

LNG Shipping News

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9 June 2022

Venture Global takes Plaquemines FID

Venture Global LNG has taken a final investment decision (FID) and closed \$13.2 bill of project financing for the initial phase of the Plaquemines LNG facility.

This also includes the associated Gator Express pipeline.

Plaquemines probable LNG output has also been increased to 13.33 mill tonnes per annum by Venture Global.

This transaction represents the world's largest project financing closed this year thus far. The debt and equity financing fully funds the balance of construction and commissioning of the initial phase.

This is also the first LNG project located in the US to reach financial closure since Venture Global's Calcasieu Pass facility in August, 2019.

"The Venture Global team is proud to announce FID on our second project, Plaquemines LNG, just months after exports began at Calcasieu Pass. I want to thank our team for their tireless efforts to support this remarkable achievement," said Mike Sabel, Venture Global LNG CEO.

"Plaquemines will build on the success of Calcasieu Pass, which broke global records for speed and execution. The project has attracted robust financial and commercial support, which has enabled us to formally sanction

this project at a critical moment for energy markets.

"Speed matters more than ever and Venture Global is uniquely positioned to quickly bring US LNG to the market to support global energy security and environmental progress. I would like to thank our customers, lenders, advisers, construction partners and local partners in Louisiana for their trust and support," he said.

Plaquemines LNG has received all the necessary permits, including FERC authorisation and non-FTA export authorisation from the US Department of Energy.

In addition, the company has signed 20-year sales and purchase agreements (SPAs) for 80% of the full 20 mill tonnes per annum project.

For example, Plaquemines LNG phase one customers include PGNiG, Sinopec, CNOOC, Shell and EDF; phase two customers announced to date include ExxonMobil, PETRONAS and New Fortress Energy (NFE).

Marketing is underway for the company's third facility, CP2, and two SPAs with ExxonMobil and NFE have already been agreed for



Venture Global Managing Director, Mike Sabel

this project.

The lenders who provided funding at the closing are: Bank of America, Banco Santander, Bank of China, CaixaBank, Deutsche Bank (New York Branch), Goldman Sachs Bank USA, Industrial and Commercial Bank of China, ING Capital, JPMorgan Chase Bank, Landesbank Baden Württemberg, Mizuho Bank, Morgan Stanley Senior Funding, MUFG Bank, Natixis, Nomura Securities International, Royal Bank of Canada, Sumitomo Mitsui Banking Corp, The Bank of Nova Scotia and Trust Bank.

Bank of America, Goldman Sachs, ING, JP Morgan, Mizuho, Morgan Stanley and RBC served as Venture Global's lead banks for the transaction. Latham & Watkins acted as counsel to Venture Global and Skadden, Arps, Slate, Meagher & Flom was the counsel for the lenders.

NEWS NUDGE

First LNGC leaves re-opened Hammerfest

'Arctic Voyager' has become the first LNGC to load a cargo at Norway's Hammerfest/Melkoya LNG export facility since it reopened.

The plant was closed in September, 2020 following a fire.

She sailed on 6th June heading for the Baltic Sea, according to S&P Global Platts cFlow vessel tracking platform.

Two more LNGCs - 'Arctic Lady' and 'Arctic Princess' - are reported to be waiting to load

cargoes.

On 2nd June, Equinor, which operates the export terminal, said it had resumed production with LNG being loaded into a tank at the plant.

At full capacity, one LNGC would leave the plant about every five days.

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US to lead worldwide LNG liquefaction capacity additions

The US is expected to contribute 57% of the world's LNG liquefaction capacity additions between 2022 and 2026.

Data and analytical company, GlobalData's latest report, 'LNG Liquefaction Terminals Capacity and Capital Expenditure (CapEx) Forecast by Region, Countries and Companies, including details of New Build and Expansion (Announcements and Cancellations) Projects, 2022-2026 Global Capacity and Capital Expenditure Outlook for LNG Liquefaction Terminals, 2022-2026', said that the US will add newbuild LNG liquefaction capacity of 220.3 mill tonnes per annum by 2026.

Expansion projects account for another 30.3 mill tonnes.

Himani Pant Pandey, GlobalData Oil & Gas Analyst, said: "LNG developers in the US are incentivised by ever-growing demand for natural gas worldwide, especially in the Asian and European regions. The plans of several European countries and Japan to reduce their dependency on Russian gas post Ukraine invasion would further boost lique-

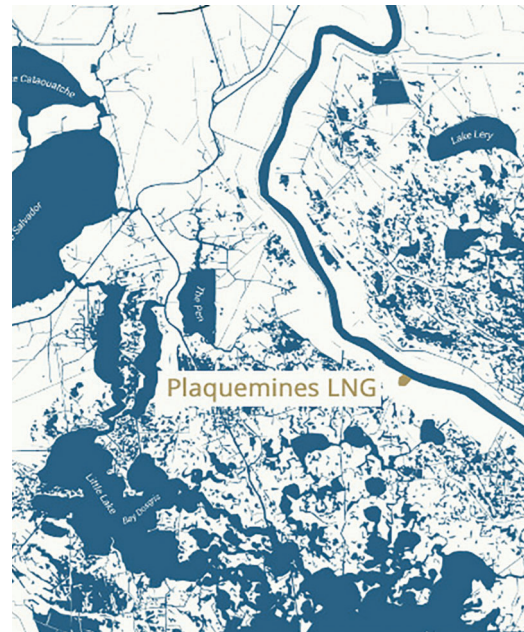
faction developments in the US."

For example, Venture Global's Plaquemines facility is one of the key LNG liquefaction projects in the US with a capacity of 20 mill tonnes per annum (see page 1).

Venture Global recently announced a financial investment decision (FID) for the initial phase of the project, as well as for the associated Gator Express Pipeline. The company has already negotiated several long-term contracts with companies, such as Shell and China National Offshore Oil (CNOOC) for Plaquemines produced LNG.

The developer also plans to bring another project to the table, CP2, with the same capacity. CP2 is expected to start operations in 2025 and will be located adjacent to the company's first LNG terminal in Louisiana, Calcasieu Pass in Cameron Parish.

Venture Global has already signed long-term agreements with New Fortress Energy (NFE) and ExxonMobil for CP2's LNG.



Plaquemines will add considerably to the US' total liquefaction capacity

GAIL seeks term LNG import deal

India's state-owned gas utility GAIL is seeking a 1 mill tonne LNG import deal for 10 years, starting 2023.

This was confirmed by GAIL's Chairman and Managing Director, Manoj Jain, speaking during a press conference to coincide with the company's quarterly report presentation.

"The main consideration of buying LNG will be competitive prices from anywhere, including Russia," Jain said, adding that the company did not rule out buying more LNG from Russia's Gazprom, local newswires reported.

Currently, GAIL has a term LNG import deal in place with Gazprom's Singapore-based trading arm, the average size of which is 2.5 mill tonnes per year, which the Russian supplier has progressively been increasing at GAIL's request,

S&P Global Platts reported.

GAIL imported 2 mill tonnes of LNG from Gazprom last year, while imports have been pegged at 2.5 mill tonnes for 2022 and 2.85 mill tonnes next year, company officials said during the presentation.

Imports increase

Jain said GAIL's total natural gas imports could increase 5%-6% year-on-year in fiscal year 2022/23 ending 31st March, 2023.

"We aren't looking at short-term contracts as they are costlier," Jain explained, while forecasting global LNG spot prices to be in the range of \$20-\$24 per MMBtu in the medium term even though prices would stay volatile

in the short run.

The company said that Gazprom had rescheduled the delivery of one LNG cargo to June from May recently amid difficult market conditions but GAIL said that it remained confident of receiving regular supplies from Gazprom.

"We don't see any disruption in our supplies under the deal as ours is a portfolio contract, meaning Gazprom can supply gas from anywhere in the world," Jain explained.

Meanwhile, GAIL has also been mandated to import more LNG for city gas distribution networks.

A policy guideline from the Indian Ministry of Petroleum and

Natural Gas Division issued on 6th May said GAIL will supply pooled natural gas 2.5% over and above the 100% requirement of the compressed natural gas for transport, and the piped natural gas domestic segments of each geographical area identified in the quarterly allocation period.

For now, GAIL will buy one LNG cargo from the spot market every 30-40 days to meet city gas demand, Jain said.

India aimed to raise the share of gas in its overall energy mix to 15% by 2030 from the current 6.7%. However, the plan to reach this level will likely be delayed by 12-24 months, due to the Ukraine/Russia war, he added.

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NFE sells Brazilian interest - to continue to operate FSRU

New Fortress Energy (NFE) and its joint venture partner, Ebrasil Energia, have signed a share purchase agreement (SPA) with Brazilian power company Eneva.

As a result, Eneva will acquire 100% of the equity interests of the Porto de Sergipe power plant for R\$6.1 bill in cash.

However, NFE will continue to operate and provide gas for the FSRU 'Golar Nanook', which feeds the plant, under a long term charter agreement.

Located in Barra dos Coqueiros in the country's Northeast region, the 1,593 MW power plant was said to play a critical role in Brazil's energy security.

As part of the transaction, Eneva has agreed to acquire, directly and indirectly, 100% of the shares of Centrais Elétricas de Sergipe Participações (CELSEPAR), which owns 100% of the equity interests of the power plant, and Centrais Elétricas Barra dos Coqueiros (CEBARRA), which owns 1.7 GW of expansion rights adjacent to the plant, for a total im-

plied enterprise value of around R\$10.2 bill.

Under the terms of the transaction, Eneva will take on the current debt of Centrais Elétricas de Sergipe (CELSE), the 100% owned subsidiary of CELSEPAR.

"We look forward to maintaining a long-term relationship with Eneva and the CELSE power plant," explained Wes Edens, NFE Chairman and CEO. "Eneva is one of Brazil's leading power companies and a highly capable long-term owner and operator of this critical power asset for northeast Brazil. NFE will continue to operate the 'Golar Nanook', an FSRU that remains chartered to CELSE for the next 20 years."

"CELSE will play a critical role for Eneva's strategy going forward. With multiple options embedded and a significant Thermal Power Plant pipeline to be developed it

will allow Eneva to focus on what it does best - developing new business opportunities in Brazil having the access to gas as a cornerstone," said Pedro Zinner, CEO of Eneva. "This can be the beginning of a very fruitful and long-lasting relationship between two companies which have complementary roles in the gas value chain."

Subject to satisfying certain covenants and closing conditions, the transaction is expected to close in the second half of 2022.

Accounting for NFE's 50% ownership of CELSEPAR, the sale is projected to generate about \$550 mill for NFE, following the debt payment and other liabilities and net of transaction expenses. ■



NFE will continue to operate the FSRU 'Golar Nanook'

SPAs signed with Chinese and South Korean buyers

Energy Transfer and China Gas Hongda Energy Trading, a subsidiary of China Gas Holdings Limited (China Gas), have signed an LNG Sale and Purchase Agreement (SPA) for gas from the Lake Charles LNG project.

Under the SPA, Energy Transfer will supply 0.7 mill tonnes of LNG per annum to China Gas on a free-on-board (FOB) basis for 25 years.

The purchase price is indexed to the Henry Hub benchmark, plus a fixed liquefaction charge. The first deliveries are expected to commence in 2026.

This SPA will become fully effective upon the satisfaction of the conditions precedent, including Energy Transfer LNG taking a final investment decision (FID) on the project.

"This LNG SPA signed with Energy Transfer LNG, which is the first long-term contract of China Gas, strengthens our existing portfolio for the import of LNG, and will further enable China Gas to reliably and securely meet our natural gas customers' needs. It is

also an important step along the path to realising China's carbon peaking and carbon neutrality goals," said Yalong Qi, General Manager of China Gas Hongda Energy Trading.

"China Gas is a premier natural gas distribution company in China, and we are pleased to enter into this 25-year LNG off-take agreement with them," said Tom Mason, President of Energy Transfer LNG. "This SPA brings our total amount of LNG contracted from our Lake Charles LNG export facility to nearly 6.0 mtpa and is an important step towards our goal of reaching FID later this year."

South Korean SPA

Another SPA was recently signed by Cheniere Marketing with POSCO

International Corp, a subsidiary of POSCO Holdings, South Korea's largest steelmaker.

POSCO is also owner of South Korea's first private LNG terminal.

Under the SPA, POSCO will purchase about 0.4 mill tonnes per annum of LNG from Cheniere on a free-on-board (FOB) basis for 20 years beginning in late 2026.

As is now normal, the purchase price will be indexed to the Henry Hub price, plus a fixed liquefaction fee.

"We are pleased to enter into this long-term LNG contract with POSCO International, a key player in the global industrial complex, and we look forward to a successful, long-term relationship with POSCO International as a customer," said Jack Fusco, Cheniere's President and CEO.

"The signing of this SPA further evidences the growing demand for long-term LNG supply and highlights Cheniere's leadership in providing flexible, cleaner burning energy supply to meet both the energy security needs and environmental goals of our customers.

"The SPA is expected to provide additional support to the Corpus Christi Stage III project, on which we expect to reach FID this summer," he said.

The agreement is subject to Cheniere making a positive final investment decision (FID) to construct Corpus Christi Stage III.

It is being developed to include up to seven mid-scale liquefaction trains with a total expected nominal production capacity of over 10 mill tonnes per year. ■

Snam purchases FSRU - looks for second

Italian energy giant Snam is to acquire 100% of the shares of Golar LNG NB 13 Corp, which owns the FSRU 'Golar Tundra' for \$350 mill. 'Golar Tundra' can operate either as an LNGC or an FSRU.

The 2015-built vessel has a storage capacity of around 170,000 cu m and a continuous regasification capacity of 5 bill cu m per year.

To maximise the unit's regasification capacity, she will be located in central/northern Italy, close to the largest gas consumption areas.

2023 start up

'Golar Tundra' is expected to start operations as an FSRU during the spring of 2023, subject to completion of authorisation, regulatory processes and the construction of the necessary infrastructure to connect the terminal to the existing gas transport network.

Snam CEO, Stefano Venier, commented: "With the purchase of the 'Golar Tundra', Snam is taking a decisive step to enhance the security and diversification of Italy's energy supplies, in line with its mission.

"The role of the new FSRU for the benefit of our country will be essential: alone it will contribute to about 6.5% of domestic needs thus bringing the country's regasification capacity to over 25% of the demand.

"Snam completed the transaction quickly and effectively in a

highly competitive market due to the scarcity of supply and is continuing its efforts to acquire a second FSRU of a similar size, for which exclusive negotiations are currently under way and expected to be finalised by end of June," he said.

Golar CEO, Karl Fredrik Staubo, added: "We are pleased to have reached an agreement for 'Golar Tundra' with Europe's largest natural gas infrastructure owner. Today's announced sale marks the second transaction between Golar and Snam for two independent FSRU projects in Italy in a short period of time.

"We are pleased to work with Snam for the successful start-up of the LNG terminals, and to contribute to Europe's drive towards energy security. With the sale of 'Golar Tundra', Golar reinforces its focus on FLNG, enabling efficient production of proven gas reserves allowing customers to further diversify gas supply," he said.

As part of the transaction, which followed a due diligence assessment of the acquired company and the FSRU, Golar will lease 'Golar Tundra' from Snam

as an LNGC for a limited period of time after closing, and help Snam with the preparatory work to install the vessel at the port chosen.

The transaction's completion occurred simultaneously with the signing of the contracts and will be financed by Snam out of its own resources.

In the coming months, Snam will begin to contract LNG regasification capacity, which will gradually become available from the FSRU's start-up.

Snam was advised by Watson Farley & Williams (WFW) on all matters relating to due diligence, corporate (under English and Marshall Islands law), administrative, maritime and competition law, as well as the negotiation and drafting of the contractual documentation connected with the transaction and its closing.

The Italian energy company was also supported throughout the transaction by an in-house legal team.

Wikborg Rein Partner, Jonathan Goldfarb and Senior Associate, Nikhil Datta advised Golar on the sale. ■

Petrofac to service Greater Tortue Ahmeyim

Engineering concern, Petrofac has been awarded a contract to provide offshore operations services for bp's Greater Tortue Ahmeyim (GTA) project.

The company will provide specialist personnel, plant and equipment to support offshore operations at the FPSO and LNG hub in Mauritania and Senegal.

This contract was awarded following a competitive tender, Petrofac said.

Nick Shorten, Petrofac's Asset Solutions Business COO, said: "We are proud to support bp's ongoing investment in the Mauritania and Senegal region.

"We will continue to drive excellence, supporting bp to operate safely and responsibly through their ongoing operations," he said.

The GTA gas field, which is due to produce around 2.5 mill tonnes of LNG per year, is located offshore on the border of Mauritania and Senegal. ■

TES' LNG import terminal - a 'priority project'

Tree Energy Solutions' (TES) Wilhelmshaven LNG import terminal has been included in the list of priority projects under the German Government's LNG Acceleration law.

This law was passed on 19th May, 2022 and was approved by the Federal Council a day later. Its aim is to accelerate the implementation of the critical infrastructure needed to secure Germany's energy supply and its short-term gas imports.

It was designed to reduce permitting and associated approval periods for the construction of onshore import facilities, as part of the Wilhelmshaven Green Energy Hub, development by TES, specifically on the Voslapper Groden location.

The speed up will support the targeted commencement of operations of gas imports from 2025 onwards to secure German gas supplies, TES said. Subsequently, fossil-gas imports will be replaced by fossil-free hydrogen-based green gas imports to de-carbonise and diversify the energy system from 2028 onwards.

TES has been preparing for the required permits and to clarify nature protection measures since 2019.

The Wilhelmshaven terminal will comprise six ship berths, 1.6

mill cu m of onshore storage capacity, using eight onsite tanks (of which four will be available during the initial stage), regasification equipment and the main connection to the OGE gas grid.

It will play a key role in reducing Germany's energy dependence on Russia, as well as in the move to obtain fossil-free energy imports, based on green hydrogen, TES said.

Paul van Poecke, TES Co-Founder and Managing Director, said: "We are delighted that the German government has included

the TES onshore terminal in the new LNG law. It is a recognition of the importance the project will play in ensuring the security of gas supply, while concurrently accelerating the energy transition and fossil-free gas imports.

"This will also bring clarity to the open season participants that are currently considering the booking of capacity through our terminal. The trust placed in us by the Government is greatly appreciated and a reward for leading the development of the onshore terminal at Wilhelmshaven," he said. ■

Awilco enjoys small net result increase

Oslo-based Awilco LNG reported a net result of \$6 mill and earnings per share of \$0.05 for the first quarter of this year.

This was an increase from \$5.8 mill and \$0.04, respectively recorded for the previous quarter.

Net freight income was \$14.1 mill in 1Q22, down from \$14.5 mill in 4Q21.

EBITDA for 1Q22 ended at \$11 mill, up from \$10.7 mill in the fourth quarter of last year, while vessel utilisation for the quarter was 100% with a net TCE of \$78,300 per day.

Last month, Awilco received the judgement on liability on the collision case involving 'WilForce' in May, 2019. As expected, the other vessel was found to have

caused the accident and appointed 75:25 liability and costs of the case.

The judgement is still open for appeal and the cost had not been settled to date.

Jon Skule Storheill, Awilco CEO, commented: "We are pleased to deliver another strong quarterly result of \$6 mill and a TCE of \$78,300 per day, as both our vessels sailed on fixed rate contracts throughout the quarter.

"The shift of demand from Asia to Europe caused by the war in Ukraine has led to shorter sailing distances and higher availability of

ships, which has led to a weak spot market at the start of the year.

"The weakening in the market has now been reversed and so far in the second quarter, we have seen the market gradually strengthen. Both our vessels are currently trading in the spot market in anticipation of improving longer-term rates.

"We focus on optimising performance but expect earnings for second quarter to come in lower than the previous quarters," he said.

Cash and cash equivalents

decreased from \$23.6 mill to \$18.8 mill during the quarter, while Awilco purchased 700,000 shares in CoolCo for \$7 mill.

Interest-bearing debt net of capitalised and amortising transaction costs was reduced by \$4.3 mill in the quarter to \$221.3 mill as at 31st March, 2022 in accordance with the repayment profile of the leases.

As of 31st March, the total book value of 'WilForce' and 'WilPride' was \$325.1 mill after depreciation of \$3.1 mill and capitalised cost for engine overhauls of \$1.3 mill in 1Q22. ■

Texas LNG contract awarded

In a joint venture, Technip Energies and Samsung Engineering have won the contract to develop Glenfarne's Texas LNG Brownsville export terminal.

To be constructed at Brownsville, Texas, the export plant will have a capacity of 4 mill tonnes of LNG per year.

Technip and Samsung will be responsible for all facets of the liquefaction facility's delivery, including engineering, construction co-ordination, start-up, and commissioning.

"We're proud to have selected such pre-eminent businesses as Technip Energies and Samsung Engineering to build our Texas LNG export facility," said Glenfarne CEO and Founder, Brendan Duval. "With the help of these partners, Texas LNG will be one of the cleanest LNG export facilities in the world, powered by renewable energy and providing access to secure energy supply for economies across the world."

"We're looking forward to supporting Texas LNG in its promise to provide environmentally-responsible, clean natural gas using our all electric, emissions free, SnapLNG™ design to its customers around the world," added Loic Chapuis, Senior Vice President Gas

and Low Carbon Energies, Technip Energies. "Our team of world-class LNG project engineers, working jointly with Samsung Engineering, will ensure that the facility will be capable of safe, reliable, and efficient natural gas export to global markets."

"Our team is excited to partner with Technip Energies and leverage our combined capabilities to drive the successful completion of this important project," said Cheonhong Park, Samsung Engineering's Executive Vice President and Head of Solution Business Division. "The combined resources of our two leading companies will be able to deliver excellence to Texas LNG and its global customers."

"Texas LNG will be one of the greenest LNG facilities globally with its innovative 'green by design' strategy that uses renewable energy to power the entire liquefaction process. In addition, Texas LNG is exploring partnerships with other like-minded companies to ensure that the upstream resources coming to the plant are responsibly produced," com-



Glenfarne has signed development contracts for the Texas LNG project

mented Vlad Bluzer, Glenfarne Managing Director and President of its LNG business.

Majority owner

Glenfarne, a developer, owner, and operator of energy transition infrastructure, is the majority owner and managing member of Texas LNG with Samsung as a minority stakeholder.

A final investment decision (FID) is expected this year and operations are due to commence

in 2026.

Glenfarne is also the sole owner and developer of the 8.8 mill tonnes per annum Magnolia LNG at Lake Charles, Louisiana.

Law firm White & Case advised Texas LNG Brownsville on the deal.

The team was led by partner, David Strickland and counsel Michael Yates (both Houston), with support from partners, Sean Goldstein (Miami) and Christopher Richardson (Houston). ■

Golar sees increased FLNG/FSRU inquiries

Golar LNG reported net income of \$345.2 mill for the first quarter of this year.

Adjusted EBITDA was \$93.4 mill for the quarter, which included the FLNG 'Hilli', 'Golar Arctic' and 'Golar Tundra', however excluding the eight TFDE vessels and management companies sold to Cool Company (CoolCo).

This sale is due to be finalised this quarter. In total, the CoolCo transactions will reduce the company's contractual debt position by \$821 mill, release around \$217 mill in cash and cash equivalents to Golar, whilst the company will

still maintain a 31.25% shareholding in CoolCo.

In addition, Golar sold 6.2 mill New Fortress Energy (NFE) shares in 2Q22, gaining net cash proceeds of \$253 mill. Golar now owns 12.4 mill NFE shares following the sale.

Total cash and listed securities increased by \$0.4 bill to \$1.3 bill during 1Q22, while the share of contractual debt decreased by \$0.5 bill to \$1.7 bill and a further \$0.5 bill in 2Q22 after the sale of

remaining LNGCs to CoolCo in April.

FLNG 'Hilli' maintained its unbroken four-year record of 100% uptime during the quarter and started to produce its additional 0.2 mill tonnes per year production, increasing scheduled production volume to 1.4 mill tonnes.

Conversion of the FLNG 'Gimi' for a 20-year contract with bp, scheduled to commence in 4Q23, is 83% technically complete. Once

delivered, 'Gimi' is expected to unlock around \$3 bill of earnings backlog to Golar, equivalent to \$151 mill in annual adjusted EBITDA.

Developments in Europe have created an urgent need for more floating LNG terminals. As a result, Golar had received multiple approaches from European governments and utility companies for the FSRU 'Golar Tundra', which was snapped up by Snam (see page 4).

RWE to offtake Port Arthur LNG

Sempra Infrastructure has signed a heads of agreement (HOA) with RWE Supply & Trading to purchase around 2.25 mill tonnes per annum of LNG.

The LNG will be supplied on a long-term, free-on-board (FOB) basis from the Port Arthur LNG Phase 1 project currently under development in Jefferson County, Texas.

"Sempra Infrastructure's LNG projects are uniquely positioned to help provide US LNG to support the energy security of America's allies in Europe, while also accelerating the transition to a lower carbon future. We are excited about the opportunity to work with one of Germany's top power producers to achieve these dual goals," said Justin Bird, Sempra Infrastructure CEO.

"We see opportunities to work together with RWE across the energy transition, including LNG, hydrogen and renewables. With this

agreement, we make significant progress toward the development of our Port Arthur LNG project and remain committed to lowering greenhouse gas (GHG) emissions across the LNG value chain through the use of new technologies and the improvement of key processes," he said.

Andree Stracke, RWE Supply & Trading CEO, added, "As RWE, we are very pleased to join forces with Sempra Infrastructure. Our partnership can contribute largely to securing significant LNG volumes for the RWE portfolio on a long-term basis while building the basis for supplying low carbon gas in the future."

The HOA is intended to pave the way for negotiations and finalisation of a 15-year LNG SPA for

2.25 mill tonnes per annum.

In addition, Sempra Infrastructure and RWE have agreed to work toward a broad framework for the reduction, mitigation, and reporting of GHG emissions associated with deliveries of LNG from Port Arthur LNG, including addressing the use of responsibly sourced natural gas as part of the project's feed gas supply and renewable energy as part of the project power mix.

Phase 1 of the Port Arthur LNG project is fully permitted and is expected to include two liquefaction trains and LNG storage tanks, as well as associated facilities capable of producing, under optimal conditions, up to about 13.5 mill tonnes per annum of LNG.

Conditions

Port Arthur LNG project's development remains subject to a number of conditions, including, among others, reaching definitive agreements, maintaining all necessary permits, finalising engineering and construction arrangements, obtaining financing and incentives, and reaching a final investment decision (FID), Sempra said.

The company has also entered into a memorandum of under-

standing (MoU) with Entergy Louisiana, a subsidiary of Entergy Corp, to develop options to accelerate the deployment of renewable energy to power its infrastructure located in vicinity of the Gulf Coast.

In addition, the company is developing Hackberry carbon sequestration, a planned carbon sequestration facility located in Southwest Louisiana expected to have the potential to sequester up to 2 mill tonnes per annum of CO₂ from LNG and other industrial facilities in the region and is developing opportunities to co-locate low-carbon hydrogen production at or near existing Sempra Infrastructure facilities.

It is also working with other companies to reduce GHG emissions across the US natural gas value chain, consistent with its aim to have net-zero GHG emissions by 2050.

The company is a founding member of Veritas, a GTI energy differentiated gas measurement and verification initiative, supporting Sempra Infrastructure and other customers' needs for responsibly sourced natural gas that is produced and transported using proven technologies that minimise GHG emissions.



RWE has committed to offtake Port Arthur LNG's gas

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LNGC used in deepsea autonomous ship trials

HD Hyundai subsidiary Avikus and SK Shipping have successfully carried out an autonomous navigation trial on board an LNGC across the Pacific.

The 180,000 cu m 'Prism Courage', was equipped with HiNAS 2.0, Avikus' Level 2 autonomous navigation solution. This deepsea voyage was claimed to be the world's first with a vessel using autonomous navigation technology.

'Prism Courage' sailed from Freeport (Texas) on 1st May. She passed through the Panama Canal, and arrived at the Boryeong LNG terminal in South Korea after 33 days.

The vessel sailed half of the roughly 20,000 km voyage by using the HiNAS 2.0 autonomous navigation technology.

Avikus' HiNAS 2.0 is a naviga-

tion system that creates optimal routes and speeds based on Hyundai Global Service's Integrated Smartship Solution (ISS).

Its artificial intelligence recognises the surrounding environment, such as weather and wave heights, and nearby ships, and then controls the vessel's steering commands in real-time.

The Level 2 autonomous navigation technology can control and operate the ship in addition to the functions of recognition and judgement - Level 1 autonomous navigation technology.

During the ocean crossing, the SK Shipping managed LNGC was

operated autonomously on the optimal routes, increasing her fuel efficiency by around 7%, while reducing greenhouse gas emissions by about 5%.

In addition, the system accurately recognised the locations of nearby ships over 100 times, thus avoiding a collision.

The voyage was conducted under real-time monitoring by American Bureau of Shipping (ABS) and the Korea Register of Shipping (KR) to verify the performance and stability of the technology.

Avikus plans to commercialise HiNAS 2.0 this year after receiving a certification from ABS confirming the results of the ocean crossing.

The LNGC's Capt Young-hoon Koh, said, "Avikus' autonomous navigation technology was greatly helpful in this ocean crossing test, especially for maintaining navigating routes, autonomously changing directions, and avoiding nearby ships, which were all increasing ship crews' work conveniences."

Avikus CEO, Do-hyeong Lim, added, "It is meaningful that we have successfully tested the Level 2 system to operate a vessel beyond the Level 1 technology providing optimal routes. We will lead

innovation by upgrading autonomous navigation solutions not only for large merchant ships but also for small leisure boats."

Avikus was launched in December, 2020 as the first in-house venture of Hyundai Heavy Industries Group. It conducted the first fully autonomous operation of a 12-seater cruise boat in South Korea.



On the bridge of the LNGC during the autonomous passage

LNGCs to be equipped with TMC's ALS compressors

TMC Compressors (TMC) has been awarded a contract to deliver marine air lubrication system (ALS) compressors to two LNGCs.

The vessels are being built by Hyundai Heavy Industries (HHI) for Korea Line Corp.

Each LNGC will be equipped with HHI's Hi-ALS air lubrication system. TMC will supply its frequency-controlled marine compressors for the systems.

The equipment will be manufactured in Scandinavia and shipped to HHI.

"ALS is a very efficient way of reducing drag, thereby cutting fuel consumption and associated

emissions substantially. It is one of many sensible paths towards a greener shipping industry," said Hans Petter Tanum, TMC's Director of Sales and Business Development.

TMC's frequency-controlled ALS compressors also offer fuel savings, compared to conventional compressors, the company claimed.

As the frequency-controlled technology offers precise control of the compressor speed, the speed of the electrical motor will adjust itself according to what is

required to produce the exact air volume necessary to meet the actual compressed air consumption at all times.

In turn, lower air consumption requires less speed on the compressor and this directly results in less power consumption.

"While the large majority of our ALS compressors have so far been supplied to newbuild vessels, it is worthwhile remembering that ALS can easily be retrofitted to existing vessels too," added Tanum.

NEWS NUDGE

Tellurian to raise cash

Tellurian has executed definitive agreements to sell \$500 mill principal amount of senior secured convertible notes, subject to customary closing conditions.

The notes will bear interest at 6% per annum, will expire on 1st May, 2025, and will be convertible into shares of Tellurian common stock at an initial conversion price of \$5.724, subject to customary adjustments.

Roth Capital Partners and Citigroup served as placement agents for the offering.

Yingkou project receives approval

China Urban Rural Energy (CURE), a wholly-owned subsidiary of China state-owned China Communications Construction Co Group, has obtained approval from the National Development and Reform Commission (NDRC) to build a LNG receiving terminal in Yingkou, northeast China Liaoning province.

According to CURE's social media platform, the Yingkou LNG terminal project has an approved LNG receiving capacity of 6.2 mill tonnes per year.

The project involves the construction of four LNG storage tanks of 200,000 cu m each and a jetty capable of berthing LNGCs of up to 266,000 cu m.

WinGD unveils on-engine emissions solution

Swiss marine power company WinGD has introduced an on-engine version of its iCER system.

This system enables the emissions reduction technology to be installed without impact on the engine footprint, the company claimed.

iCER was the first X-DF2.0 technology introduced to further boost the emissions performance and efficiency of the dual-fuel X-DF 2-stroke engine series, which has proved popular with LNGC owners and operators.

X-DF engines running on LNG already offer a more than 20% reduction in greenhouse gas emissions and a dramatic reduction in air pollution compared to fuel oil, WinGD said.

Its iCER delivers a 50% reduction of methane slip in gas mode. Combined with better fuel efficiency, this reduces total greenhouse gas emissions by up to 8% in gas mode. Running on diesel, iCER improves the emissions performance of X-DF engines by 6%.

The on-engine iCER offers the

same advantages, while simplifying testing, building and installation of the engine, as well as reducing the engine room space needed for emissions reduction equipment.

The exhaust gas cooler and all exhaust gas flow control components are installed on the engine, offering significant engine room design flexibility.

Dr Rudolf Holtbecker, WinGD's Executive Director of Operations, said: "The iCER technology is a vital component of our proven X-DF engine portfolio that has a clear role in supporting the marine industry's transition to cleaner, greener fuels and reducing the carbon footprint of a vessel.

"This important addition to the choices in our X-DF2.0 portfolio extends the benefits to all shipyards and global engine builders with an improved arrangement and a production-friendly design for minimised manufacturing and

installation costs," he said.

LNGC engines

On-engine iCER is initially available on WinGD's X72DF engines, which have become the standard on modern LNGCs. Minimising their methane slip has an added benefit for operators using cargo as a fuel, allowing them to maximise the value of the LNG delivered.

The technology will also be rolled out to other models in the X-DF engine range.

As well as reducing methane slip and total greenhouse gas emissions, both on- and off-engine iCERs enable compliance with IMO's Tier III NOx limits, whether using LNG or diesel fuels, WinGD said.

In addition, WinGD has published a white paper highlighting its holistic approach to help shipowners and operators to decarbonise their vessels.

The paper, entitled The X-Act

Initiative, outlines WinGD's development programmes in five areas - advanced engine technologies, core engine development, green technologies, digitalisation and integration, and the autonomous engine room.

Projects include the latest generation of dual-fuel engine technologies, on-engine emission abatement systems, alternative fuel developments and advances in hybrid energy system integration and control software.

WinGD has recently outlined the timeframe for adding ammonia and methanol capability to its engines.

The company has also invested in developing expertise in hybrid power arrangement design and integration. Its first system integration contract is underway for four newbuilding car carriers - featuring WinGD's X-DF dual-fuel LNG engines and batteries - being built for NYK Line. ■

NEWS NUDGE

GTT in five LNGC orders

Last month, GTT received an order from Hyundai Heavy Industries (HHI) and Hyundai Samho Heavy Industries (HSHI) for the tank design of four LNGCs.

Two will be built by HHI and the other two by HSHI on behalf of an undisclosed Asian shipowner.

GTT will design the tanks of the 174,000 cu m vessels.

They will each be fitted with the Mark III Flex membrane containment system and will be delivered between the first and the fourth quarters of 2025.

GTT has also received an order from Hyundai Samho Heavy Industries for the tank design of a new LNGC building on behalf of an Asian shipowner.

The vessel will also be of 174,000 cu m and will be fitted with a Mark III Flex system.

She is due for delivery in the fourth quarter of 2025.

Ships - Newbuildings, etc

ADNOC Logistics & Services has ordered three more LNGCs at Jiangnan Shipyard.

Brokers said that two were firmed up options, while the third was a new contract.

ADNOC said that they will each have a capacity of 175,000 cu m and are significantly larger than the current fleet, which has a capacity of 137,000 cu m each.

In April, the Abu Dhabi-based energy company announced that it would acquire two LNGCs. The latest order brings the total number of newbuildings to five, with the latest vessels scheduled for delivery in 2025 and 2026.

Meanwhile, Daewoo Shipbuilding & Marine Engineering (DSME) said this week that it had won a Won1.07 trillion order to build four LNGCs from a South Korean consortium on behalf of a Qatari

state oil firm.

DSME said it will build the 174,000 cu m LNGCs at the Okpo shipyard and deliver them by the first half of 2025.

One of the companies involved was rumoured to be Knutsen.

This order was said to be the first in a \$19 billion contract that DSME and Hyundai Heavy Industries and Samsung Heavy Industries signed with Qatar Petroleum in June, 2020 to construct more than 100 LNGCs through 2027, Yonhap newswire reported.

Elsewhere, the first newbuilding W-Max type LNGC for Petronas LNG, 'Lagenda Suria', was delivered by Hudong-Zhonghua Shipbuilding (Group) recently.

Two LNGCs were ordered under long-term timecharters.

The second is due to be named 'Lagenda Serenity' next month.

They will transport LNG from Malaysia (Bintulu) to Shenergy's terminal at Shanghai.

In addition, Capital Product Partners has exercised its right of first offer and acquired a 174,000 cu m X-DF LNGC from Capital Maritime & Trading Corp.

The LNGC, to be named 'Assterix I', is currently under construction at Hyundai Heavy Industries and is expected to be delivered to the Partnership in January, 2023.

She comes with a long-term timecharter to Hartree Partners Power & Gas Co (UK) Limited for a firm period of five years, which, together with an optional period, expires in 2031.

Brokers have also reported the first LNGC recycling deal thus far this year.

This involves the 1979 US-built 'Dahlia', ex 'Ocean Quest', ex 'Matthew', which had been lying idle at Labuan.

She was sold to Indian breakers for green recycling and arrived at Alang on 26th May and beached a day later. ■

Wärtsilä signs up LNGCs - extends another service agreement

Wärtsilä has signed a long-term Guaranteed Asset Performance Agreement with NYK LNG Ship Management.

This agreement is valid for 15 years. It covers the engines and related equipment for an LNGC and is designed to maximise the ship's uptime, while providing long-term cost predictability, and optimised maintenance costs, the company claimed.

The agreement includes the use of Wärtsilä's Expert Insight digital predictive maintenance solution.

By using artificial intelligence (AI) and advanced diagnostics, the service enables on board equipment and systems to be monitored in real-time onshore. Should anomalous behaviour be detected, it is flagged to specialists at Wärtsilä's Expertise Centres automatically, allowing them to support the customer pro-actively with an appropriate resolution to the issue.

Wärtsilä will also provide its Dynamic Maintenance Planning solution. This innovation takes advantage of Wärtsilä's experience and capabilities in digitalisation and analytics to optimise major overhaul intervals, without compromising reliability or engine efficiency while also guaranteeing

maintenance costs.

"Our remote operational support capabilities represent a benchmark for the industry and allow us to provide the level of support our customers need in today's operating environment. Agreements such as this are an integral element within Wärtsilä's lifecycle support approach," said Henrik Wilhelms, Director Agreement Sales at Wärtsilä.

Covered by the agreement are the vessel's three Wärtsilä 50DF dual-fuel engines, the Gas Valve Units (GVU) and turbochargers.

Two of NYK's sister LNGCs are supported by similar Wärtsilä agreements.

Agreement renewal

In another move, Wärtsilä has renewed an optimised maintenance agreement with Maran Gas Maritime.

The renewal will run for another five years, following the original five year agreement. It is designed to ensure operational certainty with controlled and predictable costs for Maran Gas's fleet of 21 TFDE LNGCs, which are powered by Wärtsilä 50DF



Wärtsilä has signed up more LNGCs

dual-fuel engines.

In addition to maintenance services, including scheduled parts and maintenance work for the engines and turbochargers, the agreement will feature all workshop services and a full support package of advanced solutions.

"Wärtsilä has efficiently and effectively planned and executed maintenance of these vessels' engines over the past five years and have provided valuable operational support. We are pleased, therefore, to renew this service for a further five years.

"The company's worldwide ser-

vice support network demonstrates a high level of professionalism, which is important to both us and to our charterers," said Maria Angelicoussis, Maran Gas' President and CEO.

"The renewal of this particular agreement with Maran Gas is a strong endorsement of the added value brought to our customers through Wärtsilä lifecycle agreements. We are delighted to continue providing Maran Gas with our value-adding services for a further five years," added Roger Holm, President Marine Power, Wärtsilä.

NEWS NUDGE

Indian FSRU to be commissioned this year

According to local media, Swan Energy is to commission its new-building FSRU this year.

Swan Energy is the developer and operator of a planned LNG receiving terminal offshore Jafrabad, Gujarat, which will make use of India's first newbuilding FSRU.

Its terminal will have a regasification capacity of 10 mill tonnes per annum of LNG and is being

implemented in phases.

The first phase involves LNG port facilities using an FSRU with a regasification capacity of 5 mill tonnes per annum and an FSU connected for ship-to-ship transfers.

Vivek Merchant, the project's general manager told the *India*

Times that the company had signed regasification agreements with Gujarat State Petroleum Corp, Indian Oil Corp, Bharat Petroleum Corp, and Oil and Natural Gas Corp, which covers the whole 5 mill tonnes capacity for 20 years.

Monthly Large LNGC Values*

Newbuildings (174,000 cu m)	\$218.86 mill
Five years old (174,000 cu m)	\$171.53 mill
Total Fleet (545 ships)	\$67.75 bill
Orderbook (218 ships)	\$49.37 bill

*Source: VesselsValue (23/05/22)

*The above is updated each month courtesy of VesselsValue

LNG rate assessments

Spot market (155,000-165,000 cu m)

Region	This week	Change*
East of Suez	\$86,000	+\$17,000
West of Suez	\$96,000	+\$19,000
12 mos T/C	\$120,000	+\$10,000

*Since last report (26/05/22)

Source: Fearnleys (08/06/22)



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WORLD LNG CARRIER ORDERBOOK

Name	Owners	Yard	Ordered	Capacity	Propulsion	Delivery
Minerva Amorgos	Minerva Marine	Samsung	1/1/2019	174,000	XDF	Q4, 2022
Clean Cajun	Dynagas	Hyundai Heavy	5/22/2019	200,000	XDF	Q2, 2022
Clean Copano	Dynagas	Hyundai Heavy	5/22/2019	200,000	XDF	Q3, 2022
Orion Star	JP Morgan	Samsung	6/1/2019	174,000	XDF	Q2, 2022
Orion Sun	JP Morgan	Samsung	6/1/2019	174,000	XDF	Q2, 2022
Prism Diversity	SK Shipping	Hyundai Heavy	6/29/2019	180,000	XDF	Q3, 2022
Asterix I	Capital Gas	Hyundai Heavy	8/1/2019	174,000	XDF	Q1, 2023
Hudong-zhonghua H1829a	CSSC	Hudong-Zhonghua	8/1/2019	174,000	XDF	Q1, 2024
Hudong-zhonghua H1830a	CSSC	Hudong-Zhonghua	8/1/2019	174,000	XDF	Q2, 2024
Alexey Kosygin	Smart LNG	Zvezda SSK	9/1/2019	172,600	TFDE - Azipod	Q1, 2023
Pyotr Stolypin	Smart LNG	Zvezda SSK	9/1/2019	172,600	TFDE - Azipod	Q3, 2023
Sergei Witte	Smart LNG	Zvezda SSK	9/1/2019	172,600	TFDE - Azipod	Q4, 2023
Zvezda 044	Smart LNG	Zvezda SSK	9/1/2019	172,600	TFDE - Azipod	Q4, 2023
Zvezda 045	Smart LNG	Zvezda SSK	9/1/2019	172,600	TFDE - Azipod	Q4, 2023
Bw Cassia	BWGas	DSME	10/1/2019	174,000	MEGI	Q3, 2022
Bw Iris	BWGas	DSME	10/1/2019	174,000	MEGI	Q3, 2022
Samsung 2364	MISC	Samsung	10/10/2019	174,000	XDF	Q1, 2023
Samsung 2365	MISC	Samsung	10/10/2019	174,000	XDF	Q1, 2023
Vivit Arabia Lng	H-Line	Hyundai Samho	12/1/2019	174,000	XDF	Q2, 2022
Alicante Knutsen	Knutsen	Hyundai Samho	12/18/2019	174,000	XDF	Q4, 2022
Huelva Knutsen	Knutsen	Hyundai Samho	12/18/2019	174,000	XDF	Q4, 2022
Malaga Knutsen	Knutsen	Hyundai Samho	12/18/2019	174,000	XDF	Q3, 2022
Santander Knutsen	Knutsen	Hyundai Samho	12/18/2019	174,000	XDF	Q2, 2022
Sm Albatross	Korea Line	Hyundai Heavy	12/18/2019	174,000	XDF	Q3, 2022
Sm Bluebird	Korea Line	Hyundai Heavy	12/18/2019	174,000	XDF	Q4, 2022
Lng Prosperity	JP Morgan	Hyundai Heavy	12/19/2019	174,000	XDF	Q4, 2022
Orion Song	JP Morgan	Hyundai Heavy	12/19/2019	174,000	XDF	Q4, 2022
Grace Freesia	NYK	Hyundai Samho	12/27/2019	173,000	XDF	Q2, 2022
Lagenda Serenity	K-Line	Hudong-Zhonghua	1/1/2020	79,960	XDF	Q2, 2022
Lagenda Suria	K-Line	Hudong-Zhonghua	1/1/2020	79,960	XDF	Q2, 2022
Hudong-zhonghua H1831a	ULT	Hudong-Zhonghua	6/30/2020	174,000	XDF	Q3, 2022
Hudong-zhonghua H1832a	ULT	Hudong-Zhonghua	6/30/2020	174,000	XDF	Q1, 2023
Hudong-zhonghua H1833a	ULT	Hudong-Zhonghua	6/30/2020	174,000	XDF	Q2, 2023
Lng Harmony	JP Morgan	Hyundai Heavy	7/20/2020	174,000	XDF	Q3, 2023
Orion Sage	JP Morgan	Hyundai Heavy	7/20/2020	174,000	XDF	Q3, 2023
El Ferrol Knutsen	Knutsen	Hyundai Samho	7/30/2020	174,000	XDF	Q4, 2022
Extremadura Knutsen	Knutsen	Hyundai Samho	7/30/2020	174,000	XDF	Q1, 2023
Daewoo 2514	Sovcomflot	DSME	8/1/2020	172,500	TFDE - Azipod	Q1, 2023
Daewoo 2515	Sovcomflot	DSME	8/1/2020	172,500	TFDE - Azipod	Q2, 2023
Daewoo 2516	Sovcomflot	DSME	8/1/2020	172,500	TFDE - Azipod	Q3, 2023
Daewoo 2517	MOL, COSCO	DSME	8/1/2020	172,500	TFDE - Azipod	Q3, 2023
Daewoo 2518	MOL, COSCO	DSME	8/1/2020	172,500	TFDE - Azipod	Q4, 2023
Daewoo 2519	MOL, COSCO	DSME	8/1/2020	172,500	TFDE - Azipod	Q4, 2023
Zvezda 046	Smart LNG	Zvezda SSK	8/1/2020	172,600	TFDE - Azipod	Q3, 2024
Zvezda 047	Smart LNG	Zvezda SSK	8/1/2020	172,600	TFDE - Azipod	Q3, 2024
Zvezda 048	Smart LNG	Zvezda SSK	8/1/2020	172,600	TFDE - Azipod	Q4, 2024
Zvezda 049	Smart LNG	Zvezda SSK	8/1/2020	172,600	TFDE - Azipod	Q4, 2024
Zvezda 050	Smart LNG	Zvezda SSK	8/1/2020	172,600	TFDE - Azipod	Q4, 2024

Name	Owners	Yard	Ordered	Capacity	Propulsion	Delivery
Zvezda 051	Smart LNG	Zvezda SSK	8/1/2020	172,600	TFDE - Azipod	Q3, 2025
Zvezda 052	Smart LNG	Zvezda SSK	8/1/2020	172,600	TFDE - Azipod	Q3, 2025
Zvezda 053	Smart LNG	Zvezda SSK	8/1/2020	172,600	TFDE - Azipod	Q4, 2025
Zvezda 054	Smart LNG	Zvezda SSK	8/1/2020	172,600	TFDE - Azipod	Q4, 2025
Zvezda 055	Smart LNG	Zvezda SSK	8/1/2020	172,600	TFDE - Azipod	Q4, 2025
Sm Golden Eagle	Korea Line	Hyundai Heavy	8/12/2020	174,000	XDF	Q3, 2023
Sm Kestrel	Korea Line	Hyundai Heavy	8/12/2020	174,000	XDF	Q4, 2023
Grazyna Gesicka	Knutsen	Hyundai Heavy	10/30/2020	174,000	XDF	Q2, 2023
Lech Kaczynski	Knutsen	Hyundai Heavy	10/30/2020	174,000	XDF	Q1, 2023
Samsung 2425	Maran Gas Maritime	Samsung	11/1/2020	174,000	XDF	Q3, 2023
Hyundai Samho 8100	Knutsen	Hyundai Samho	12/14/2020	174,000	XDF	Q3, 2024
Orion Sky	JP Morgan	Hyundai Heavy	12/14/2020	174,000	XDF	Q4, 2024
Hyundai Ulsan 3221	Pan Ocean	Hyundai Heavy	12/15/2020	174,000	XDF	Q3, 2024
Hyundai Ulsan 3222	Pan Ocean	Hyundai Heavy	12/15/2020	174,000	XDF	Q4, 2024
Samsung 2426	Pan Ocean	Samsung	1/1/2021	174,000	XDF	Q2, 2023
Jules Verne	Sovcomflot	Hyundai Samho	1/8/2021	174,000	XDF	Q2, 2023
Hudong-zhonghua H1837a	Shenzhen Gas	Hudong-Zhonghua	3/21/2021	79,960	XDF	Q1, 2023
Hyundai Ulsan 3294	Hyundai LNG Shipping	Hyundai Heavy	4/15/2021	174,000	XDF	Q1, 2024
Hyundai Ulsan 3295	Hyundai LNG Shipping	Hyundai Heavy	4/29/2021	174,000	XDF	Q2, 2024
Hyundai Ulsan 3296	Hyundai LNG Shipping	Hyundai Heavy	4/29/2021	174,000	XDF	Q3, 2024
Hyundai Samho 8139	Knutsen	Hyundai Samho	4/30/2021	174,000	XDF	Q4, 2023
Jiangnan H2637	Jovo Energy	Jiangnan	5/1/2021	79,800	XDF	Q4, 2023
Samsung 2473	Maran Gas Maritime	Samsung	5/1/2021	174,000	XDF	Q3, 2024
Samsung 2474	Maran Gas Maritime	Samsung	5/1/2021	174,000	XDF	Q3, 2024
Daewoo 2521	Hyundai LNG Shipping	DSME	5/28/2021	174,000	MEGI	Q3, 2023
Hyundai Ulsan 3290	Dynagas	Hyundai Heavy	5/31/2021	200,000	ME-GA	Q4, 2023
Hyundai Ulsan 3291	Dynagas	Hyundai Heavy	5/31/2021	200,000	ME-GA	Q4, 2023
Hyundai Ulsan 3292	Dynagas	Hyundai Heavy	5/31/2021	200,000	ME-GA	Q1, 2024
Hyundai Ulsan 3293	Dynagas	Hyundai Heavy	5/31/2021	200,000	ME-GA	Q3, 2023
Daewoo 2520	MOL	DSME	6/1/2021	174,000	MEGI	Q4, 2023
Amore Mio I	Capital Gas	Hyundai Heavy	6/18/2021	174,000	ME-GA	Q4, 2023
Axios II	Capital Gas	Hyundai Heavy	6/18/2021	174,000	ME-GA	Q4, 2023
Alexandre Dumas	Sovcomflot	Hyundai Samho	7/1/2021	170,520	XDF	Q1, 2024
Hyundai Samho 8147	H-Line	Hyundai Samho	7/1/2021	174,000	XDF	Q3, 2023
Samsung 2459	Celsius Shipping	Samsung	7/1/2021	180,000	ME-GA	Q2, 2023
Samsung 2460	Celsius Shipping	Samsung	7/1/2021	180,000	ME-GA	Q3, 2023
Samsung 2461	Celsius Shipping	Samsung	7/1/2021	180,000	ME-GA	Q4, 2023
Victor Hugo	Sovcomflot	Hyundai Samho	7/1/2021	170,520	XDF	Q3, 2024
Hyundai Samho 8101	Knutsen	Hyundai Samho	7/13/2021	174,000	XDF	Q4, 2023
Hyundai Samho 8102	Knutsen	Hyundai Samho	7/13/2021	174,000	ME-GA	Q3, 2025
Hyundai Ulsan 3320	JP Morgan	Hyundai Heavy	7/13/2021	174,000	ME-GA	Q3, 2025
Hyundai Ulsan 3321	JP Morgan	Hyundai Heavy	7/13/2021	174,000	ME-GA	Q3, 2025
Hyundai Ulsan 3224	Pan Ocean	Hyundai Heavy	7/14/2021	174,000	ME-GA	Q4, 2024
Hyundai Ulsan 3225	Pan Ocean	Hyundai Heavy	7/14/2021	174,000	ME-GA	Q4, 2024
Daewoo 2522	Hyundai LNG Shipping	DSME	7/15/2021	174,000	MEGI	Q2, 2024
Hyundai Samho 8148	Knutsen	Hyundai Samho	7/22/2021	174,000	XDF	Q1, 2024
Hyundai Samho 8149	Knutsen	Hyundai Samho	7/22/2021	174,000	ME-GA	Q1, 2024
Hyundai Ulsan 3297	Hyundai LNG Shipping	Hyundai Heavy	7/22/2021	174,000	XDF	Q2, 2024
Hyundai Ulsan 3298	Hyundai LNG Shipping	Hyundai Heavy	7/22/2021	174,000	XDF	Q4, 2024
Hyundai Ulsan 3299	Hyundai LNG Shipping	Hyundai Heavy	7/22/2021	174,000	XDF	Q1, 2025

Name	Owners	Yard	Ordered	Capacity	Propulsion	Delivery
Samsung 2579	Celsius Shipping	Samsung	7/26/2021	180,000	ME-GA	Q1, 2024
Samsung 2584	Celsius Shipping	Samsung	8/1/2021	180,000	ME-GA	Q3, 2024
Samsung 2585	Celsius Shipping	Samsung	8/1/2021	180,000	ME-GA	Q3, 2024
Hudong-zhonghua H1838a	K-Line	Hudong-Zhonghua	9/1/2021	79,960	XDF	Q3, 2023
Hyundai Samho 8140	Capital Gas	Hyundai Samho	9/1/2021	174,000	ME-GA	Q3, 2024
Daewoo 2523	MOL	DSME	9/14/2021	174,000	ME-GA	Q1, 2024
Daewoo 2524	MOL	DSME	9/14/2021	174,000	ME-GA	Q2, 2024
Daewoo 2525	MOL	DSME	9/14/2021	174,000	ME-GA	Q3, 2024
Daewoo 2526	MOL	DSME	9/14/2021	174,000	ME-GA	Q4, 2024
Daewoo 2527	MOL	DSME	10/1/2021	174,000	ME-GA	Q3, 2024
Hudong-Zhonghua QP #1	Qatar Petroleum	Hudong-Zhonghua	10/1/2021	175,000	XDF	Q3, 2024
Hudong-Zhonghua QP #2	Qatar Petroleum	Hudong-Zhonghua	10/1/2021	175,000	XDF	Q1, 2024
Hudong-Zhonghua QP #3	Qatar Petroleum	Hudong-Zhonghua	10/1/2021	175,000	XDF	Q4, 2024
Hudong-Zhonghua QP #4	Qatar Petroleum	Hudong-Zhonghua	10/1/2021	175,000	XDF	Q1, 2025
MOL 23	MOL	DSME	10/1/2021	174,000	ME-GA	Q3, 2023
MOL 25	MOL	DSME	10/1/2021	174,000	ME-GA	Q3, 2025
MOL 26	MOL	DSME	10/1/2021	174,000	ME-GA	Q3, 2026
Samsung 2580	NYK	Samsung	10/1/2021	174,000	XDF	Q3, 2023
Samsung 2581	NYK	Samsung	10/1/2021	174,000	XDF	Q4, 2023
Samsung 2582	NYK	Samsung	10/1/2021	174,000	XDF	Q4, 2023
Samsung 2583	NYK	Samsung	10/1/2021	174,000	XDF	Q1, 2024
Samsung 2592	JP Morgan	Samsung	10/1/2021	174,000		Q2, 2024
Samsung 2593	JP Morgan	Samsung	10/1/2021	174,000		Q3, 2024
Samsung 2594	JP Morgan	Samsung	10/1/2021	174,000		Q4, 2024
Samsung 2595	JP Morgan	Samsung	10/1/2021	174,000		Q1, 2025
Hyundai Ulsan 3341	Capital Gas	Hyundai Heavy	11/4/2021	174,000	ME-GA	Q2, 2024
Hyundai Ulsan 3342	Capital Gas	Hyundai Heavy	11/4/2021	174,000	ME-GA	Q2, 2024
Qatar DSME 1/4	Qatar Petroleum	DSME	11/7/2021	174,000	MEGI	Q1, 2025
Qatar DSME 2/4	Qatar Petroleum	DSME	11/7/2021	174,000	MEGI	Q3, 2025
Qatar DSME 3/4	Qatar Petroleum	DSME	11/7/2021	174,000	MEGI	Q2, 2025
Qatar DSME 4/4	Qatar Petroleum	DSME	11/7/2021	174,000	MEGI	Q4, 2025
Qatar SHI 1/2	Qatar Petroleum	Samsung	11/7/2021	174,000	ME-GA	Q1, 2025
Qatar SHI 2/2	Qatar Petroleum	Samsung	11/7/2021	174,000	ME-GA	Q1, 2025
Daewoo 2528	Maran Gas Maritime	DSME	11/10/2021	174,000	MEGI	Q3, 2024
Daewoo 2529	Maran Gas Maritime	DSME	11/10/2021	174,000	MEGI	Q4, 2024
Daewoo 2530	BWGas	DSME	11/25/2021	174,000	MEGI	Q1, 2025
Daewoo 2531	BWGas	DSME	11/25/2021	174,000	MEGI	Q2, 2025
Qatar HHI 1	Qatar Petroleum	Hyundai Heavy	11/29/2021	174,000		Q1, 2025
Qatar HHI 2	Qatar Petroleum	Hyundai Heavy	11/29/2021	174,000		Q1, 2025
Qatar HHI 3	Qatar Petroleum	Hyundai Heavy	11/29/2021	174,000		Q2, 2025
Qatar HHI 4	Qatar Petroleum	Hyundai Heavy	11/29/2021	174,000		Q3, 2025
Samsung 2600	JP Morgan	Samsung	12/1/2021	174,000		Q3, 2024
Samsung 2601	JP Morgan	Samsung	12/1/2021	174,000		Q1, 2025
Samsung 2598	Celsius Shipping	Samsung	12/7/2021	180,000	ME-GA	Q1, 2025
Samsung 2599	Celsius Shipping	Samsung	12/7/2021	180,000	ME-GA	Q2, 2025
Hudong-zhonghua H1834a	ULT	Hudong-Zhonghua	12/8/2021	174,000	XDF	Q3, 2024
Hudong-zhonghua H1835a	ULT	Hudong-Zhonghua	12/8/2021	174,000	XDF	Q4, 2024
Hudong-zhonghua H1836a	ULT	Hudong-Zhonghua	12/8/2021	174,000	XDF	Q1, 2025
Samsung 2604	NYK	Samsung	12/27/2021	174,000	XDF	Q4, 2024
Daewoo 2532	GasLog	DSME	1/1/2022	174,000	MEGI	Q2, 2024

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 = Data last updated = 12th April 2022

Name	Owners	Yard	Ordered	Capacity	Propulsion	Delivery
Daewoo 2533	GasLog	DSME	1/1/2022	174,000	MEGI	Q3, 2024
Daewoo 2534	GasLog	DSME	1/1/2022	174,000	MEGI	Q2, 2025
Daewoo 2535	GasLog	DSME	1/1/2022	174,000	MEGI	Q3, 2025
NYK 2	NYK	Hyundai Samho	1/1/2022	174,000	XDF	Q1, 2025
Qatar SHI 3	Qatar Petroleum	Samsung	1/1/2022	174,000	ME-GA	Q1, 2025
Qatar SHI 4	Qatar Petroleum	Samsung	1/1/2022	174,000	ME-GA	Q2, 2025
Hyundai Samho 8173	SK Shipping	Hyundai Samho	1/4/2022	174,000	ME-GA	Q3, 2024
Daewoo 2537	Maran Gas Maritime	DSME	1/6/2022	174,000	MEGI	Q3, 2025
Daewoo 2538	Maran Gas Maritime	DSME	1/6/2022	174,000	MEGI	Q4, 2025
Hudong-zhonghua H1880a	MOL	Hudong-Zhonghua	1/7/2022	174,000	XDF	Q4, 2024
Hudong-zhonghua H1881a	MOL	Hudong-Zhonghua	1/7/2022	174,000	XDF	Q3, 2025
Hudong-zhonghua H1882a	MOL	Hudong-Zhonghua	1/7/2022	174,000	XDF	Q4, 2025
Hudong-zhonghua H1883a	MOL	Hudong-Zhonghua	1/7/2022	174,000	XDF	Q1, 2026
Hudong-zhonghua H1884a	MOL	Hudong-Zhonghua	1/7/2022	174,000	XDF	Q2, 2026
Hudong-zhonghua H1885a	MOL	Hudong-Zhonghua	1/7/2022	174,000	XDF	Q3, 2026
Samho Jan		Hyundai Samho	1/10/2022	174,000	ME-GA	Q1, 2025
Daewoo	MOL	DSME	1/17/2022	174,000	ME-GA	Q4, 2024
Daewoo 2539	Maran Gas Maritime	DSME	2/7/2022	174,000	MEGI	Q4, 2025
Daewoo 2540	Maran Gas Maritime	DSME	2/7/2022	174,000	MEGI	Q4, 2025
Bono Samho 1	Bono Energy	Hyundai Samho	2/10/2022	174,000	ME-GA	Q1, 2025
Bono Samho 2	Bono Energy	Hyundai Samho	2/10/2022	174,000	ME-GA	Q1, 2025
Qatar DSME 5	Qatar Petroleum	DSME	2/15/2022	174,000	MEGI	Q2, 2025
Qatar HHI 5	Qatar Petroleum	Hyundai Heavy	2/15/2022	174,000		Q3, 2025
Qatar HHI 6	Qatar Petroleum	Hyundai Heavy	2/15/2022	174,000		Q4, 2025
Qatar SHI 5	Qatar Petroleum	Samsung	2/15/2022	174,000	ME-GA	Q2, 2025
HL 1	H-Line	Samsung	2/16/2022	174,000		Q1, 2025
HL 2	H-Line	Samsung	2/16/2022	174,000		Q2, 2025
HL 3	H-Line	Samsung	2/16/2022	174,000		Q3, 2025
HL 4	H-Line	Samsung	2/16/2022	174,000		Q3, 2025
Glovis Samho	Hyundai Glovis	Hyundai Samho	2/21/2022	174,000		Q4, 2024
Samsung 1		Samsung	2/24/2022	174,000		Q2, 2025
Samsung 2		Samsung	2/24/2022	174,000		Q2, 2025
Samsung 3		Samsung	2/24/2022	174,000		Q3, 2025
Samsung 4		Samsung	2/24/2022	174,000		Q3, 2025
Jiangnan ADNOC 1	ADNOC	Jiangnan	3/1/2022	175,000	XDF	Q1, 2025
Jiangnan ADNOC 2	ADNOC	Jiangnan	3/1/2022	175,000	XDF	Q2, 2025
HHI 1	Dynagas	Hyundai Heavy	3/3/2022	200,000	ME-GA	Q1, 2025
HHI 2	Dynagas	Hyundai Heavy	3/3/2022	200,000	ME-GA	Q2, 2025
HHI 3	Dynagas	Hyundai Heavy	3/3/2022	200,000	ME-GA	Q4, 2025
BW DSME 3	BWGas	DSME	3/18/2022	174,000	MEGI	Q4, 2025
BW DSME 4	BWGas	DSME	3/18/2022	174,000	MEGI	Q4, 2025
VG DSME 1	Venture Global LNG	DSME	3/24/2022	200,000		Q3, 2025
VG DSME 2	Venture Global LNG	DSME	3/24/2022	200,000		Q4, 2025
VG DSME 3	Venture Global LNG	DSME	3/24/2022	200,000		Q4, 2025
Dalian Merchant 1	China Merchant	Dalian Shipbuilding	3/31/2022	175,000	XDF	Q3, 2025
Dalian Merchant 2	China Merchant	Dalian Shipbuilding	3/31/2022	175,000	XDF	Q2, 2026
Samho 1	Knutzen	Hyundai Samho	3/31/2022	174,000	ME-GA	Q1, 2026
Samho 2	Knutzen	Hyundai Samho	3/31/2022	174,000	ME-GA	Q2, 2025
Samsung Apr	Celsius Shipping	Samsung	3/31/2022	180,000	ME-GA	Q4, 2025

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	Anthony Veder
2010	Coral Fraseri	10,000	LNG/LPG/Ethylene	Worldwide	No	Anthony Veder
2011	Coral Furcata	10,000	LNG/LPG/Ethylene	Worldwide	No	Anthony Veder
2011	Coral Fungia	10,000	LNG/LPG/Ethylene	Worldwide	No	Anthony Veder
2011	Akebono Maru	3,556	LNG	Japan	Yes	Chuo Kaiun
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	Coral Anthelia	6,500	LNG/Ethylene			Anthony Veder
2013	JX Energy TBN	2,500	LNG	Japan	Yes	JX Energy
2013	Kakuyu Maru	2,500	LNG	Japan	Yes	Tsurumi Sunmarine
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	LNG Barge TBN	3,000	LNG	US Coast	Yes	LNG America
2015	PetroChina TBN	30,000	LNG	China		PetroChina
2016	Hai Yang Shi You 301	30,000	LNG	Bali FSU	Yes	CETS (CNOOC)
2016	Clean Jacksonville	2,200	LNG	US Coast	Yes	CME
2016	JS Ineos Indepence	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2016	JS Ineos Innvovation	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	LNG Prime	2,250	LNG	Northwest Europe	Yes	Veka Deen LNG
2017	Coralius	5,800	LNG	Northwest Europe/Baltics	Yes, for Skangas	Anthony Veder
2017	Coral EnergiCE	18,000	LNG	Northwest Europe/Baltics	Yes	Anthony Veder
2017	Coral Encanto	30,000	LNG	China	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	Oizmendi	600	LNG	Spain	Yes	Itsas Gas
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	Green Zeebrugge	5,000	LNG	Northwest Europe	Yes	NYK
2017	New Frontier 1	6,500	LNG	Northwest Europe	Yes	Shell
2018	Kairos	7,500	LNG	Baltic	Yes	Bernhard Schulte
2018	LNG London	3,000	LNG	Northwest Europe	Yes	Shell

Built	Name	CBM	Cargo Type	Trading area	Trading in LNG?	Ship Owner / Operator
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	Bunker Breeze	1,200	LNG	Barcelona	Yes	Suardiaz Energy Shipping
2018	HUA XIANG 8	13,720	LNG	China	Yes	Zhejiang Huaxiang
2019	SM Jeju LNG1	7,500	LNG	Korea	Yes	Korea Line
2019	Gas Agility	18,600	LNG	NWE	Yes	MOL
2019	Flexfueller 001	1,480	LNG	Amsterdam	Yes	Titan LNG
2020	Avenir Advantage	7,500	LNG	Mediterranean	Yes	Avenir LNG
2020	Avenir Accolade	7,500	LNG	Mediterranean	Yes	Avenir LNG
2020	Avenir Aspiration	7,500	LNG		Yes	Avenir LNG
2020	Kaguya	3,500	LNG	Japan	Yes	CLS
2020	CNTIC VPOWER Global	28,000	LNG	Myanmar	Yes	Dalian Inteh Group
2020	Ecobunker Tokyo Bay	2,500	LMG	Japan	Yes	Ecobunkers
2020	Optimus	6,000	LNG	NWE	Yes	Elenger
2020	FueLNG Bellina	7,500	LNG	Singapore	Yes	FueLNG
2020	SM Jeju LNG2	7,500	LNG	Korea	Yes	Korea Line
2020	Q-LNG 4000	4,000	LNG	US Coast	Yes	Q-LNG Transport/Harvey Gulf
2020	Flexfueller 002	1,480	LNG	Antwerp	Yes	Titan LNG
2021	Xin Ao Pu Tuo Hao	8,500	LNG	China	Yes	ENN
2021	Avenir Ascension	7,500	LNG		Yes	Avenir LNG
2021	Hai Gang Wei Lai	20,000	LNG	China	Yes	SSES
2021	Bergen LNG	850	LNG	Norway	Yes	Bergen Tankers
2021	Dmitry Mendeleev	5,800	LNG	Russia	Yes	Gazprom Neft
2021	JMU TBN	2,500	LNG	Japan	Yes	JMU
2021	Ravenna Knutsen	30,000	LNG	Mediterranean	Yes	Knutsen OAS
2021	Brassavola	12,000	LNG	Singapore	Yes	MOL
2021	Gas Vitality	18,600	LNG	Mediterranean	Yes	MOL
2021	TG TBN	500	LNG	Korea	Yes	Trans Gas
2021	Titan Hyperion	8,000	LNG	Benelux	Yes	Titan LNG
2022	Coral Nordic	30,000	LNG	Worldwide	Yes	Anthony Veder
2022	Avenir Achievement	20,000	LNG	Worldwide	Yes	Avenir LNG
2022	Haugesund Knutsen	5,000	LNG	Spain	Yes	Knutsen OAS
2022	Clean Cañaveral	5,400	LNG	USG	Yes	PNE
2022	K.Lotus	18,000	LNG	Korea	Yes	K Line
2023	Cryopeak TBA	4,000	LNG	West Canada	Yes	Cryopeak
2023	Knutsen TBN	12,500	LNG	Spain	Yes	Knutsen OAS
2023	SM Jeju LNG3	7,500	LNG	Korea	Yes	Korea Line
2023	Pan Ocean TBN	18,000	LNG	USG	Yes	Pan Ocean Co
2023	Krios	4,200	LNG	Benelux	Yes	Titan LNG
2023	Fratelli Cosulich TBN	8,000	LNG	Mediterranean	Yes	Fratelli Cosulich
2023	Kanfer TBN	6,000	LNG	Worldwide	Yes	Kanfer Shipping
2023	Kanfer TBN	6,000	LNG	Worldwide	Yes	Kanfer Shipping
2023	PNE TBN	5,500	LNG	USG	Yes	PNE
2024	Avenir TBN (option)	20,000	LNG	Worldwide	Yes	Avenir LNG
2024	Avenir TBN (option)	20,000	LNG	Worldwide	Yes	Avenir LNG
2024	TBN	30,000	LNG	Australia	Yes	Anthony Veder ?
2024	Crowley TBN	12,000	LNG	US Coast	Yes	Crowley Maritime
2024	CNOOC TBN	12,000	LNG	China	Yes	CNOOC
2024	TBN	12,500	LNG	Worldwide	Yes	???
2024	Keys TBN	3,500	LNG	Japan	Yes	Keys Bunkering West Japan Co
2026	Avenir TBN (option)	20,000	LNG	Worldwide	Yes	Avenir LNG
2026	Avenir TBN (option)	20,000	LNG	Worldwide	Yes	Avenir LNG