

LNG Shipping News

AN LNG JOURNAL TITLE ON LNG CARRIERS

22 August 2019

FSRU players look to small and medium scale markets

Numerous FSRU projects are being developed worldwide and prospects remain strong.

This is particularly true in Asia, the Middle East, Africa and South America, according to Tor-Ivar Guttuilsrød, Director FSRU & FLNG, ABS Global Gas Solution, writing in Gastech Insight.

With the number of projects in progress set to rise as demand for LNG rises, the business case for the supply of LNG on a small scale is attracting more attention.

Similar to full scale FSRUs, small scale projects are challenged in a number of ways. While a full scale project will require a proven business case, small scale endeavours also need to balance risks around national legislation, baseload cargo volumes and whether the supply economics provide the necessary return on a smaller scale. A small scale opportunity could also be an extension of a larger scale project, he said.

In the large FSRU market, an emerging trend is towards asset ownership rather than chartering in the units required, for economic reasons or possibly political ones. Project owners might charter tonnage while units are under construction but the longer term strategy is to maximise return on investment by owning the FSRU, as well as associated storage vessels, which follows the trend set in the FPSO market.

Among notable small scale projects, the Bali LNG terminal comprising a floating regasification barge and a 26,000 cu m FSU was an early mover and has been operational since 2016. Exmar had ordered speculatively rather than against specific projects but still



Could we see more floating units built for small scale operations?

secured long term charters while FIDs are awaited or local regulations to permit the use of floating power supply in national waters.

Further vessels are under construction in China for potential end-users in South America and an energy major is understood to be tendering for small scale regas units for the same location.

Indonesia

Elsewhere, a tender for small scale energy provision in Indonesia, including regas units and storage barges, has been offered on more than one occasion but thus far has failed to materialise. Indonesia has around 7,000 islands that have a need for electricity and for these locations LNG is the logical answer, being cheaper and cleaner than coal-fired alternatives, as well as offering greater versatility as it can also be used as a local transport fuel.

The question of the unit cost for which the supplier can deliver LNG is not straightforward. Whether selling gas on a MMBtu or per tonne basis the infrastructure and transport costs are not linear and therefore can be a challenge to achieve the necessary delivered price, he warned.

Operators must also navigate local conditions since power markets can be subject to regulation,

users sensitive to price fluctuations and national laws may impact the ability to operate some types of vessels offshore.

Asian markets, as well as the Southern Hemisphere or the Caribbean are still suitable for small scale LNG but the relationship has to be based on long term government commitment and access to finance.

In technical terms, there is not a huge difference between classing a full scale FSRU and a small scale unit, though smaller units can be more complex in execution.

One issue is that only certain yards can build units of the required complexity. These tend to be in South Korea or China, where ABS has multi-decade experience in classing some of the world's most advanced LNGCs. Of current full scale FSRU projects, ABS is classing a 170,000 cu m unit currently under construction for Turkish operator Botas at Hyundai Heavy Industries and Dynagas' FSRU under construction at Hudong-Zhonghua in China.

With the era of the very big floating E&P gas projects coming to an end, there is some doubt as to LNG's role in de-carbonisation. Most governments have identified LNG as part of the solution but others see it more as a transition fuel, at least until renewables are established at affordable prices. ■

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Australian state to fast track LNG import terminal review

EPIK's Newcastle GasDock project has received Critical State Significant Infrastructure (CSSI) status from New South Wales Minister for Planning and Public Spaces, the Hon Rob Stokes MP.

The announcement by Acting Premier John Barilaro and Minister Stokes recognises the need to significantly increase local gas supply, promote competition between suppliers and put downward pressure on the State's gas prices.

Port of Newcastle CEO Craig Carmody said: "This is a critical future-proofing project for the region. Projects such as the EPIK Newcastle GasDock project open a number of new trade opportuni-

ties, develop capability and support businesses and jobs across the Hunter Region and around New South Wales."

The project - proposed by South Korean group EPIK - involves the use of a 170,000 cu m FSRU, which will connect to a new jetty planned to be built on port land at Kooragang Island, enabling it to join the existing East Coast natural gas network.

Carmody congratulated EPIK on

the significant milestone as the company works towards a final investment decision (FID) early next year with an estimated direct on-shore investment of up to AU\$250 mill at the port.

"Port of Newcastle has been a global trade gateway for more than 220 years and this project introduces new trade and economic growth opportunities for the region and NSW," he said. "Newcastle has much to offer, including a deepwater shipping channel operating at 50% of its capacity, significant port land available and enviable access to national infrastructure such as rail and road."

EPIK Founder and Managing Director, Jee Yoon, said the company was pleased with the project's momentum. "EPIK's primary objective is to deliver the most competitive infrastructure solution for natural gas imports into NSW," Yoon said.

"With CSSI status in hand, we are a considerable step closer to delivering the critical infrastructure needed to bring new energy to NSW, providing access to long-term, competitive gas supply to the region, safely powering our homes, driving industry forward and keeping prices low for everyone to enjoy.

"Newcastle was chosen because of its strategic location proximate to significant industrial gas and power users, and access into the Sydney Short Term Trading Market, allowing natural gas imported through the Newcastle terminal to reach users throughout NSW and broader southeast Australian market at a competitive price point.

"Port of Newcastle's support, along with that of the broader business and industrial sector, is greatly appreciated and of much value to the project development," he concluded. ■



NSW is to fast track Newcastle's LNG import terminal project

LNG traders hedge winter demand

Earlier this month, traders started to send out enquiries for LNGCs to store or ship gas, as they hedge on winter demand boosting prices for spot cargoes.

Spot cargoes are trading at near record lows, according to industry sources talking with Reuters.

Enquiries were circulating for periods ranging from one month to several months business, which was expected to firm the spot rates, the sources said.

This contango trading is common in oil markets but is considered risky for LNG because of high storage costs and the fact that LNG cargoes evaporate over time.

At least one Japanese trader had circulated an enquiry for 60 days duration to charter an Australian cargo loading in September, a shipbroker said.

Last year, more than 30 vessels globally were deemed to be used as floating storage ahead of winter as traders hedged that demand would increase exponentially such as seen in 2017, however, spot prices subsequently fell due to the mild winter.

This year, an abundance of supply globally from new projects has pushed spot prices to record lows. However, traders are still reported to be cautious, due to the economic uncertainty in today's market.

"While the forward curve (suggests floating storage works), I personally do not think (it) works as ... the cost of hiring ships will go up when there are too many cargoes," a Singapore-based trader told Reuters. ■

NEWS NUDGE

Alaska LNG public meetings

The US Federal Energy Regulatory Commission (FERC) has issued a notice stating that public meetings on the environmental impact of the proposed Alaska LNG project will be held in Utqiagvik and Trap-per Creek (9th September); Nuiqsut and Houston (10th September); Healy and Nikiski (11th September); and Fairbanks and Anchorage (12th September). ■

LNG Shipping News

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Freeport LNG joins the US exporters list

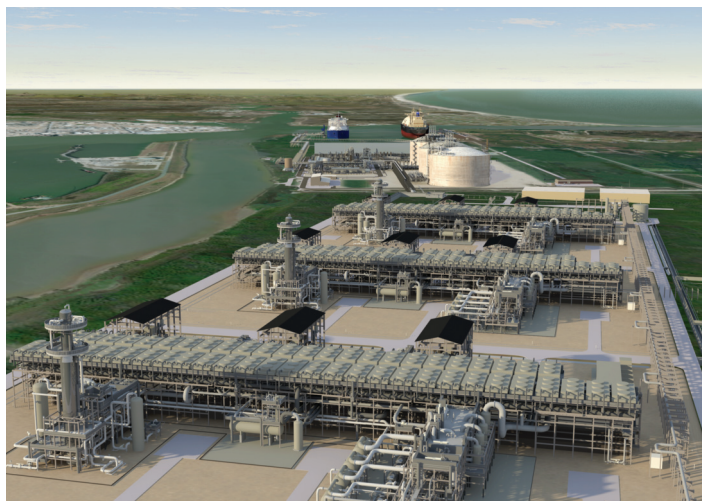
Freeport LNG has become the sixth major US liquefaction facility to start operations.

First LNG production for the project's Train 1 occurred on 12th August, 2019, according to Japanese utility major JERA.

Osaka Gas and JERA are involved in the project through FLNG Liquefaction (FLIQ1). They said that they would continue to work towards commercial operation in the Autumn of this year.

FLIQ1 made its final investment decision (FID) in Train 1 in October, 2014. The project operator is Freeport LNG Development.

After achieving commercial start up, Osaka Gas and JERA will lift half of Train 1's total contracted capacity amounting to about 4.64 mill tonnes per annum, on liquefaction tolling agreements with FLIQ1.



Freeport comes on stream

In addition, both companies will each secure LNG without destination restrictions, diversify their supply sources and price indices, and enhance the stability

and flexibility of their LNG procurement, JERA said.

Ship tracking data showed several LNGCs in the area possibly waiting to load at the facility. ■

BP sets tone for LNG transactions

BP has claimed to be first major oil and gas business to publish its LNG Master Sale and Purchase Agreement template for delivered ex-ship and free on board transactions (BP DES and FOB LNG MSA).

BP DES and FOB LNG MSA allow either party to buy or sell physical LNG cargoes on a delivered ex-ship and free on board basis, respectively.

As BP operates an established LNG portfolio, both buying and selling LNG, the BP DES and FOB LNG MSA were developed over many years to be balanced and fair between buyers and sellers. BP expects that their publication will contribute to the broader discussion around standardisation and liquidity for LNG transactions.

They have also been refined over time to reflect current industry standards. As with BP's General Terms & Conditions for Sales and Purchases of Crude Oil and Petroleum Products (GT&Cs), the BP DES and FOB LNG MSA will continue to evolve with developments in the LNG industry, BP said. ■

Shenzhen Gas launches new terminal

Chinese city-gas distributor Shenzhen Gas was due to open its first fully-owned LNG import terminal this week.

Qiu Lihua, general manager of Sino-Benny, a subsidiary of Shenzhen Gas that operates the terminal, told Reuters that the new facility at Yantian has an annual capacity of 800,000 tonnes of LNG.

"This will be our own facility that will be connected to the existing municipal grid that takes in piped gas from CNOOC and PetroChina," Qiu told the newswire.

The new LNG berth and an

80,000 cu m storage tank have been built next to an LPG import facility also operated by Sino-Benny.

The first cargo of 65,000 cu m of LNG is due to arrive at Yantian this Sunday, supplied by Italy's ENI. Qiu said his company is exploring taking regular supplies under a term contract of three to five years.

"As our berth is not of a standard size, we can't really rely on random spot supplies, as the car-

goes available may not fit our berth," he explained.

The terminal is located about 10 km from the larger CNOOC-operated Dapeng LNG terminal, in which Shenzhen Gas has a minority stake.

Qiu said he expected natural gas demand in Shenzhen, bordering Hong Kong, to maintain double-digit growth in the coming few years, led by residential use and power generation. ■

NEWS NUDGE

Teekay takes delivery of fourth Arc 7

Named after a famous Soviet sea captain, Teekay recently took delivery of the 'Vladimir Voronin', the fourth in the series of six Arc 7 newbuildings.

The vessels are being built by Daewoo and the latest delivery was completed under the ship-

building contract in international waters off the Russian coast.

Like her sisterships, she will operate for Yamal LNG export project loading gas at Sabetta.

MOL extends partnership with CSET to cover LNGCs and ethane carriers

On 6th August, 2019, Mitsui OSK Lines (MOL) and COSCO SHIPPING Energy Transportation (CSET), a

subsidiary of China COSCO Shipping Corp, signed a MOU to further develop the joint co-operation between the two organisations, for future LNGC and ethane carrier projects.

For more than 10 years, MOL and CSET have jointly participated in various ongoing projects, namely

the ExxonMobil DES project, Australia Pacific LNG project and the Yamal LNG project. ■



The signing ceremony

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Calcasieu Pass is fully financed

Venture Global LNG has closed its Calcasieu Pass LNG facility and associated TransCameron pipeline project financing.

The proceeds of the debt and equity financing fully fund the balance of the construction and commissioning of Calcasieu Pass. Full site construction has been underway since February, 2019, and the project is expected to reach its commercial operations date (COD) in 2022, the company said.

Stonepeak Infrastructure Partners has provided a \$1.3 bill equity investment for the project. The lender group for the company's \$5.8 bill construction financing includes leading Asian, European and North American project finance banks.

The lenders who provided funding at closing are Banco Santander, Bank of America, Goldman Sachs Bank USA, Industrial & Commercial Bank of China, ING Capital, JPMorgan Chase Bank, Mizuho Bank, Morgan Stanley Senior Funding, Natixis, Nomura Securities International, Royal Bank of Canada, Sumitomo Mitsui Banking Corp, and The Bank of Nova Scotia.

Venture Global LNG Co-CEOs Mike Sabel and Bob Pender jointly stated, "Our goal has always been

to lower the cost of electricity by delivering clean, low-cost LNG to the world. The closing of our financing is the culmination of years of hard work, and we want to sincerely thank our Venture Global team, our construction partners, our foundation customers, our lenders and advisors, Cameron Parish and our local partners in Louisiana."

Calcasieu Pass has received all the necessary permits, including FERC authorisation and non-FTA export authorisation from the US Department of Energy. The project has 20-year LNG sale and purchase agreements with Shell, BP, Edison, Galp, Repsol and PGNiG.

Venture Global LNG is also developing the 20 mill tonnes per annum Plaquemines LNG project and the 20 mill tonnes per annum Delta LNG project, both located in Plaquemines Parish, Louisiana.

Morgan Stanley served as financial advisor to Venture Global for the transaction, while Latham & Watkins served as counsel to Venture Global and Skadden, Arps, Slate, Meagher & Flom served as counsel to the lenders.

Seasonal factors and dry-dockings hit Höegh LNG

Höegh LNG Holdings has reported a net loss of \$3.6 mill for the second quarter of this year.

EBITDA was \$45.7 mill, while a dividend of \$0.025 per share was declared for 2Q19.

During the period, a representative office was opened in Shanghai, China.

In the third quarter thus far, Höegh LNG executed an interim charter of the 'Höegh Galleon' as an LNGC and completed the class renewal of the 'PGN FSRU Lampung' afloat.

President and CEO Sveinung Støhle, commented: "Höegh LNG's results for 2Q19 are negatively affected by seasonal variations and drydocking costs. Adjusted for these effects our underlying numbers are in line

with previous quarters.

"I am very pleased to see that the LNG market continues its rapid growth by increasing 16% in the first half of 2019, driven by the continued coal to gas switch and ample LNG supplies available at very competitive prices across the market.

"This is further reflected by the important progress being made on all FSRU projects where the company is already selected as the FSRU provider or has won exclusivity. In addition, the company is engaged in negotiations and business development activities that aims to see its complete fleet of FSRUs on long-term FSRU contracts by end of 2021," he concluded.



Venture Global's Calcasieu Pass project is now fully funded

Flex LNG suffers increased loss

Flex LNG suffered a net loss of \$3.9 mill for the second quarter of this year, compared to a loss of \$2.9 mill in 2Q18 and loss per share of \$0.07, compared to a net loss of \$3.4 mill and loss per share of \$0.06 for 1Q19.

Adjusted EBITDA for 2Q19 was \$11.3 mill, compared to \$3 mill in 2Q18 and \$8.7 mill for the first quarter of this year.

Vessel operating revenues were \$19 mill, compared with \$7 mill for 2Q18 and \$19.1 mill in 1Q19.

For the first six months of this year, Flex LNG reported a net loss of \$7.4 mill, compared to a net loss of \$4.6 mill for 1H18.

Adjusted EBITDA was \$20 mill, compared to \$5.3 mill for the previous first half period. Vessel operating revenue was \$38.2 mill for 1H19, compared to \$22.1 mill for the first six months of 2018.

Total cash, restricted cash and

cash equivalents was \$26.4 mill as of June 30, 2019, a decrease of \$19.2 mill during the second quarter 2019. Net cash provided by operating activities in the second quarter 2019 was \$9.4 mill (1Q19: \$3.6 mill cash used). Net cash used in investing activities in 2Q19 was \$146.2 mill (1Q19: zero), relating to the final payments due on delivery of 'Flex Constellation'. Net cash provided by financing activities was \$117.6 mill (1Q19: \$5.9 mill cash used), which included drawdown of the \$125 mill tranche relating to 'Flex Constellation' under the \$250 mill term loan facility, offset by scheduled

repayment of long term debt.

Øystein M Kalleklev, Flex LNG Management AS CEO, commented: "The first half of 2019 has been a cold shower for most LNG industry participants with the exception of the end consumers, who have benefited from cheap clean fuel and made significant savings on their utility bills.

"Low gas prices during the first half of the year have also negatively affected the results of Flex LNG, as excess gas supply has predominantly been absorbed by European consumers, cutting sailing distances and thus affecting shipping demand and rates.

"Despite this challenging market environment, we do see improved outlook for the second half as the LNG shipping market is expected to become increasingly tight and the likelihood of a repeat of last winter's 'El Nino' is low. These factors should provide tailwinds into 2020 and we expect the LNG product market to become increasingly tight from next year. Tighter product markets generally result in higher shipping demand, due to arbitrage and reloads. Hence, we think a tighter product market will positively affect the market balance in 2021," he said.

K Line receives AIP for LNG-fuelled ore carrier design

Classification society DNV GL has awarded Kawasaki Kisen Kaisha ('K'Line) and Namura Shipbuilding a joint Approval in Principle (AIP) for a new LNG-fuelled ore carrier concept design.

This new design offers the same deadweight and service speed as the patented reference WOZMAX vessel while meeting EEDI phase 3 requirements.

Interest in gas as a marine fuel is on the rise in the shipping industry,

in particular due to the incoming sulfur cap and IMO's Green House Gas (GHG) reduction targets, the class society claimed. The technical maturity, efficiency, availability, and emissions reduction of LNG as a ship fuel means

that it is becoming an attractive and viable option for many vessels, especially for newbuilding projects.

The new LNG-fuelled ore carrier design is based on Namura's second generation WOZMAX ore carrier - a vessel with the optimum size to transport iron ore from western Australia. The new LNG-fuelled design modifies the cargo hold and locates the tanks midships, without changing the hull form or sacrificing significant cargo capacity. Operating on LNG the ship can undertake a round trip between Singapore and Brazil without needing to bunker.

"We were very pleased to work with 'K' Line and Namura to approve this design," said Stian Sollied, Country Manager Japan, DNV GL - Maritime. "It offers another

avenue for shipowners to meet incoming environmental regulations, while remaining competitive in terms of cargo capacity. LNG is a solution that could help to shrink the shipping industry's environmental footprint over the next few years and it is great to see new options in different ship types. We look forward to working with 'K' Line and Namura to see this design in operation in the near future."

DNV GL's Maritime Forecast to 2050, part of the research behind the DNV GL Energy Transition Outlook 2018, projects that more than 10% of the world's shipping fleet will be LNG-powered by 2030. The report also forecasts that LNG-powered vessels will make up 23% of the world's fleet by 2050.



Presentation of the AIP: L - R: Shingo Ikeda, General Manager - Ship Technical Group, 'K' Line; Stian Sollied, Country Manager Korea & Japan, DNV GL - Maritime; Yasuhiro Yamamoto, General Manager, Technology Development Centre - Namura Shipbuilding

Renk supplies first hybrid-system for LNGC

At the end of March, 2019, the maritime sales team of RENK's Rheine plant won the first new construction project for the maritime hybrid system MARHY.

This system enables ships fitted with 2-stroke engines to efficiently generate on board power supply by using the main engine (PTO-operation). In addition, a fully electric drive (PTH-operation) is available for areas with low emissions zones (port areas) and for emergencies.

The newbuild is a 30,000 cu m LNGC owned by Knutsen OAS. She is fitted with a 6,000 kW 2-stroke main engine.

RENK delivered a tunnel gearbox (type SHH1-1600), a fully-automatic PSC-85(propeller shaft clutch), elastic couplings, and, for the first time, key electric

components, including a 1 MW generator/e-motor, as well as the corresponding frequency converter.

In addition, RENK was responsible for the system integration. After completion of the ship at the Hyundai Mipo shipyard, she will be stationed in the Italian Mediterranean Sea and will be operated by Milan-based Edison Energy.

This LNGC is part of an infrastructure strategy, which provides for the construction of several LNG depots along the Italian coast to provide a reliable energy supply.

Kitimat LNG terminal contract awarded

The Canadian subsidiary of Belgian group BESIX and its joint venture partner Vancouver Pile Driving (Vanpile) have won a contract to build an LNG export facility at Kitimat, British Columbia, Canada.

The contract was awarded by the JGC-Fluor BC LNG joint venture (JFJV). Construction of the Kitimat facility will begin this year.

Expected to be completed in 2021, the contract calls for the construction of a 500 m long quay wall, an LNG platform, multiple dolphins and onshore infrastructure.

Once completed, the LNG terminal will be maintained by JFJV and operated by LNG

Canada, a joint venture between Shell, PETRONAS, PetroChina, Mitsubishi and Korea Gas Corp (KOGAS).

In October 2018, the final investment decision (FID) was taken whose development will cost about \$14 bill. The facility will initially export LNG from two trains totaling 14 mill tonnes per annum with the potential to expand to four trains in the future.



Kitimat- construction tenders awarded

Vee Bee to release strainer design and performance white paper at Gastech

Vee Bee Filtration, has produced a White Paper that details the use of simulation technology to optimise the design and performance of strainers engineered for LNGC transfer and liquefaction process plants.

The paper, entitled 'Impact of simulation technology on design and engineering of optimized strainers', looks in detail at the benefits of utilising simulation techniques during the design and engineering of pipeline strainers and the resultant prediction and pre-validation of the flow performance. Accuracy of performance prediction leads to greater reliability and protection of the LNG liquefaction and transfer systems during their expected operational life cycle.

The White Paper objectively details how the simulation technologies employed by Vee Bee, focusing on computational fluid dynamics (CFD) and finite element analysis (FEA) modelling, provide an accurate insight into the real-life per-

formance of the strainers. This allows engineers to design systems to operate up to and within the safe operating limits of the strainer at the highest flow efficiencies.

"For critical strainer applications, we often recommend engineering contractors to employ an optimised solution, ensuring that the strainers are effective in their filtration duty whilst minimising their impact on the system flow efficiencies," said Vee Bee's Sales Director, Guy Downie. "Engineering contractors benefit from predictable performance from installation, shorter commissioning and start-up times and lower overall associated costs. Ultimately the site operator has the greatest benefit as these engineered strainers are able to perform to the highest

standards with a minimum of maintenance for their operational life.

"We identified some time ago that by adopting a simulation driven engineering philosophy, we could reach levels of efficiency in the design of our strainers that was far beyond anything the market had seen before. The application of this approach is well suited to LNG projects, due to the criticality of output performance and the expensive assets the strainers are designed to protect.

"The broader impact of poor strainer selection may include risk of damage to critical equipment, resulting in high potential replacement cost, commensurate downtime, exposure to litigation, damaged reputation and raised insurance premiums.

"The comprehensive understanding Vee Bee has developed of strainer flow performance provides a pre-validated foresight of strainer performance at an accuracy level which has never been achievable before.

"Due to the benefit this approach brings to our customers, we have taken the decision to share our approach more widely with the formal release of this White Paper, driving better understanding and raising the standard for the whole sector," he concluded.

'Impact of simulation technology on design and engineering of optimized strainers' will become formally available at the forthcoming Houston Gastech exhibition, which takes place from 17th-19th September, 2019. ■

NEWS NUDGE

More LNGCs ordered

Samsung Heavy Industries (SHI) has won an order to build an LNGC for an Asian customer, the company said in a stock exchange filing.

According to the builder, the construction contract has a value of around KRW225.5 bill (around \$185.8 mill).

The new vessel is scheduled for delivery to the undisclosed

owner in late October, 2021.

This latest contract pushes SHI's orderbook value to \$3.6 bill secured so far this year, almost half of the shipbuilder's \$7.8 mill target for 2019. The orders include 10 LNGCs.

This follows Hyundai's orders recently received from Tsakos for one, option one 174,000 cu m LNGCs valued at \$190 mill and another from Capital Gas of a similar size at \$186 mill, which was an exercised option.

Daewoo (DSME) was also said to have firmed up another option for Maran Gas, bringing the total to 14 on order at the yard for the Angelicoussis controlled company.

This total includes an FSRU. One LNGC was delivered to Maran Gas by DSME last month.

Brokers have also reported that CSSC Leasing has ordered two 174,000 cu m Arc7 specified LNGCs at Hudong-Zhonghua for 2022 delivery.

In addition, a hybrid 9,500 cu m

LNG/LEG/LPG carrier was said to have been ordered at Huangpu Wencheng for Tianjin Southwest Maritime for delivery by the end of next year.

Yamal LNG passes 20 mill tonne milestone

This month, Yamal LNG reached 20 mill tonnes of LNG shipped since the commencement of the project.

The new Arc7 'Vladimir Voronin' loaded the 273rd cargo passing the 20 mill tonne mark since the start-up of Train 1 in December, 2017. This was the 'Vladimir Voronin' first voyage and she was the 12 Arc7 delivered specifically for the Yamal LNG project (see page 3).

Three liquefaction trains are currently in operation at Yamal LNG with cumulative nameplate production capacity of 16.5 mill tonnes per annum.

Once train 4 comes on stream, the nameplate capacity will rise to 17.4 mill tonnes per annum. ■

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The Atlas Copco logo is displayed in white text within a blue rectangular box. The background of the entire advertisement features a low-angle shot of a worker in a red protective suit and white hard hat, standing with arms crossed in front of a large industrial structure, likely an LNG plant, under a bright blue sky with wispy clouds. A large, semi-transparent blue triangle is overlaid on the bottom left, containing technical drawings and text.

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WORLD LNG CARRIER ORDERBOOK

Name	Delivery	Capacity	Propulsion	Containment	Primary Owner	Yard	Ordered
Energy Universe	01/08/2019	165000	TFDE	SPB	MOL	Japan Marine United	01/02/2014
Georgiy Ushakov	11/09/2019	172000	TFDE - Azipod	GT NO 96	Teekay LNG	DSME	01/07/2014
Nikolay Urvantsev	15/07/2019	172410	TFDE - Azipod	GT NO 96	MOL	DSME	01/07/2014
Yakov Gakkel	25/10/2019	172000	TFDE - Azipod	GT NO 96	Teekay LNG	DSME	01/07/2014
Marvel Pelican	15/12/2019	155000	TFDE	Moss	MOL	Kawasaki	01/09/2014
Marvel Heron	20/09/2019	177000	STaGE	Moss	MOL	Mitsubishi H.I.	01/01/2015
Marvel Swan	15/10/2021	178000	MEGI		K-Line	Imabari	15/05/2015
BW Pavilion Aranda	10/09/2019	173400	MEGI	GT NO 96	BWGas	DSME	01/09/2015
Daewoo 2466	15/10/2019	173400	MEGI	GT NO 96	Maran Gas Maritime	DSME	01/06/2016
Daewoo 2467	15/10/2019	173400	MEGI	GT NO 96	Maran Gas Maritime	DSME	01/06/2016
Gaslog Windsor	15/04/2020	180000	XDF	GTT Mark III Flex	GasLog	Samsung	01/09/2016
Daewoo 2469	01/04/2020	173400	MEGI	GT NO 96	Maran Gas Maritime	DSME	16/12/2016
Rias Baixas Knutsen	15/07/2019	180000	MEGI	GTT Mark III Flex	Knutsen	Hyundai	01/03/2017
Flex Courageous	15/08/2019	173400	MEGI	GT NO 96	Flex LNG	DSME	02/03/2017
MOL Hudong-Zhonghua 1/4	15/12/2019	174000	MEGI	GT NO 96	MOL	Hudong-Zhonghua	01/07/2017
MOL Hudong-Zhonghua 2/4	01/03/2020	174000	MEGI	GT NO 96	MOL	Hudong-Zhonghua	01/07/2017
MOL Hudong-Zhonghua 3/4	15/07/2020	174000	MEGI	GT NO 96	MOL	Hudong-Zhonghua	01/07/2017
MOL Hudong-Zhonghua 4/4	01/10/2020	174000	MEGI	GT NO 96	MOL	Hudong-Zhonghua	01/07/2017
Gaslog Warsaw	15/07/2019	180000	XDF	GTT Mark III Flex	GasLog	Samsung	01/12/2017
Daewoo 2478	15/05/2020	173400	MEGI	GT NO 96	Maran Gas Maritime	DSME	06/12/2017
Elisa Larus	30/03/2020	174000	XDF	GTT Mark III Flex	NYK	Hyundai	01/01/2018
SHI #1	15/07/2020	174000	XDF	GTT Mark III Flex	Cardiff Marine	Samsung	01/01/2018
SHI #17	15/10/2020	174000	XDF	GTT Mark III Flex	Cardiff Marine	Samsung	01/01/2018
HHI / Total	15/01/2020	174000	XDF	GTT Mark III Flex	Cardiff Marine	Hyundai	04/01/2018
HHI / Total / Sovc	28/02/2020	174000	XDF	GTT Mark III Flex	Sovcomflot	Hyundai	04/01/2018
BW Magnolia	15/12/2019	173400	MEGI	GT NO 96	BWGas	DSME	01/02/2018
BW Pavilion Aramhera	15/06/2020	173400	MEGI	GT NO 96	BWGas	DSME	01/02/2018
HHI / Cardiff #1	15/02/2020	174000	XDF	GTT Mark III Flex	Cardiff Marine	Hyundai	01/02/2018
HHI / Cardiff #2	15/04/2020	174000	XDF	GTT Mark III Flex	Cardiff Marine	Hyundai	01/02/2018
Flex Reliance	15/07/2020	173400	MEGI	GT NO 96	Flex LNG	DSME	28/02/2018
Flex Resolute	15/08/2020	173400	MEGI	GT NO 96	Flex LNG	DSME	28/02/2018
Flex Amber	15/07/2020	174000	XDF	GTT Mark III Flex	Flex LNG	Hyundai	01/03/2018
Flex Aurora	15/05/2020	174000	XDF	GTT Mark III Flex	Flex LNG	Hyundai	01/03/2018
SHI Gaslog #1	15/04/2020	180000	XDF	GTT Mark III Flex	GasLog	Samsung	01/03/2018
Samsung 2271	15/04/2020	174000	XDF	GTT Mark III Flex	Cardiff Marine	Samsung	09/03/2018
DSME Minerva #1	15/01/2021	173400	MEGI	GT NO 96	Minerva Marine	DSME	15/03/2018
DSME Minerva #2	15/04/2021	173400	MEGI	GT NO 96	Minerva Marine	DSME	15/03/2018
Traiano Knutsen	15/06/2020	180000	MEGI	GTT Mark III Flex	Knutsen	Hyundai	23/03/2018
DSME 2483	15/08/2020	173400	MEGI	GT NO 96	Alpha Gas	DSME	28/03/2018
DSME 2484	01/12/2020	173400	MEGI	GT NO 96	Alpha Gas	DSME	28/03/2018
SHI Gaslog #2	15/07/2020	180000	XDF	GTT Mark III Flex	GasLog	Samsung	30/05/2018
DSME 2487	15/01/2021	173400	MEGI	GT NO 96	Maran Gas Maritime	DSME	05/06/2018
Maran Gas DSME	15/09/2020	173400	MEGI	GT NO 96	Maran Gas Maritime	DSME	05/06/2018
DSME 2485	15/04/2021	173400	MEGI	GT NO 96	Alpha Gas	DSME	07/06/2018

DFDE = dual fuel diesel engines, STRH = steam turbine reheat / ultra steam turbine, MEGI = marine electric gas injection, DRL = slow speed diesel, FSRU = vessel with regas capacity, FLNG = floating LNG production unit
Data last updated = 6th August 2019

Name	Delivery	Capacity	Propulsion	Containment	Primary Owner	Yard	Ordered
Cool Discoverer	15/08/2020	174000	XDF	GTT Mark III Flex	Thenamaris	Hyundai	19/06/2018
Flex Vigilant	15/03/2021	174000	XDF	GTT Mark III Flex	Flex LNG	Hyundai	30/06/2018
Flex Volunteer	15/11/2020	174000	XDF	GTT Mark III Flex	Flex LNG	Hyundai	30/06/2018
Aristarchos	15/03/2021	174000	XDF	GTT Mark III Flex	Capital Gas	Hyundai	01/07/2018
Aristidis I	15/11/2020	174000	XDF	GTT Mark III Flex	Capital Gas	Hyundai	01/07/2018
Aristos I	15/10/2020	174000	XDF	GTT Mark III Flex	Capital Gas	Hyundai	01/07/2018
Attalos	15/06/2021	174000	XDF	GTT Mark III Flex	Capital Gas	Hyundai	01/07/2018
Flex Freedom	15/10/2020	173400	MEGI	GT NO 96	Flex LNG	DSME	05/07/2018
Celcius #1	15/10/2020	180000	XDF	GTT Mark III Flex	Celcius Shipping	Samsung	01/08/2018
Celcius #2	15/12/2020	180000	XDF	GTT Mark III Flex	Celcius Shipping	Samsung	01/08/2018
HHI 3037	15/09/2020	174000	XDF	GTT Mark III Flex	Cardiff Marine	Hyundai	15/08/2018
SHI 2300	15/10/2020	174000	XDF	GTT Mark III Flex	GasLog	Samsung	15/08/2018
SHI 2301	15/12/2020	174000	XDF	GTT Mark III Flex	GasLog	Samsung	15/08/2018
HHI 3038	15/11/2020	174000	XDF	GTT Mark III Flex	Cardiff Marine	Hyundai	15/09/2018
Cool Racer	15/01/2021	174000	XDF	GTT Mark III Flex	Thenamaris	Hyundai	27/09/2018
SHI NYK	15/04/2021	174000	XDF	GTT Mark III Flex	NYK	Samsung	28/09/2018
SHI Minerva #1	15/01/2021	174000	XDF	GTT Mark III Flex	Minerva Marine	Samsung	15/10/2018
HHI 3039	15/03/2021	174000	XDF	GTT Mark III Flex	Cardiff Marine	Hyundai	15/11/2018
HHI 3112	15/01/2021	174000	XDF	GTT Mark III Flex	Cardiff Marine	Hyundai	15/11/2018
HHI Latsco #1	15/02/2021	174000	XDF	GTT Mark III Flex	Latsco Shipping	Hyundai	25/11/2018
HHI Latsco #2	15/08/2021	174000	XDF	GTT Mark III Flex	Latsco Shipping	Hyundai	25/11/2018
SHI 2306	15/09/2021	174000	XDF	GTT Mark III Flex	NYK	Samsung	03/12/2018
SHI 2307	15/11/2021	174000	XDF	GTT Mark III Flex	NYK	Samsung	03/12/2018
DSME 2496	15/02/2021	174000	MEGI	GT NO 96	BWGas	DSME	05/12/2018
DSME 2497	15/06/2021	174000	MEGI	GT NO 96	BWGas	DSME	05/12/2018
DSME 2495	15/05/2021	173400	MEGI	GT NO 96	Nakilat	DSME	10/12/2018
HHI NYK DG #1	15/09/2020	174000	XDF	GTT Mark III Flex	NYK	Hyundai	11/12/2018
HHI NYK DG #2	15/05/2021	174000	XDF	GTT Mark III Flex	NYK	Hyundai	11/12/2018
HHI NYK DG #3	15/06/2021	174000	XDF	GTT Mark III Flex	NYK	Hyundai	11/12/2018
DSME Dec #1	15/12/2020	180000	MEGI	GT NO 96	MOL	DSME	15/12/2018
DSME Dec #2	15/02/2021	180000	MEGI	GT NO 96	MOL	DSME	15/12/2018
SHI Navigare	15/03/2021	173400	XDF	GTT Mark III Flex	Navigare	Samsung	15/12/2018
HHI Sovcom #1	30/08/2020	174000	XDF	GTT Mark III Flex	Sovcomflot	Hyundai	19/12/2018
HHI Sovcom #2	15/12/2020	174000	XDF	GTT Mark III Flex	Sovcomflot	Hyundai	19/12/2018
Alpha Gas	15/06/2021	174000	MEGI	GT NO 96	Alpha Gas	DSME	27/12/2018
SHI Gaslog CE #1	15/06/2021	180000	XDF	GTT Mark III Flex	GasLog	Samsung	27/12/2018
SHI Gaslog CE #2	15/08/2021	180000	XDF	GTT Mark III Flex	GasLog	Samsung	27/12/2018
SHI #18	15/03/2021	174000	XDF	GTT Mark III Flex	Cardiff Marine	Samsung	31/12/2018
Celcius #3	15/02/2021	180000	XDF	GTT Mark III Flex	Celcius Shipping	Samsung	15/01/2019
Celcius #4	15/04/2021	180000	XDF	GTT Mark III Flex	Celcius Shipping	Samsung	15/01/2019
SHI Minerva #2	15/09/2021	174000	XDF	GTT Mark III Flex	Minerva Marine	Samsung	15/01/2019
CSSC #1	15/09/2021	178000	XDF	GT NO 96	CSSC	Hudong-Zhonghua	30/01/2019
CSSC #2	15/02/2022	178000	XDF	GT NO 96	CSSC	Hudong-Zhonghua	30/01/2019
DSME Maran	15/05/2021	174000	MEGI	GTT Mark III Flex	Nakilat	DSME	15/02/2019
Samsung Feb #1	15/03/2022	174000	XDF	GTT Mark III Flex		Samsung	15/02/2019

Name	Delivery	Capacity	Propulsion	Containment	Primary Owner	Yard	Ordered
Samsung Feb #2	15/03/2022	174000	XDF	GTT Mark III Flex		Samsung	15/02/2019
Samsung Feb #3	15/03/2022	174000	XDF	GTT Mark III Flex		Samsung	15/02/2019
Capital Gas #5	15/07/2021	174000	XDF	GTT Mark III Flex	Capital Gas	Hyundai	25/02/2019
DSME Maran #2	15/08/2021	173400	XDF	GTT Mark III Flex	Nakilat	DSME	25/02/2019
DSME Maran #3	15/10/2021	173400	XDF	GTT Mark III Flex	Nakilat	DSME	25/02/2019
SHI Mar19	15/03/2022	174000	XDF	GTT Mark III Flex	Nisshin Shipping	Samsung	20/03/2019
DSME Maran 2504	15/01/2022	174000	MEGI	GT NO 96	Maran Gas Maritime	DSME	01/04/2019
H Samho NYK	15/03/2022	174000	XDF	GTT Mark III Flex	NYK	Hyundai	01/04/2019
HHI Samho Edison	15/01/2022	174000	XDF	GTT Mark III Flex	NYK	Hyundai	10/04/2019
Capital Gas #6	15/09/2021	174000	XDF	GTT Mark III Flex	Capital Gas	Hyundai	15/04/2019
Samsung N/A	15/01/2022	174000	XDF	GTT Mark III Flex	Minerva Marine	Samsung	01/05/2019
DSME May19	15/05/2022	174000	MEGI	GT NO 96	Maran Gas Maritime	DSME	14/05/2019
DSME MOL #3	15/07/2021	173400	MEGI	GT NO 96	MOL	DSME	15/05/2019
Hyundai European #1	15/03/2022	180000	XDF	GTT Mark III Flex	Dynagas	Hyundai	22/05/2019
Hyundai European #2	15/06/2022	180000	XDF	GTT Mark III Flex	Dynagas	Hyundai	22/05/2019
Samsung 2019 #10	15/06/2022	174000	XDF	GTT Mark III Flex	Morgan Stanley	Samsung	08/06/2019
Samsung 2019 #9	15/01/2022	174000	XDF	GTT Mark III Flex	Morgan Stanley	Samsung	08/06/2019
HHI SK E&S	15/09/2021	180000	XDF	GTT Mark III Flex	SK Shipping	Hyundai	10/07/2019

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WORLD SMALL SCALE LNG FLEET*

Built	Name	CBM	Cargo Type	Trading area	Trading in LNG?	Ship Owner / Operator
1974	Seagas	187	LNG	Sweden	Yes	AGA
1988	Kayoh Maru	1,517	LNG	Japan	Yes	Daiichi
1993	Aman Bintulu	18,928	LNG	Malaysia - Japan	Yes	Perbadanan/NYK
1996	Surya Aki	19,475	LNG	Indonesia - Japan	Yes	MCGC
1997	Aman Sendai	18,928	LNG	Malaysia - Japan	Yes	Perbadanan/NYK
1998	Pelita Energy	18,800	LNG	Malaysia - Japan	Yes	Perbadanan/NYK
2000	Triputra	23,096	LNG	Indonesia - Japan	Yes	MCGC
2003	Pioneer Knutsen	1,100	LNG	Norway	Yes	Knutsen
2003	Shinju Maru No.1	2,540	LNG	Japan	Yes	Shinwa
2005	North Pioneer	2,500	LNG	Japan	Yes	Japan Liquid Gas
2007	Sun Arrows	19,531	LNG	Malaysia - Russia - Japan	Yes	Mitsui
2008	Kakurei Maru	2,536	LNG	Japan	Yes	Hogaki Zosen
2008	Shinju Maru No.2	2,540	LNG	Japan	Yes	Shinwa
2009	Coral Methane	7,551	LNG/LPG/Ethylene	Northwest Europe/Baltics	Yes, sometimes	Anthony Veder
2010	Coral Favia	10,000	LNG/LPG/Ethylene	Worldwide	No	Norgas Carriers
2010	Coral Fraseri	10,000	LNG/LPG/Ethylene	Worldwide	No	Norgas Carriers
2011	Akebono Maru	3,556	LNG	Japan	Yes	Chuo Kaiun
2011	Coral Furcata	10,000	LNG/LPG/Ethylene	Worldwide	No	Norgas Carriers
2011	Coral Fungia	10,000	LNG/LPG/Ethylene	Worldwide	No	Norgas Carriers
2011	Vision Spirit	12,000	LNG/LPG/Ethylene	Worldwide	No	Teekay
2011	Unikum Spirit	12,000	LNG/LPG/Ethylene	Worldwide	No	Teekay
2012	Coral Energy	15,600	LNG	Northwest Europe/Baltics	Yes	Anthony Veder
2013	JX Energy TBN	2,500	LNG	Japan	Yes	JX Energy
2013	Kakuyu Maru	2,500	LNG	Japan	Yes	Tsurumi Sunmarine
2013	Coral Anthelia	6,500	LNG/Ethylene			Anthony Veder
2014	LNG-Oil combi**	2,000	LNG	Germany	Yes	Veka
2014	Short Sea LNG Tanker **	4,000	LNG	Germany	Yes	Veka
2015	LNG Inland bunker**	800	LNG	Germany	Yes	Veka
2015	LNG bunker barge 1†	2,250	LNG	China	Yes	Anhui Huaqiang Natural Gas
2015	LNG bunker barge 2†	2,250	LNG	China	Yes	Anhui Huaqiang Natural Gas
2015	LNG bunker barge 3†	2,250	LNG	China	Yes	Anhui Huaqiang Natural Gas
2015	LNG Barge TBN	3,000	LNG	US Coast	Yes	LNG America
2015	10 small carriers TBN**	5,000	LNG			Bimantara Group
2015	Jahre TBN**	6,200	LNG	Norway	Yes	Donsotank/Jahre Marine
2015	Norgas TBN**	17,000	LNG/LPG/Ethylene	Worldwide		Norgas Carriers
2015	Norgas TBN**	17,000	LNG/LPG/Ethylene	Worldwide		Norgas Carriers
2015	JS Ineos Ingenuity	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2015	JS Ineos Insight	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2015	JS Ineos Intrepid	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2015	TBN 1	27,500	LNG	China?		Danyang?
2015	TBN 2	27,500	LNG	China?		Danyang?
2015	TBN 3	27,500	LNG	China?		Danyang?
2015	PetroChina TBN	30,000	LNG	China		PetroChina
2016	Clean Jacksonville	2,200	LNG	US Coast	Yes	CME
2016	LNG Prime	2,250	LNG	Northwest Europe	Yes	Veka Deen LNG
2016	JS Ineos Indepence	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2016	JS Ineos Innovation	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2016	JS Ineos Inspiration	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2016	Hai Yang Shi You 301	30,000	LNG	Bali FSU	Yes	CETS (CNOOC)
2016	Navigator Aurora	35,000	Ethane/Ethylene	Markus Hood - Stenungsund	Ethane, for Borealis	Navigator
2016	Gaschem Beluga	36,000	Ethane/Ethylene	US - Teeside	Ethane, for Sabic	Gaschem Services
2016	Gaschem Orca	36,000	Ethane/Ethylene	US - Teeside	Ethane, for Sabic	Gaschem Services

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*Includes multi-gas, ethylene and LNG bunker ships with 40,000 cubic metres LNG cargo capacity or less

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** = project shelved † =Data to be verified Data last updated = 6th August 2019

Built	Name	CBM	Cargo Type	Trading area	Trading in LNG?	Ship Owner / Operator
2016	Ocean Yield TBN**	36,000	Ethane/Ethylene	US - Teeside	Ethane, for Sabic	Gaschem Services
2017	Oizmendi	600	LNG	Bilbao	Yes	Itsas Gas
2017	CME TBN†	2,200	LNG	US Coast	Yes	CME
2017	CME TBN†	2,200	LNG	US Coast	Yes	CME
2017	ENGIE Zeebrugge	5,000	LNG	Northwest Europe	Yes	NYK
2017	Coralius	5,800	LNG	Northwest Europe/Baltics	Yes, for Skangas	Anthony Veder
2017	Cardissa	6,500	LNG	Northwest Europe	Yes	Shell
2017	LNG-Gorskaya TBN	7,300	LNG	Russia	Yes	LNG-Gorskaya
2017	LNG-Gorskaya TBN	7,300	LNG	Russia	Yes	LNG-Gorskaya
2017	LNG-Gorskaya TBN	7,300	LNG	Russia	Yes	LNG-Gorskaya
2017	Coral EnergyICE	18,000	LNG	Northwest Europe/Baltics	Yes	Anthony Veder
2017	JS Ineos Invention	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2017	JS Ineos Intuition	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2017	Yuan He 1	30,000	LNG	China	Yes	CSR
2017	Navigator Eclipse	35,000	Ethane/Ethylene	US	Ethane	Navigator
2017	Navigator Nova	35,000	Ethane/Ethylene	US	Ethane	Navigator
2017	Navigator Prominence	35,000	Ethane/Ethylene	US	Ethane	Navigator
2018	HUA XIANG 8	13,720	LNG	China	Yes	Zhejiang Huaxiang
2018	CME TBN†	2,200	LNG	US Coast	Yes	CME
2018	LNG London	3,000	LNG	Northwest Europe	Yes	Shell
2018	Shell Bunker Barge TBN 2	6,500	LNG	Northwest Europe	Yes	Shell
2018	Shell Bunker Barge TBN 3	6,500	LNG	Northwest Europe	Yes	Shell
2018	Kairos	7,500	LNG	Baltic	Yes	Bernhard Schulte
2018	Qi Yuan	28,000	LNG	China	Yes	Dalian Inteh Group
2018	Evergas TBN	32,000	Ethane/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2018	Evergas TBN	32,000	Ethane/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2018	Evergas TBN	32,000	Ethane/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2018	Evergas TBN	32,000	Ethane/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2018	Bunker Breeze	0	LNG	Barcelona	Yes	Suardiaz Energy Shipping
2019	KLine TBN	7,500	LNG	Korea	Yes	Korea Line
2019	KLine TBN	7,500	LNG	Korea	Yes	Korea Line
2019	Stolt TBN	7,500	LNG	Mediterranean	Yes	Stolt-Nielsen Gas
2019	Stolt TBN	7,500	LNG	Mediterranean	Yes	Stolt-Nielsen Gas
2020	Shell Bunker Barge	4,000	LNG	US Coast	Yes	Q-LNG Transport/Harvey Gulf
2020	Stolt TBN (option) **	7,500	LNG		Yes	Stolt-Nielsen Gas
2020	Stolt TBN (option)	7,500	LNG		Yes	Stolt-Nielsen Gas
2020	Total TBN	18,600	LNG	NWE	Yes	MOL
2020	FuelLNG TBN	7,500	LNG	Singapore	Yes	FuelLNG
2020	CLS TBN	3,500	LNG	Japan	Yes	CLS
2020	Elenger TBN	6,000	LNG	NWE	Yes	Elenger
2020	ENN TBN	8,500	LNG	China	Yes	ENN
2021	Stolt TBN (option)	7,500	LNG		Yes	Stolt-Nielsen Gas
2021	Knutsen TBN	30,000	LNG	Mediterranean	Yes	Knutsen OAS
2021	Gazprom Neft TBN	5,800	LNG	Russia	Yes	Gazprom Neft
2021	PE TBN	12,000	LNG	Singapore	Yes	MOL
2021	JMU TBN	2,500	LNG	Japan	Yes	JMU
2022	Stolt TBN	20,000	LNG	Worldwide	Yes	Stolt-Nielsen Gas
2022	Stolt TBN	20,000	LNG	Worldwide	Yes	Stolt-Nielsen Gas
2024	Stolt TBN (option)	20,000	LNG	Worldwide	Yes	Stolt-Nielsen Gas
2024	Stolt TBN (option)	20,000	LNG	Worldwide	Yes	Stolt-Nielsen Gas
2026	Stolt TBN (option)	20,000	LNG	Worldwide	Yes	Stolt-Nielsen Gas
2026	Stolt TBN (option)	20,000	LNG	Worldwide	Yes	Stolt-Nielsen Gas

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