



LNG

2021: a steady recovery in a new geopolitical context

LNG demand continues to grow at a regular pace with a particular focus on China which is now the world's largest LNG importer for the first time. Accordingly, Chinese LNG imports are expected to exceed 85 m mt in 2022 representing almost 20% of global LNG production.

H-LINE
174,000 cbm LNG carrier delivered at December, 2021 from HSHI.

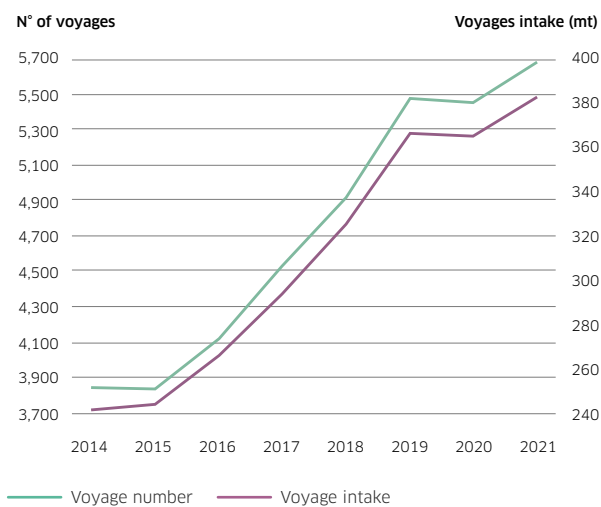
It is interesting to note that LNG is increasingly considered as a geopolitical tool with the signature of several significant long-term sale and purchase agreements between US-based LNG projects and Chinese companies including Unipecc, Sinochem and CNOOC. These agreements were signed against the backdrop of the diplomatic crisis between Australia and China which has led Chinese buyers to search for new sources of supply. At the same time, several Eastern European countries including Poland are reinforcing their LNG Imports from elsewhere, especially the US Gulf, despite the availability of pipeline gas from neighbouring Russia. The high spot rates observed in 2021 will increase the development of new liquefaction projects, especially in Russia and North America, to address the growing demand for LNG in China and Southeast Asia. This new geopolitical situation will undoubtedly increase both the international trade of LNG and associated shipping demand.

LNG TRADE

LNG trade increased by 5% year-on-year in 2021. After numerous cargo cancellations during 2020, LNG trade has now resumed on its pre-pandemic path of steady growth. Accordingly, we anticipate annual growth of 10% in 2022.

During 2021 more than 380 m mt of LNG were loaded onboard LNG Carriers which accounted for 5,653 voyages.

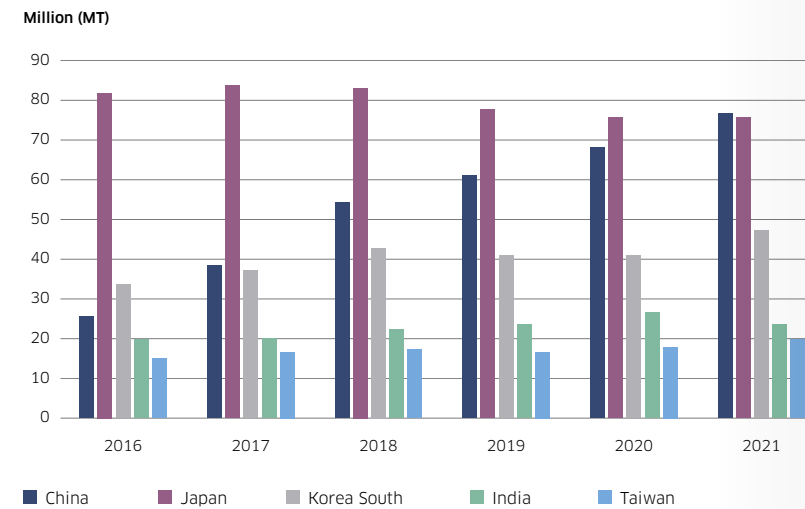
Annual voyage number & LNG intake



64% of global LNG demand was in Asia last year and for the first time, China overtook Japan as the world's top LNG buyer. Indeed, while Japanese imports have slipped slightly over the past couple of years, Chinese imports have continued to increase by 12-13% annually over the last 3 years.

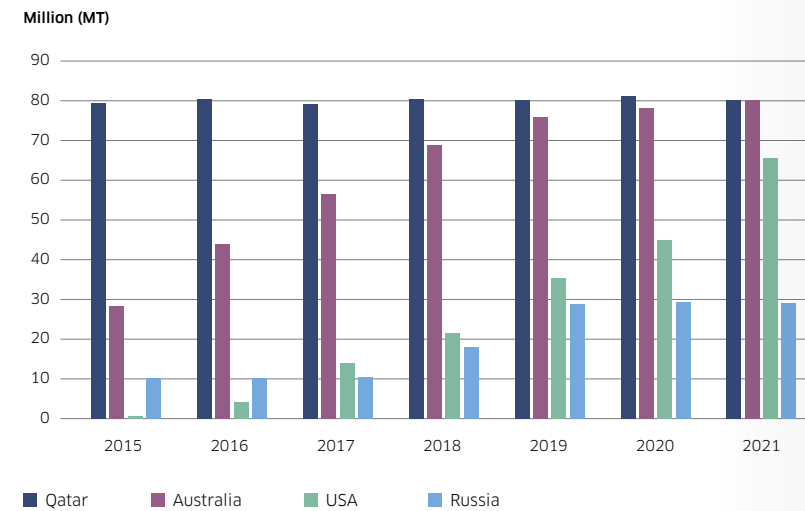
Global LNG trade has also been supported by Chinese demand rising to around 77 m mt per year, an unprecedented level which represents double its imports in 2017. More than 30 m mt of the LNG imported by China last year originated from Australia, almost the same level as in 2020.

Main LNG importers



Australia edged Qatar as the world's largest LNG exporter in 2021. Meanwhile, the US saw the largest increase in exports as volumes ballooned by 45%.

Main LNG exporters

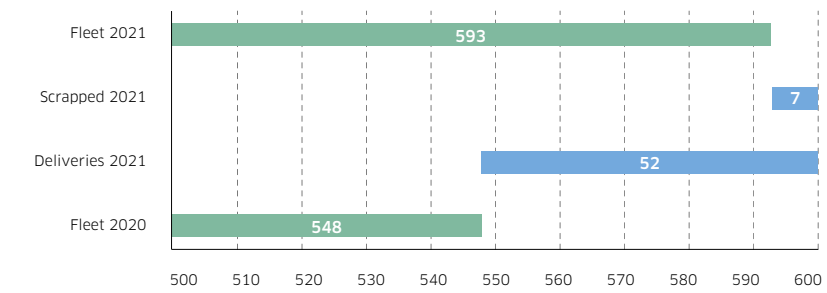


LNG exports from the globe's major suppliers increased last year. The three major LNG exporters (Qatar, Australia and the US) which together account for more than 60% of global LNG production have steadily increased their exports over the last three years, and with it their share of global volumes. LNG exports from the US now represents almost 70 m mt per year which is double its 2019 production level.

THE FLEET

By end-2021, the fleet of large LNG Carriers stood at 593 units representing annual growth of 8%. Last year, 52 vessels were delivered and 7 were scrapped.

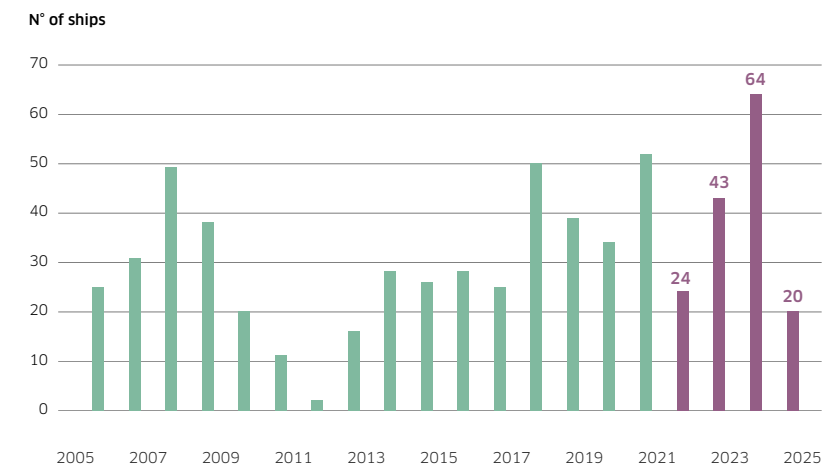
LNG carrier Fleet evolution in 2021



The vessels scrapped in 2021, as in 2020, were old ladies built between 1977 and 1997, with a capacity between a 125,000 cbm to 128,000 cbm (5 Moss type and 2 Membrane type).

Deliveries in 2022 will be towards the bottom of the historical range with only 24 units scheduled, which reflects low ordering activity in 2020. The orderbook extends out to 2025 with at least 20 deliveries. With a record number of orders placed in 2021, and with the slots reserved by QatarEnergy for the renewal of their fleet as well as the expansion of their new terminals, and Total for Mozambique, South Korean and Chinese yards have very few slots remaining for 2025 and obviously 2024 is already full.

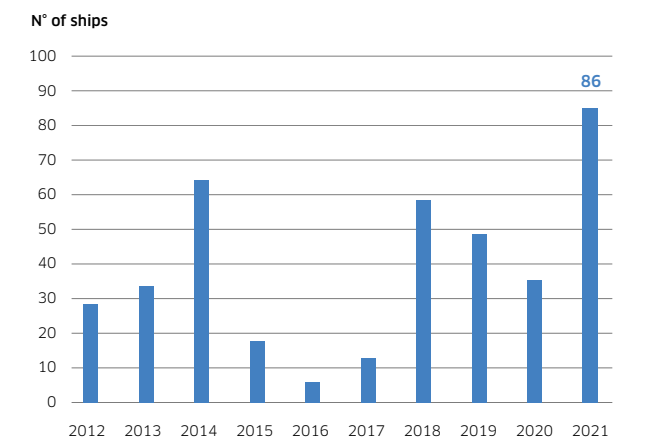
Conventional LNG carriers deliveries and orderbook



LNG carriers new orders

86 large LNG carriers were ordered in 2021, an all-time record. Whereas all orders placed in 2020 were linked to a specific project and/or a long-term contract with a major oil and gas company, 2021 shows a different attitude. Encouraged by the surging prices of newbuildings, shipowners declared their options or decided to place new orders, on a speculative basis which totalled 19 orders.

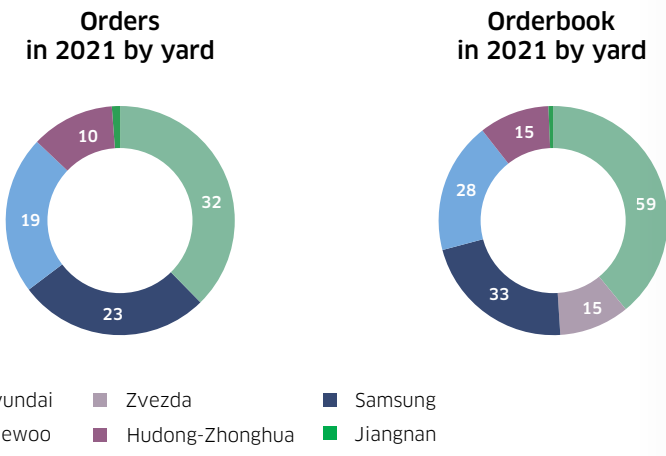
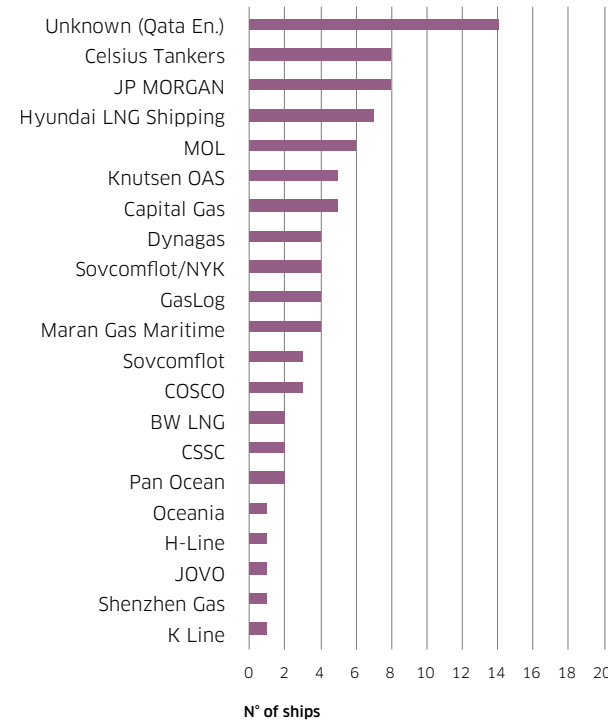
LNG carriers orders



Hyundai Heavy Industries accounted for more than 35% of the orders placed last year and so remains the yard with the largest orderbook with 59 LNG carriers on order (39% of the global orderbook). Then follows, Samsung Heavy Industries and Daewoo which have both registered a similar number of orders, with 23 and 19 orders, respectively. 10 orders were placed at Hudong-Zonghua in 2021, among them, 4 for QatarEnergy and 5 for Chinese owners.

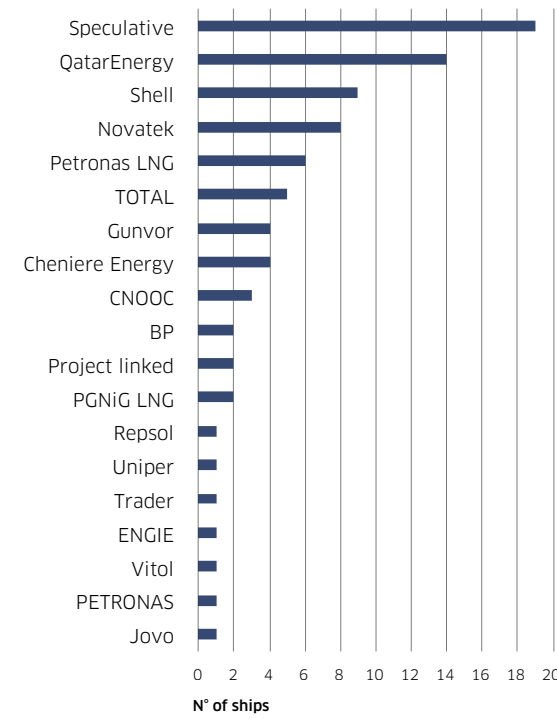
86 large LNG carriers were ordered in 2021, an all-time record

Owners of 2021 orders

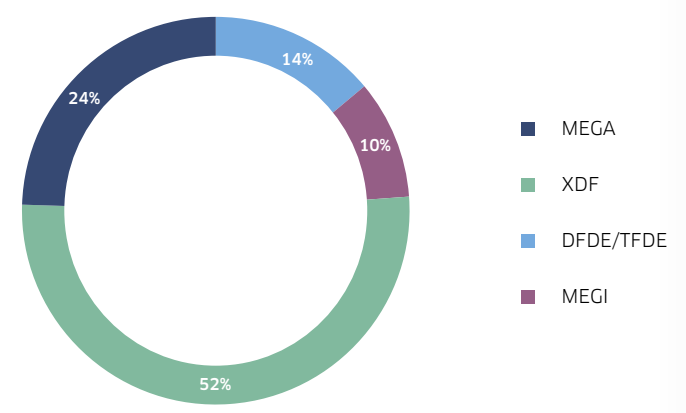


Last year we noticed that the share of the current orderbook to be fitted with XDF slow speed two stroke engine-based propulsion rose to 70%, at the expense of the MEGI-based propulsion. 2021 has seen the spectacular emergence of the new MAN low pressure two stroke engine-based propulsion – the MEGA. Launched mid-2021, the MEGA accounted for 43% of orders placed in 2021 and 24% of the current orderbook, with 37 LNG carriers set to be equipped with the technology.

Charterers of 2021 orders



LNG carriers on order by engine type



The LNG Shipbuilding market saw a very hectic year in 2021. The price level for a 174,000 cbm LNG carrier built to the most modern standards, with slow speed diesel engine-based propulsion, a 0.085% boil-off rate and a reliquefaction/subcooling unit started in the range of \$180 -190 million until May 2021 and reached \$215-220 million by end-2021. As expected, the Qatari project has provoked a bottleneck for LNG carrier deliveries over 2024-25, with 151 berths reserved. Qatar Energy has already placed 14 orders in the four main yards. Total still hold 16 slots at Hyundai and Samsung, with these options to be declared in March 2022.

LNG Carriers Forecast

By 2031, 202 LNG carriers are required to meet the 5% projected annual increase in LNG demand. This forecast takes into account:

- the current orderbook
- vessels scrapped > 40years
- the speed reduction of steam turbine vessels (ST) to fulfil IMO CO2 emission regulations

As of 1st January 2022, 134 mtpa of export capacity is under construction. This implies that there is a need for 173 standard LNG carriers.

Terminals	Region	Start up expected	Export capacity mtpa	Gross fleet requirement
Sengkang LNG Train 1	SEA	2023	0.5	0.3
Portovaya LNG (FSU)	Baltic	2022	1.5	1.4
Tangguh LNG Train 3	SEA	2022	3.8	2.1
Tortue West Ahmeyim 1 (FLNG)	WAF	2024	2.5	3.2
Coral South 1 (FLNG)	EAF	2023	3.4	4.7
Calcasieu Pass LNG	USGC	2022	10.0	13.1
Arctic 2 LNG Train 1	Yamal	2023	6.6	8.2
Sabine Pass Train 6	USGC	2022	4.5	5.9
LNG Canada	WCAN	2025	14.0	17.0
Mozambique LNG	EAF	2026	12.9	17.9
Nigeria LNG Train 7	WAF	2024	7.6	9.9
Arctic 2 LNG Train 2	Yamal	2025	6.6	8.2
Golden Pass LNG Train 1	USGC	2025	5.2	6.8
Golden Pass LNG Train 2	USGC	2025	5.2	6.8
Golden Pass LNG Train 3	USGC	2025	5.2	6.8
Arctic 2 LNG Train 3	Yamal	2025	6.6	8.2
Energia Costa Azul	WCAN	2024	2.5	3.0
Pluto LNG Expansion	SEA	2026	4.5	2.5
North Field LNG Expansion Train 1	ME	2025	7.8	10.9
North Field LNG Expansion Train 2	ME	2026	7.8	10.9
North Field LNG Expansion Train 3	ME	2026	7.8	10.9
North Field LNG Expansion Train 4	ME	2027	7.8	10.9
Total			134	173

Proposed LNG terminal capacity to meet the forecast 5% annual increase in LNG demand over 2022-31 totals 106 mtpa. This would require an extra 138 standard LNG carriers.

In total, LNG export capacity under construction and that proposed would imply a need for 311 extra standard LNG carriers.

Among them, 151 vessels have already been ordered.

However, 13 vessels above 40 years old up to 2031 are expected to be scrapped. Besides, due to the new IMO regulations being introduced in 2023, the steam turbine fleet will have to reduce their speed. This speed reduction implies a need for 29 new standard LNG carriers.

Therefore the net requirement from 2022 to 2031 will be 202 LNG carriers, equivalent to 29 vessels ordered each year over the next 7 years.

STATUS OF TERMINAL	Export Capacity mtpa	Fleet requirement #
Under construction	134	173
Proposed	106	138
TOTAL U/C & PROPOSED	240	311

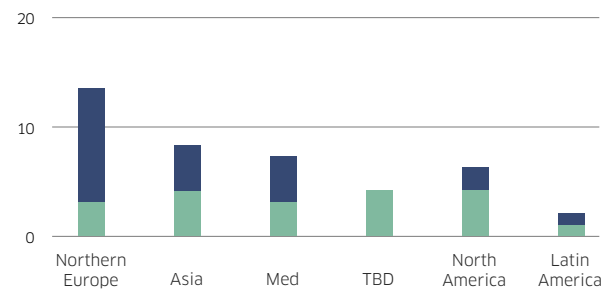
FLEET BALANCE	Vessel #
Orderbook	-151
<i>at end Dec 2021</i>	
Expected scrapped vessels	+13
Impact of speed reduction <i>(17kn to 14kn) of ST on the fleet requirement (202# of c. 135k cbm)</i>	+29
Net Fleet Requirement	202

By 2031, 202 LNG carriers are required to meet the 5% projected annual increase in LNG demand

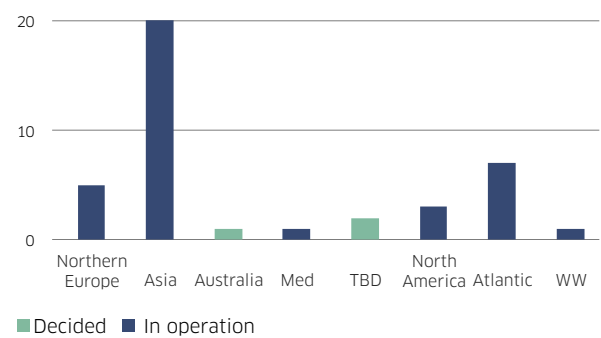
Small Scale LNG

Small scale LNG either for feedering operations or for LNG bunkering purposes has seen strong momentum in 2021 as 12 orders (including 2 LOI by Kanfer) were placed with yards. 21 LNG bunkering vessels are currently in operation while another 19 are under construction. In addition to these vessels, 37 small-scale LNG carriers are in operation with 3 under construction. These LNG feeders can perform bunkering operations but are not equipped with specific bunkering systems.

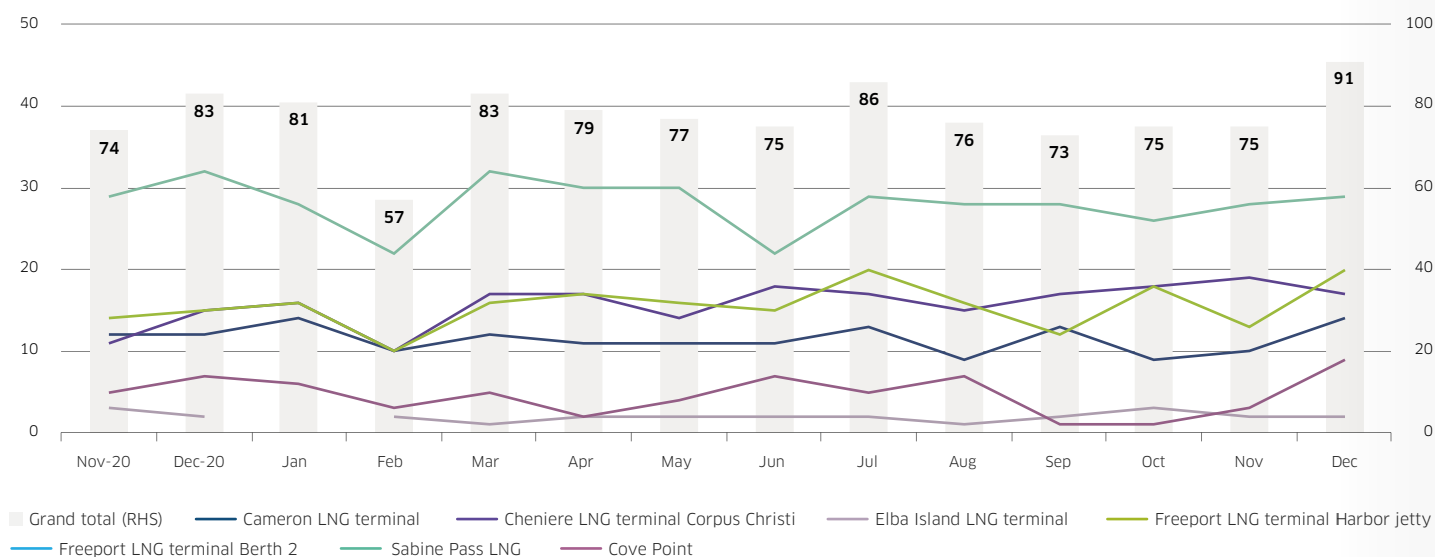
LNG bunkering vessels



LNG feeder vessels



LNG cargoes lifted from US in 2021



THE CHARTER MARKET

LNG prices

Last year was marked by a significant increase in LNG prices compared with 2020. It was led by the dovetailing of rising energy needs against a backdrop of companies encountering difficulties in increasing supply. On one hand, the rising energy requirements are explained by a cold and long winter of 2020-21 in Europe and in Asia and by the rapid restart of the economy after the Covid crisis in 2020. On the other hand, numerous incidents in gas producing and exporting countries such as maintenance, fires, shortages, diplomatic tensions and electricity production issues triggered a squeeze in world LNG supply.

The year was also characterised by increased competition for gas supplies between Europe and Asia. The latter captured a growing share of LNG imports to the detriment of the former. China has now overtaken Japan as the world's largest LNG importer, while European LNG imports fell by 35% in 3Q21. Meanwhile, China's pipeline gas imports from Russia, Turkmenistan and Kazakhstan increased. Simultaneously, Russia delivered only contractual volumes to Europe, thereby failing to deliver incremental volumes despite firmer European natural gas demand.

The first semester of 2021 was characterised by unseasonably high Asian LNG prices which took strength by post-winter restocking and higher European natural gas prices. Higher than usual (for the season) TTF prices were driven upwards by high carbon prices which promoted natural gas over coal in the power generation sector while further support came from summer injections into European storage. Other bullish momentum stemmed from the shutdown of Hammerfest LNG, the Suez Canal blockage, Australian floods, a fire on one Russian gas pipeline, maintenance in Oman, Qatar, Malaysia and the US.

The second semester saw some particularly notable moves. JKM and NWE prices continued to soar and by end-September stood above \$30/MMBtu, around 6 times and 5 times higher than end-March prices, respectively.



JKM prices hit a record high on 6 October at \$56.3/MMBtu, \$16.65/MMBtu above the previous day. However, prices plunged by \$20.7/MMBtu the next day. Northwest European prices reached a record high of \$58.6/MMBtu on 21 December. Price increases in 3Q21 and 4Q21 were not only driven by normal seasonal demand and restocking ahead of winter but also by continuous strong post-Covid demand and persistent tight supply in the wake of difficulties across the LNG supply chain. Nevertheless, in a rare move, as of 14 December, NWE prices stood above JKM prices. This is explained by low European gas inventories at end-4Q21 which combined with temperatures which dropped to well below normal seasonal levels in late November and early December, led to an acceleration in gas storage withdrawals. Moreover, a vigorous winter in Russia could encourage the country to keep nominating no pipeline gas to Europe for an indefinite period. On the contrary, Asian buyers, such as Korea and China, have high inventory levels to face winter 2021-2022.

Charter rates

In March rates slumped sharply after peaking during the winter. Rates were rangebound around \$30,000/day for a 160,000 TDFE and around \$25,000/day for a 140,000 steam turbine.

The second quarter is usually a cyclically low period during the calendar year for LNG spot shipping, as Q2 is historically lower than Q1, Q3 and the peak Q4 period. Similar to 2019, the 2020 LNG spot shipping market showed a similar pattern, with prices falling from an average of \$90,000/day at the start of the year toward a year-to-date low in the mid-to-high \$30,000s/day across both basins by early-March. Nevertheless, stronger than usual demand in 2Q21, led to very busy shipping activity and higher-than-expected rates for the season, despite the relets of portfolio players and the delivery of 27 newbuildings during the first semester. Around 12 mid-term deals were contracted in April, usually one of the least active months. Rates increased for a 160,000 TDFE from \$70,000/day in mid-May to \$75,000/day end-June; for a two-stroke from \$83,000/day to \$86,000/day. However, rates decreased for a steam turbine from \$55,000/day to \$50,000/day.

During 3Q21, LNG prices hit record highs ahead of the northern hemisphere winter peak demand season, but charter rates did not increase. The main explanation was the lack of LNG available to be moved due to strong demand and numerous incidents in the LNG world supply chain. 3Q21 rates were stagnant, around mid-\$60,000/day for a 160,000 TDFE, around \$80,000/day for a two-stroke, and around \$50,000/day for a steam turbine vessel.

4Q21 rates saw a steep increase from early October, from \$60,000/day to a record of around \$300,000/day for a 160,000 TDFE, reached in early December. Rates rose amid increased levels of spot activity, encouraged by a steep contango, and Panama Canal congestion. Constraints in the Panama Canal for LNG carriers transiting without reservations, increased ton-mile demand, as the tankers were diverted via Cape Horn, or waited for around 9 days to transit the canal.

After mid-December, rates slumped to stand at \$80,000/day by the end of the month for a 160,000 TDFE, around \$100,000/day for a two-stroke, and around \$40,000/day for a steam turbine. The downward trend was driven by easing congestion at the Panama Canal which reduced ton-mile demand, as well as milder temperatures and less demand from Asia.

Conclusion

2021 has been quite active and might be considered as a "year of recovery" after the pandemic. The major Qatari Project has been launched and will impact LNG shipping activity. Some large LNG projects expected to be announced in 2021 were postponed but will resume in the coming years as LNG demand continues to grow. LNG has a promising future as one of the cleanest available sources of energy, which is reflected by the continuous increase in LNG supply and demand. Associated seaborne transportation reflects not only the increase in volumes needed to be transported but also the increase in the ton-mile structure of the LNG trade patterns which, in turn, is leading the unprecedented demand for LNG carriers and an increase in shipping activity.