent peak appears to have been driven, at least initially, by traders pursuing better returns during a period of contango that had been present in the east Asian market some time beforehand. However, bottlenecks at receiving terminals operating above nameplate capacity, particularly in China, also contributed, prompting some speculation as to whether certain traders were waiting intentionally for their secured delivery slot, or waiting more nervously for previously less firm buy side indications to become firm. Some buyers may have purchased at a premium to allow flexibility to change delivery location at late notice.

The first signs of contango over the front months appeared in the ICIS East Asia Index already in July with the October-November contango hitting a high of \$0.95/MMBtu in September, and the front months' contango in October

rising above \$1.00/MMBtu, even reaching \$2.00/MMBtu on one day, before coming down to \$0.60/MMBtu. By mid-November with the number of floating cargoes staying buoyant and increasing length on the back of strong global LNG production rates, the January and February contango started to close and turned into backwardation by 21 November.

Contango in the LNG markets is nothing new but the ability and desire to capture that incremental value by keeping volumes on the water for a prolonged period is a strategy historically more akin to the oil markets than the LNG markets.

The physical nature of LNG with cargo boiling off and changing quality in tank over time, as well as the lack of depth in liquidity in the traded markets have all historically made this type of play more difficult in the past. While cargo ageing remains a concern, today's new LNG ships with boil off rates as low as 0.05%/day, as well as the increasing number of counterparties actively trading, have helped mitigate previous barriers to facilitate this new style of trade.

Whether a ship is modern with boil off at or below 0.1%/day, can be an indicator on the intention behind the cargo. If a trader had sold the cargo with the intention of first keeping it on the water for more than two months before discharge, the trader would likely have used a modern vessel. Vessels that have waited have ranged from 1993-builds to 2018-builds, indicating a wide range of trading intentions.

Whatever the intention, increased numbers of vessels waiting with cargo on board has been soaking up shipping capacity. By storing cargo rather than simply transport and discharge, vessels are prevented from loading their next cargo until potentially many months down the line.

“ Floating storage can have the same potential swing factor on ship demand as the European and east Asian destination optionality of US LNG

Considering it can triple round trip durations, on a cargo by cargo basis, floating storage can have the same potential swing factor on ship demand as the European and east Asian destination optionality of US LNG.

The longest laden voyage in 2018 has been 83 days – leaving Montoir on 19 September and arriving at Incheon on 12 December.

In the final quarter of 2018, 13 other ships have taken more than 50 days to travel from their load ports to discharge terminals, some covering relatively short distances such as Papua New Guinea to Japan. This equates to approximately 1m tonnes of LNG.

The scarcity of ships on the market at this time resulted in record prompt charter rates, expensive ballast repositioning of vessels from the Atlantic to the Pacific, and plans being forced to change from DES to FOB as some market participants could no longer feasibly include shipping.

LOOKING AHEAD

All three of the above trends will evolve in tandem with price signals from the market but there are changes independent of price drivers both in Yamal shipping logistics and US LNG production, as well as a continued stream of newbuild LNG carriers entering service adding to overall ship supply.

The final specialised Yamal LNG carrier is expected to be delivered from the shipyard towards the end of November 2019. From this point, Yamal LNG would have all 15 of its specialised vessels capable of year-round access to and from Sabetta. Up to now it has mainly used seven specialised vessels to lift from Sabetta, although it loaded its eighth at the beginning of December, and its latest delivery from the shipyard – its ninth specialised vessel – is currently on its way to Yamal.

Once it has its full specialised fleet in service, Yamal LNG will be able to deliver more volumes through the NSR, as

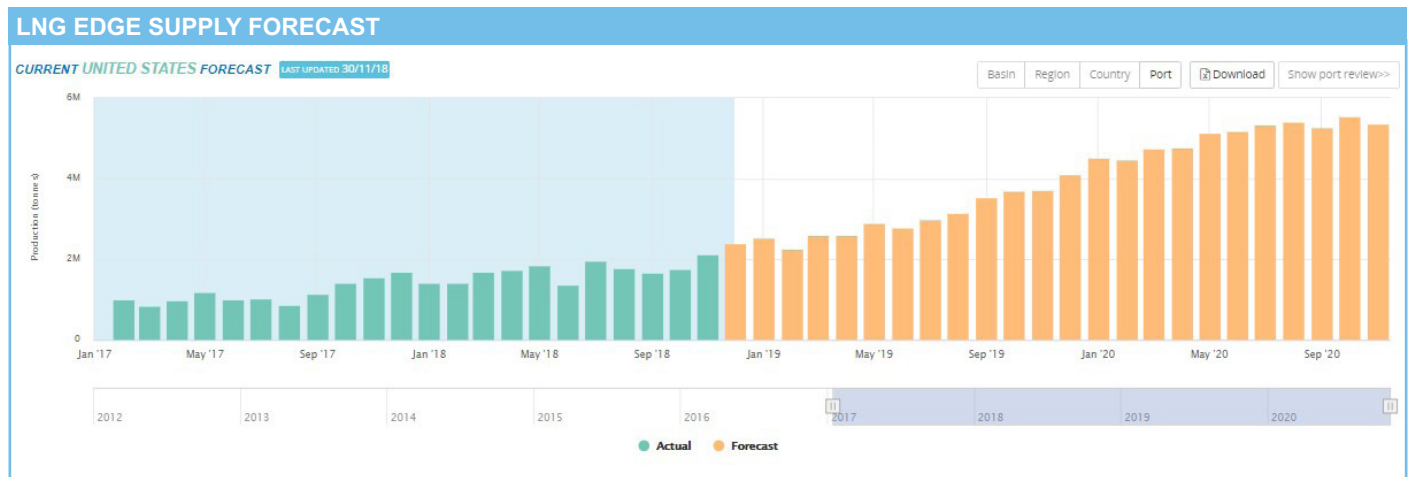
intended. The first full season in which it could use NSR as such would therefore be from late June to December 2020. The NSR at this stage could halve voyage times to Asian end markets and reduce Yamal LNG's demand for conventional tonnage.

Over the first half of 2019, transshipments are expected to be concentrated in northern Norway, but from 1 July 2019, a 20-year contract for transshipment services at Zeebrugge, Belgium, is slated to begin. The agreement paved the way for investment into a fifth storage tank at Zeebrugge, which will make the transfer of Yamal volumes more flexible, allowing for ship-storage-ship transfers, and not require two LNG carriers to be moored at the terminal simultaneously.

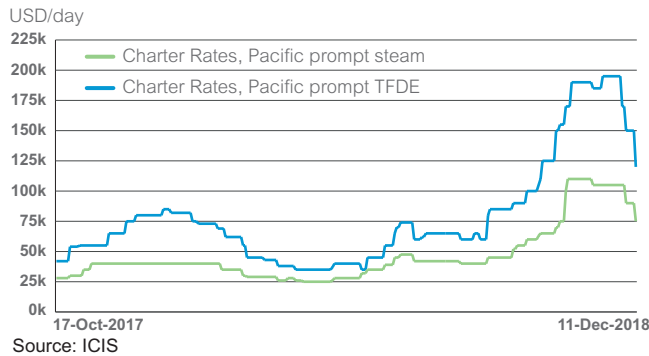
The second half of 2019 is therefore likely to already see some easing of Yamal LNG conventional shipping requirements as a) greater use of northwest Europe shortens distances relative to northern Norway, and b) reduces the need or risk for vessels to wait for shipments from Yamal, and c) by this stage the specialised fleet should already be almost 90% complete and the NSR should be open.

In the US, production is currently ramping up from Sabine Pass train 5 and Corpus Christi train 1, both 4.5mtpa trains.

There is a further 30mtpa of US Gulf liquefaction capacity expected to be brought onstream throughout 2019 helping propel total monthly US production levels above 5m tonnes by May 2020, according to the LNG Edge supply forecast.



PROMPT CHARTER RATE ASSESSMENT – PACIFIC BASIN



Most offtakers of US LNG have secured shipping whether it be from the existing fleet on the water or vessels under construction.

Some gaps may appear between vessel deliveries and the expected start up dates of intended projects. Of greater importance to the shipping balance may be where offtakers decide to take their US volumes. Many cargoes will be traded within and between global short-term portfolios although there could be a rise in volumes headed to Iberia in connection with contracts to Iberdrola, Endesa and possibly Repsol.

Up to 75 vessels are expected to be delivered in 2019 and 2020, of which 24 are currently still deemed uncommitted, mostly in 2020. These vessels will command a premium relative to older tonnage given their efficiencies ultimately drive down unit freight costs, particularly on longer routes.

However, the newbuilds, even speculatively, were not ordered to make up for a lack of land-based storage capacity, they were ordered to transport volumes over variable distances. If vessels once again play the role of floating storage as they have from September to December, that presents a tighter outlook.

The recent tightness in the market has seen a return from lay-up of several older vessels and these vessels are expected to remain competitively priced and used over the period.

Charter rates have fallen to \$110,000/day by mid-December as more vessels have become available and trade economics have recalibrated to a sub \$10.00/MMBtu Asian winter. Meanwhile charter rate assessments for older vessels, as depicted by the green line in the chart, have fallen below \$100,000/day.

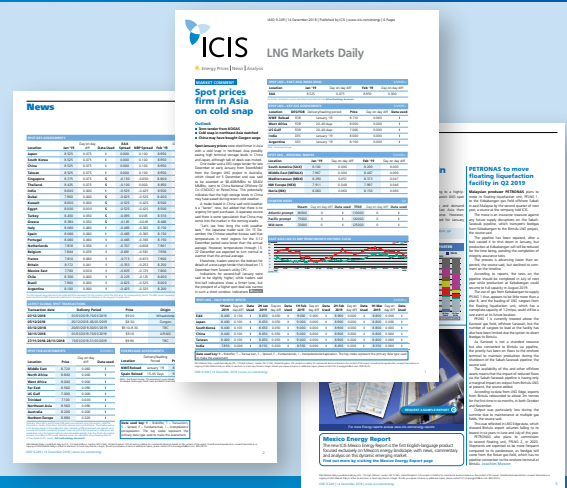
The path ahead for charter rates, as for spot LNG prices more broadly, appears volatile. Although newbuild LNG carriers will support shipping supply, the fact that 53 shipyard deliveries in 2018 did not prevent the rapid rise towards \$200,000/day in the final quarter means the market can return to those dizzying heights once more.

Equally however, much depends on the end destinations of US and Russian LNG. An increasing number of volumes heading to, and staying in Europe, keeping all else constant, would reduce shipping demand. But traders using LNG carriers seasonally like oil tankers to store cargo would increase shipping demand.

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