

LNG Shipping News

AN LNG JOURNAL TITLE ON LNG CARRIERS

31 October 2019

Chinese/US LNGC sanction issues resolved

Teekay Corp and Teekay LNG Partners have confirmed that COSCO Shipping Energy Transportation has completed an ownership restructuring on arms-length terms, due to US sanctions.

As a result, Teekay LNG's joint venture partner, China LNG Shipping (Holdings), is no longer being classed as a 'Blocked Person' under US Office of Foreign Assets Control (OFAC) rules.

Accordingly, Teekay LNG's 50/50 joint venture with China LNG, which owns four Arc7s plus two Arc7 newbuildings, is also no longer classified as a 'Blocked Person' under OFAC rules.

The four operational Arc7s are continuing to operate under their long-term contracts transporting gas from the Yamal LNG project and the remaining two newbuildings are expected to be delivered in the fourth quarter of this year, Teekay said.

Yamal LNG operator Novatek commented that it had also received notification from TC LNG



The joint venture's 'Nikolay Urvantsev' recently delivered a Yamal cargo to France

Shipping (TC LNG), the joint-venture owning the Arc7s, that the company was no longer considered a 'Blocked Person' under the US OFAC rules.

TC LNG, a joint-venture between Teekay LNG and China LNG Shipping (Holdings), owns seven Arc7s that are continuing to serve the Yamal LNG project, Novatek said.

Arc7 deliveries

Meanwhile, the latest Arc7 has entered into service recently.

Another was believed to be waiting outside Yamal LNG's plant, according to Refinitiv shipping data.

'Nikolay Urvantsev' has deliv-

ered her first cargo from Novatek-operated Yamal LNG plant, to France, while 'Georgiy Ushakov' was reported to be stationary just outside the entrance of the Gulf of Ob last week.

'Georgiy Ushakov' is one of six Icebreaking LNGCs that is owned by the 50-50 joint venture involving Teekay LNG and China LNG Shipping, a unit of COSCO Dalian (see above).

The seventh and last of the Arc7s to be built by Daewoo, 'Yakov Gakkel', was still thought to be on trials. She is also owned by the Teekay/China LNG Shipping venture. ■

Mexican export terminal to take FID early next year

Infraestructura Energetica Nova (IENOVA) expects to make a final investment decision (FID) on building the first phase of its Mexican Energia Costa Azul (ECA) LNG export plant in early 2020, the company's CEO told Reuters

Previously, IENOVA, a unit of Californian-based energy company Semptra Energy, said it had planned the FID in late 2019.

CEO Tania Ortiz Mena Lopez Negrete told analysts in an earnings call last week that the company was running the engineering, procurement and

construction (EPC) bid process in order to select a contractor and determine the capital expenditure for the facility.

She said that bid process will be ongoing through the end of this year. She also said the company was negotiating definitive agreements with its customers, Total, Mitsui & Co and Tokyo Gas.

In addition, she said the company was in the process of obtaining the last major permit needed for the project in Mexico - the gas export permit, Reuters reported.

The company had said the

project, located in Baja California, could make its first LNG deliveries in 2023.

If built, ECA will have an advantage over most US projects, as it will be much closer to Asian markets, like China.

ECA's first phase is designed to be a single-train liquefaction facility capable of producing about 2.4 mill tonnes per year of LNG.

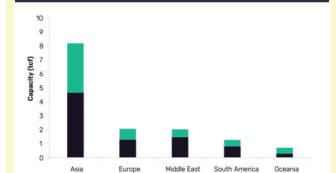
It will be located at the company's existing LNG import terminal, which can process about 1 billion cu ft per day of gas and which has been operating since 2008. ■

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Planned and Announced LNG Regasification Capacity Additions by Regions, 2019-23 GlobalData.



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Alaska North Slope export terminal proposed

Lloyds Energy subsidiary, Alaska-based Qilak LNG, has signed a Heads of Agreement (HOA) with ExxonMobil Alaska Production.

The HOA covers the possible supply of natural gas from the Point Thomson field to Qilak LNG's proposed Alaska North Slope LNG export project (Qilak LNG 1 project).

Under the agreement, ExxonMobil will provide at least 560 million cu ft per day of natural gas to Qilak LNG 1's Phase 1, based on the design concept of offshore liquefaction and loading, and the icebreaking LNGCs, needed to export 4 million tonnes per year of LNG over a 20-year period.

"The Qilak LNG 1 project would deliver on Alaska's long-held goal of commercialising North Slope natural gas," said Mead Treadwell, Qilak LNG Chairman and CEO. "With this HOA and our recently completed pre-feasibility study,

Qilak will now begin extensive feasibility efforts, including preliminary permitting, with a target of reaching final investment decision (FID) by 2021."

Qilak LNG 1 seeks to capitalise on recent developments in Arctic LNG technology allowing natural gas to be directly exported from the North Slope of Alaska.

This concept would significantly reduce the capital cost, compared to projects that require a long-distance pipeline and a large minimum LNG order, the company claimed.

Phase 1 of the project would have an export capacity of 4 million tonnes per annum, with an option for additional capacity to come online in future phases, deter-

mined by gas supply and global demand.

Asian markets

Qilak LNG will target gas deliveries to Asian markets, including Japan, with competitive shipping costs, compared to many other sources of LNG in the US and other global LNG projects. The company is also in discussions in several Asian countries to encourage potential stakeholders in various parts of the project.

"ExxonMobil sees the development of the Qilak LNG 1 project as an opportunity to develop Alaska's gas resources," said Darlene Gates, President of ExxonMobil Alaska. "As the largest holder of discovered gas resources on the

North Slope, ExxonMobil has been working for decades to tackle the challenges of bringing Alaska's gas to market."

The company also said that it will be supported by Japan's Bank for International Co-operation (JBIC), as it helps fulfill Japan's commitment to foster investment in US LNG production capacity and to bring new LNG supplies to the Indo/Pacific region. This co-operation is expected to grow, as the next phase project feasibility is determined.

This announcement came after a successful pre-feasibility study was undertaken, which examined the technical challenges of shipping directly from a facility offshore in the Beaufort Sea. ■

FERC to look at Commonwealth project

The US Federal Energy Regulatory Commission (FERC) has issued a Notice of Schedule for Environmental Review for Commonwealth LNG's proposed export plant.

This project encompasses the construction of an LNG plant, including six gas liquefaction trains and their facilities. Each train will have a liquefaction design capacity of around 1.4 million tonnes per annum for a total nominal liquefaction capacity of 8.4 million tonnes.

Located on the west side of the Calcasieu Ship Channel, near the entrance to the Gulf of Mexico in Louisiana, it will include six LNG storage tanks each with a capacity of 40,000 cu m, one marine loading berth capable of loading LNGCs of up to 216,000 cu m capacity, and a 3.04-mile long

pipeline that will connect the LNG facility with existing intrastate and interstate pipelines to supply the gas.

Environmental review schedule

- Issuance of the draft EIS in May, 2020.
- Issuance of Notice of Availability of the final EIS 2nd October, 2020.
- 90-day Federal Authorization Decision Deadline 31st December, 2020.

"We are very pleased to receive FERC's Issuance of Notice of Schedule for Environmental Review. It confirms that our project remains on schedule to take FID in



FERC is to review the Commonwealth LNG project

1Q21 and start commercial operations in 1Q24," said Paul Varello,

Commonwealth LNG's President and CEO. ■

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2 Prospect Road
St Albans AL1 2AX
United Kingdom
www.lngjournal.com
Tel: +44 (0)20 7253 2700

Publisher
Stuart Fryer

Editor

Ian Cochran
+44 (0) 7748144265
cochran@tankeroperator.com

Ad sales enquiries

Narges Jodeyri
+44 (0)20 7017 3406
narges@lngjournal.com

Subscriptions

Stephan Venter
Tel: +44 (0) 20 7253 2700
venter@lngjournal.com

Production

Vivian Chee
Tel: +44 (0) 20 8995 5540
chee@btconnect.com

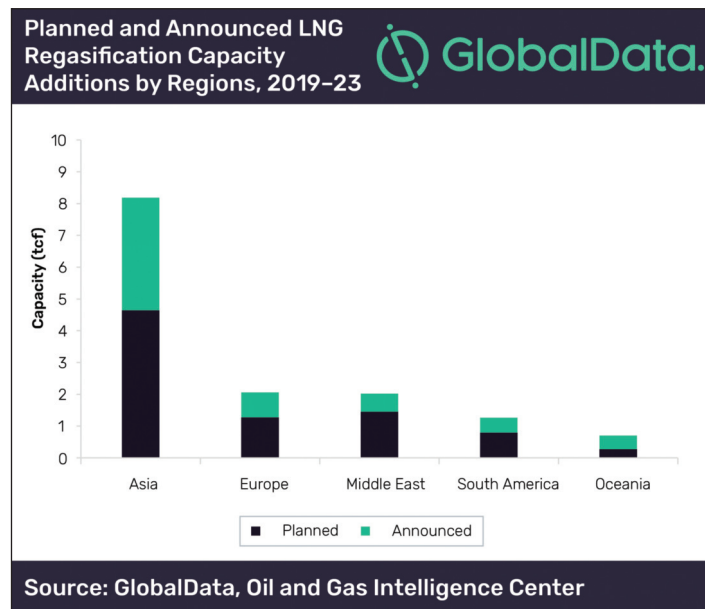
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Asia to contribute 56% newbuilding LNG regasification capacity growth

Asia is expected to lead the world's new LNG regasification capacity additions.

Analysing the planned and announced newbuilding projects, these are expected to contribute

around 56% of the global newbuild regasification terminals' capacity between 2019 to 2023, according



to a report from data and analytics company, GlobalData.

The report - 'H2 2019 Global Capacity and Capital Expenditure Outlook for LNG Regasification Terminals - India Continues to Dominate Global Regasification Capacity Additions and Capex Spending' - claimed that Asia is expected to add newbuilding liquid storage capacity of 8.2 trillion cu ft by 2023.

Adithya Rekha, GlobalData's Oil & Gas Analyst, said: "In Asia, a total of 47 terminals are expected to contribute a newbuild capacity of 8.2 trillion cu ft by 2023. Of these, Bangladesh's Matarbari terminal has the highest LNG regasification capacity of 0.54 trillion cu ft. The terminal is expected to start operations in 2023."

GlobalData identified Europe as

the second highest region in terms of newbuilding global LNG regasification capacity additions. Around 10 planned and announced regasification terminals in the region are expected to add 2.1 trillion cu ft capacity by 2023. Among the forthcoming terminals in the region, Wilhelmshaven floating terminal in Germany is expected to have the highest capacity of 0.35 trillion cu ft.

The Middle East stands at third with a newbuild LNG regasification capacity of 2.1 trillion cu ft in 2023.

Kuwait's Al-Zour terminal would account for more than half of the region's total regasification capacity. This planned onshore terminal is expected to come online in 2020 with a regasification capacity of 1.2 trillion cu ft, GlobalData said.

Vietnamese import terminal under construction

State-controlled PetroVietnam Gas (PV Gas) has begun to build the Thi Vai LNG import terminal, and also signed finance deals for the first phase of the project.

PV Gas said that Thi Vai terminal will have a capacity of 1 million tonnes per year in its first phase, and is scheduled to start operations in 2022. Its capacity will be raised to 3 million tonnes by 2023 in the development's second phase.

The first phase will cost \$285 million with 30% of investment capital being financed by PV Gas and the remaining 70% from loans, PV Gas said, adding that Thi Vai will be the first LNG terminal in Vietnam.

It is a strategic project because it represents an important step for Vietnam in ensuring national energy security. The supply of LNG will help meet the rising demand of LNG in the domestic market, the company said.

On Monday, PV Gas signed finance deals amounting to \$80 million

with HSBC and two Taiwanese banks - Mega Bank and Taipei Fubon Bank.

The company also entered into agreements to borrow Vietnamese Dong 2.1 trillion (\$81.2 million) from two Vietnamese banks - Southeast Asia Commercial Joint Stock Bank and Vietnam Export Import Bank.

PV Gas awarded an engineering, procurement and construction (EPC) contract to build the terminal to South Korea's Samsung C&T Corp and PetroVietnam Technical Services Corp on 24th June.

It also signed an agreement to supply power plants in southern Dong Nai province with a capacity of 600 MW each.

In 2014, PV Gas signed two framework LNG sale and purchase agreements (SPA) with Gazprom Marketing & Trading and Shell for

deliveries into the LNG terminal. This was followed by two preliminary LNG supply agreements with

Virginia-based AES Group and Alaska Gasline Development Corp signed in November, 2017.



PV GAS General Director Duong Manh Son

FSRU for Brazilian LNG-to-power project

Golar Power Limited, a 50/50 joint venture between Golar LNG Limited and Stonepeak Infrastructure Partners, has been awarded a 25-year power purchase agreement (PPA) to build a 605 MW combined cycle thermal power plant.

The LNG-to-power Project will be developed by CELBA (Centrais Elétricas Barcarena S/A), a special purpose company 50% controlled by Golar Power.

Located in the Brazilian city of Barcarena, State of Pará, the power plant will use imported LNG to generate electricity.

Total investment for this power project is estimated at \$430 mill, of which Golar LNG's share is \$107 mill. Capex will be funded through debt and equity between 2022 and 2025 with the equity portion expected to come from proceeds of the first wave of small-scale distribution in Golar Power.

As a result, Golar Power said it anticipated accelerating investment in a new LNG terminal at Vila do Conde, also located in Barcarena, using an FSRU for 25 years.

Strategic location

This terminal is expected to commence operations by mid-2021 and

will be located in a strategic entry point in the North region of Brazil, which will be used as a hub to allow the distribution of LNG and supply of natural gas for electricity generation, commercial and industrial customers, transportation and bunkering well in advance of the power project's start up, the company said.

FSRU selection and detailing of the terminal are currently under way with an anticipated FID in the first half of next year.

Golar Power CEO, Eduardo Antonello, commented, "We are extremely excited with the Barcarena project, that's amongst the most strategic LNG developments across the entire world. The energy hub that will be introduced by Golar Power in the State of Pará has the potential to supply an area larger than Western Europe, with millions of kilometres of river navigation routes.

"We've been working for over

three years on this endeavour, whilst also mapping the potential LNG applications, such as road and river transportation, mining, agriculture, industries as well as large population areas, and now it has become a reality.

"Considering the environmental and social benefits, our project has the potential to displace very large volumes of diesel, coal, LPG and heavy fuel oil (HFO) consumption with cheaper LNG, allowing significant reduction of greenhouse gas emissions and creating unique technical and economic development opportunities for the local populations," he concluded.

Golar LNG CEO, Iain Ross, added; "The award of this new project supports our current strategy to transform Golar LNG into a world leading LNG infrastructure player delivering cheaper and cleaner energy solutions supported by cash flow from long term contracts."

AIE requests more LNG cargoes at Port Kembla

Australian Industrial Energy (AIE) has lodged a 'Modification' to its existing Development Consent for its Port Kembla Gas Terminal to meet higher demand for natural gas during peak periods.

As first flagged to the New South Wales Government in August, AIE's customers claimed that their gas demands during peak season (typically between April and September) exceed the volume approved in the current Consent granted by the NSW Department of Planning.

The request seeks to increase the number of annual LNG cargoes received at the terminal from 26 shipments of standard-sized vessels (170,000 cu m) up to 46 shipments of variable sized vessels to reflect flexibility of demand.

This increase of up to 20 shipments represents around 2% increase in the number of vessels that visit Port Kembla each year.

The project's FSRU, which will remain moored at Port Kembla's Berth 101 to receive, store and send out natural gas, will not need to be modified, as it has the capacity to handle the extra throughput, AIE said.

AIE will be required to undertake additional environmental and hazard studies, which will then be assessed by NSW Government agencies and whilst this is expected to extend the completion timeline, the request for additional volume reinforces the project's critical importance, as a solution to the nation's near-term gas supply challenges.

Shell sale paves the way for Canadian LNG exports

Calgary-based Pieridae Energy has closed its acquisition of all of Shell Canada Energy's midstream and upstream assets in the southern Alberta Foothills for Can\$190 mill

"We are very pleased to close this transformational acquisition as it secures the majority of the natural gas needed, once developed, to supply the first train at our Goldboro LNG facility for at least 20 years," said Pieridae's CEO, Alfred Sorensen. "We will now complete our negotiations with Kellogg Brown & Root for a fixed price contract to construct the Goldboro LNG facility so that we

can then proceed to complete the project financing and final equity raise and make a final investment decision.

"With the acquisition, Pieridae now has an extensive drilling inventory encompassing multiple dry gas and liquids-rich gas reservoirs within the Foothills area. The company has engaged professionals, many of whom are transitioning from Shell, who have strong experience

managing the four major processing facilities and associated midstream assets.

"Together with existing Foothills drilling and development experience within the company, Pieridae is well positioned to leverage the \$1.5 bill of the government-backed guarantees for conventional gas supply development, which the German government approved in principle.

"This amount is in addition to the \$3 bill of government-backed guarantees for the construction of the Goldboro LNG facility which the German government has also approved in principle," he said.

“ With the acquisition, Pieridae now has an extensive drilling inventory ... within the Foothills area ”

- Alfred Sorensen., CEO, Pieridae

Sempra signs up with Mitsui

Sempra Energy has signed into a memorandum of understanding (MOU) with Mitsui & Co.

This reflects the companies preliminary agreement for Mitsui's participation in the Cameron LNG Phase 2 project in Louisiana, and a future expansion of the Energía Costa Azul (ECA) LNG project in Baja California, Mexico (see page 1).

"This agreement signals continued momentum in the growing US LNG export market, while reinforcing the unique competitive advantage that Sempra offers customers seeking LNG export capabilities from the Gulf Coast, as well as the West Coast of North America," said Justin Bird, Sempra LNG President. "We are pleased to expand our relationship with Mitsui and advance the development of both LNG projects."

"We are pleased to further expand our strategic relationship with Sempra in a broader range of opportunities. This agreement will contribute to expanding Mitsui's uniquely diversified supply portfolio worldwide by utilising the

strengths and capabilities of both companies," said Motoyasu Nozaki, managing officer, COO of Energy Business Unit II, Mitsui & Co.

The MOU is non-binding and outlines the continued mutual support for the development of Cameron LNG Phase 2, including Mitsui's purchase of up to one-third of the available capacity of the project, as well as the potential offtake of around 1 mill tonnes per annum of LNG and equity participation in a future expansion of ECA LNG.

Commercial operations

Train 1 of the Cameron LNG Phase 1 project started commercial operations in August, 2019. Trains 2 and 3 are expected to begin LNG production in the first quarter and second quarter of 2020, respectively.

Cameron LNG Phase 2, which has all necessary permits from the Federal Energy Regulatory Commission (FERC), includes up to two additional liquefaction trains and



Mitsui joins Cameron Phase 2 development

up to two additional LNG storage tanks. Mitsui is also an equity owner of Cameron LNG, LLC, the development company for Cameron LNG Phase 1 and Phase 2.

Last November, Sempra LNG and Mitsui entered into a HOA and are currently working to negotiate and finalise a definitive 20-year LNG sales-and-purchase agreement (SPA) for the potential purchase of 0.8 Mtpa of LNG from the ECA LNG Phase 1 project.

Development of Sempra Energy's

LNG export projects is contingent upon obtaining binding customer commitments, completing the required commercial agreements, securing all necessary permits, obtaining financing and reaching final investment decisions, amongst other factors.

In addition, the ability to successfully complete construction projects, such as the Cameron LNG export project, is subject to a number of risk and uncertainties, the company warned. ■

Large import terminal planned for Yantai

China's Yantai LNG Group is to operate an LNG import terminal by 2022.

According to newswire reports, the company expects Chinese government approval in the next few weeks.

Yantai is located in Shandong province, which is an industrial and petrochemical hub in eastern China. It has 25% of China's steel capacity and is a big coal-consuming region, but does not have a gas-fired power plant.

Yantai LNG is reportedly building the terminal in two phases - the first phase with a capacity of 5 mill tonnes per year and the second of 6.5 mill tonnes per year capacity. Land reclamation for the project has already started, a source told Reuters.

Phase 1 will cost \$1.1 bill and comprise an LNG-dedicated port area, a berth that can receive up to Q-Max LNGCs, a 50,000 cu m

transshipment berth, and five 200,000 cu m storage tanks, another source said.

Phase 2, to be completed by 2025, will have two Q-Max capacity LNGC berths and five more 200,000 cu m storage tanks, expanding Yantai LNG's receiving capacity to 11.5 mill tonnes per year.

Project holders are in talks with several suppliers to import LNG through long-term contracts, Eric Wang, executive director at major shareholder Poly-GCL Pan Asia International Energy told Reuters on the sidelines of an industry conference.

The partners may also consider investing in liquefaction projects to source gas for the terminal, Wang said, adding that his company has scheduled a visit to Houston later this month or in early November to meet with US producers. ■

NEWS NUDGE

Gas Entec secures LNG bunker vessel equipment contract

Gas Entec, a subsidiary of Atlantic Gulf & Pacific Company (AG&P) has won a contract from Sembcorp Marine to provide the engineering, procurement and construction (EPC) for a gas cargo handling system.

This system will be fitted on an 12,000 cu m LNG bunker vessel ordered by Indah Singa Maritime, a subsidiary of Mitsui OSK Lines, operating out of Singapore.

Gas Entec's other projects include the design and build of the first small-scale floating regasification unit installed at Benoa in Bali; key engineering for the first and only LNG bunkering barge in the US, operating in Jacksonville, Florida; and EPC of the LNG components

of Japan's first bunkering vessel, which is currently under construction.

Recently delivered LEG chartered out

Ocean Yield has taken delivery of the 2016-built 37,300 cu m ethylene gas carrier 'Navigator Aurora'.

Upon her delivery, the vessel commenced a 13 year bareboat charter to Navigator Holdings.

She is currently operating on a sub-charter to the European chemical group Borealis until December, 2026 to ship ethane from the US East Coast to Europe.

Her propulsion and electrical systems are designed to use LNG as fuel in addition to conventional fuel. The vessel is also currently undergoing conversion to enable her to use ethane as fuel. ■

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Innovation. Experience. Performance.®

Nakilat records improved profits

Nakilat announced improved net profits of QR728 mill for the first nine months of this year, compared to QR659 mill during the same period of 2018 - an increase of 10.5%.

The company's positive financial performance was primarily attributed to better operational performance in managing its LNG and LPG vessels, it claimed.

Nakilat also realised higher revenues with the additional income from the acquisition of two LNGCs and an FSRU in 2018, as well as higher LPG shipping rates worldwide.

Furthermore, Nakilat managed to reduce operational expenses through continuous rationalisation activities, process enhancements, and cost optimisation initiatives to remain efficient, leading to a significant increase in the share price of the company during this period.

Nakilat CEO Eng Abdullah Fadhilah Al Sulaiti, said, "Nakilat's strong financial performance bears testament to the com-

pany's ongoing emphasis and continuous improvements to remain competitive within the global energy transportation market, sustaining healthy cash flow and generating steady returns for our shareholders.

"With the support of Qatar Petroleum and its affiliates, the encouraging volume of projects at the Erhama Bin Jaber Al Jalahma Shipyard and more recently, the successful delivery of the Bul Hanine fabrication project for Qatar Petroleum for which we successfully achieved 1 mill safe man hours, we are highly driven to enhance synergy across the entire organisation in order to improve efficiency and increase productivity without compromising safety and quality across all our integrated shipping and maritime

operations," he said.

Al Sulaiti added that Nakilat has been pursuing efforts to strengthen its position by investing in human capital to strengthen in-house capability, with the support of charterer Qatargas.

In the coming years, Nakilat expects to take on greater ship-management responsibilities, following the second phase of LNG fleet management transition from Shell and management transfer of the FSRU, as well as the addition of four newbuilding LNGCs.

"Nakilat's superior operational excellence in energy transportation and maritime services not only support Qatar's vision in developing the LNG market, but also contribute towards developing the country's shipping and maritime industry.

"With greater demand for clean energy globally, Nakilat is ambitious in expanding our international outreach and diversifying our portfolio to meet the growing energy transportation needs.

"Together, we will remain focused in achieving our strategic goals while prudently navigating challenges, propelling Nakilat forward as a global leader and provider of choice for energy transportation and maritime services," Al Sulaiti concluded. ■



Nakilat has reported strong results

Awilco secures refinancing deal

Awilco LNG has announced that the term sheet for the refinancing of the company's two 2013-built 156,000 cu m TFDE LNGCs, 'WilForce' and 'WilPride', was recently credit approved.

The sale/leaseback facility is being provided by CCB Financial Leasing (CCBFL), a wholly owned subsidiary of China Construction Bank (CCB). It is expected to enable a full take out of the company's current sale/leaseback facilities at favourable terms.

It bears a 14-year straight line amortisation profile, a tenor of 10 years and carries a floating interest rate structure and is expected to close in 4Q19, subject to final documentation and customary closing conditions.

Jon Skule Storheill, Awilco LNG CEO, said: "We are pleased to mark the start of our long-term relationship with CCBFL, a leading leasing house in China and part of one of the largest banks in the world, and believe the terms are attractive and supportive of the company's commercial strategy." ■

NEWS NUDGE

FortisBC joins SEA\LNG

SEA\LNG, the industry coalition involved in the adoption of LNG as a marine fuel, has welcomed Canadian LNG provider FortisBC as a member.

Peter Keller, Chairman SEA\LNG, commented: "We're pleased to welcome FortisBC to the SEA\LNG coalition. Our North American member network grows as the appetite for LNG as marine fuel expands across the globe."

FortisBC brings nearly 45

years' experience in LNG production in Western Canada. It owns and operates two LNG facilities on the west coast - Tilbury LNG facility, which began operations in 1971, and Mount Hayes facility on Vancouver Island, launched in 2011.

A separate company, WesPac Midstream, is proposing a marine jetty on the Fraser River adjacent to the Tilbury LNG facility to facilitate ship-to-ship bunkering for domestic and transpacific vessels.

TMC wins second TMS Cardiff Gas contract

TMC Compressors of the Seas (TMC) has signed another contract to supply compressed air systems and associated equipment to TMS Cardiff Gas newbuildings.

This contract involves four 174,000 cu m X-DF engined LNGCs currently under construction for the Greek LNGC owner at Hyundai Heavy Industries (HHI) and Samsung Heavy Industries (SHI).

TMC will supply two control

air compressors, one service air compressor, and two N2 (nitrogen) feed air compressors for each vessel. For the vessels being built by HHI, TMC will also supply two selective catalytic reduction compressors.

The four LNGCs will enter into long-term timecharters with Shell once they are delivered in 2020/2021.

In June 2018, TMC won a contract from the same owner to supply complete marine compressed air systems for three HHI newbuilding LNGCs. ■

GTT sees revenues rise

Gaztransport & Technigaz (GTT) earned revenue of almost €200 mill for the first nine months of this year, a rise of 8.7% over the same period of 2018.

Revenues from new construction were €188.9 mill, up by 9.2%, royalties from LNGCs increased by 5.1% to €157.6 mill, while royalties from FSRUs were almost stable at €19.3 mill. Other royalties stemmed from vessels fuelled by LNG, which amounted to €5.8 mill, FLNGs at €3.8 mill, onshore storage tanks €2 mill and barges at €0.5 mill.

Revenues from services were €10.8 mill, up slightly (+1.2%) compared with the first nine months of 2018.

As of 30th September, the orderbook included 120 units in its core business and another 18 units for the LNG as a fuel sector.

Commenting on the results, Philippe Berterottière, GTT Chairman and CEO, said: "With 40 orders for LNG carriers during the

first nine months, of which 14 came in 3Q19, business activity has been particularly strong. In addition, there were significant orders for GBS and ethane carriers' equipment. This demonstrates GTT's ability to participate in the entire liquefied gas value chain from large gas projects to importation and bunkering terminals.

"As announced previously, the inflow of orders over the last two years is beginning to bear fruit and revenue has increased substantially from one quarter to the next. Consequently, given our strong order book and ship construction schedules, we confirm our revenue and EBITDA outlooks for the full 2019 financial year, as well as a minimum distribution rate of 80% for the 2019 and 2020

financial years," he said.

LNGC success

GTT's business activity claimed several successes during the first nine months of 2019. In addition to the 26 orders for LNGCs won during the first half of the year, there were another 14 orders in the third quarter of 2019.

All of the LNGCs will be equipped with GTT's recent technologies (Mark III Flex+, Mark III Flex and NO96 GW). Deliveries are scheduled between end-2020 and end-2022.

Last month GTT won an order to fit membrane technology on six VLECs to be built by Hyundai Heavy Industries (HHI) and Samsung Heavy Industries (SHI) for the Chinese company Zhejiang Satel-

ite Petrochemical. These second generation ethane carriers will be the largest ever built thus far at 98,000 cu m each.

Designed for multi-gas use, the six vessels will also be 'LNG ready', offering the possibility of shipping LNG in the future without the need to convert the ship's tanks.

GTT also changed the name of its latest technology: GTT NEXT1 (formerly NO96 Flex).

Assuming there are no major order delays or cancellations, GTT confirmed its targets for revenues and EBITDA for the 2019 financial year -

- 2019 consolidated revenues of between €260 and €280 mill;
- 2019 consolidated EBITDA of between €160 mill and €170 mill.

Advanced LNGC data analytics

LNGCs require constant monitoring and proactive maintenance to ensure safe and reliable operation.

Digitalisation provides the means to accomplish this, and comprehensive data-processing services can extract actionable insights from monitoring data, DNV GL said in a report.

Among the proposed solutions for emissions control is the large-scale production of hydrogen. Long-term forecasts see hydrogen being produced using electrolysis powered by wind and photovoltaic energy, and its conversion to methane (CH₄), which could be distributed using existing natural gas infrastructure.

For the time being, hydrogen as an emerging cleaner energy source will primarily result from methane steam reformation of natural gas, the class society said.

All LNGCs, FSRUs and FLNGs carry on board compressors, expanders, pumps, metering and control devices, etc. Monitoring and maintenance play a key role in keeping this infrastructure functional and preventing accidents.

DNV GL can draw on decades of

experience in gas-related engineering and vetting as well as maritime operations, claimed Chris Dagnall, General Manager of DNV GL's Rotating Machinery Group. "We have been active in land-based pipeline network monitoring and data acquisition, working closely with customers to provide the insights they need to run their systems smoothly.

"We know how important it is for a successful condition-monitoring programme to collect and analyse data rapidly so action can be taken promptly. Digitalisation allows us to provide automated data analytics solutions covering a wide range of performance-monitoring and maintenance-related needs of asset operators, including real-time reporting," he said.

Constant contact

Through satellite and long-distance wireless connections today's vessels are in constant contact with the Internet and their operators' computer networks, sending

and receiving data that ensure smooth operation. Furthermore, on new ships, critical equipment is fitted with numerous sensing devices, which feed a constant stream of operational data to the ship's central computer system and data centres on land.

All of this data harbours potential for improved decision-making, performance enhancements and condition-based maintenance. Aggregating, correlating and evaluating this data while keeping it safe is a challenging task, however.

"DNV GL has been providing these equipment data monitoring, analytics and reporting services to many customers, especially where

the equipment being monitored is highly safety-relevant, such as on LNG carriers and FSRUs," explained Dagnall. "We can install data acquisition hardware on a vessel and receive a full set of performance data sampled at regular time intervals, such as every 10 seconds, in an automated daily transmission to our Veracity platform.

"All operational data is then analysed using algorithms developed by DNV GL, correlated with vibration data, and assessed to extract key performance indicators and detect any deviations from the predicted performance," he explained.

LNG rate assessments

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

USD/Day	This week	Change
East of Suez	\$130,000	\$0
West of Suez	\$120,000	\$0
1 Year T/C	\$82,000	-\$1,000

Source: Fearnleys (30/10/19)

LNG fuel BOG management

Alfa Laval's dual-fuel boilers, Gas Combustion Unit (GCU) and services, offer a complete portfolio of solutions for boil-off gas (BOG) safety on board vessels, the company claimed.

LNG as a fuel is on the rise, due to its role in reducing emissions and its relative economy compared to today's low sulfur fuels. "Customers are attracted to LNG propulsion for a variety of reasons, and it's being considered for many vessel types besides LNG carriers," Markus Tauriainen, Alfa Laval's Manager Exhaust & Combustion System Sales explained.

To use LNG as fuel, vessels must be able to manage BOG, the evaporated gas that can increase tank pressure. Alfa Laval is already well known for LNGC BOG management, where the GCU burns BOG in compliance with the International code for Gas as Cargo (IGC).

When it comes to using LNG for propulsion under the International code for Gas as Fuel (IGF), the company also offers BOG management with dual-fuel Alfa Laval Aalborg boilers.

When an LNG fuel tank is incorporated into a vessel, the pressure created by BOG must be kept at a level that avoids ventilation to atmosphere via the safety valve.

Reliquefaction of the gas is possible, but undertaking this on board

adds too much complexity and cost for most vessel operators. Similarly, burning the gas in auxiliary engines or gensets requires pressurisation, which demands a redundant expensive compression train.

"On some vessels you can use a Type C tank to allow pressure to accumulate," said Tauriainen. "But what most vessels need is a safe solution for burning off the gas at low pressure. That can be a GCU on LNG carriers, but the best and most economical solution for vessels using LNG as fuel is usually a dual-fuel boiler."

Safety function

Since an Aalborg dual-fuel boiler can be fired with LNG, it can take on the additional safety function of BOG management. "Boilers are a compact, simple and highly affordable way to handle boil-off gas," Tauriainen said. "As strange as it may sound, our Aalborg dual-fuel boilers have been the enabler for LNG propulsion in many, many projects."

Aalborg boilers, like the GCU, have yet another advantage when it comes to BOG management.



An Aalborg boiler seen on test

Every fifth year, when a vessel enters drydock for inspection, the tank environment must be made non-hazardous by replacing the LNG with inert gas. During this process, Aalborg dual-fuel boilers are capable of burning the mixture of inert gas and LNG.

"Inert gas itself doesn't burn, so the mixture resulting from the

inerting process can't be fed to an engine or genset," Tauriainen added. "It can be fed to an Aalborg dual-fuel boiler, however. So the boiler offers a time-saving and economical solution to this recurring issue, which otherwise has to be solved by visiting an onshore disposal terminal before and after dry docking."

Pacific Gas opts for Fleet Xpress

China's largest LEG shipowner - Pacific Gas- is to install Inmarsat's Fleet Xpress connectivity on all its vessels.

This will also include Inmarsat's Fleet Secure Endpoint, which is aimed at negating cyber threats.

Pacific Gas has agreed to include the new Fleet Secure Endpoint solution within the terms of its contract to install Fleet Xpress across all operational ships by the end of this year, as well as on its future vessels.

The Hong Kong-headquartered group has signalled its intention to expand beyond its existing focus on VLGCs and LEGs into LNGCs and VLECs.

According to Capt Tao Yong, Vice President Fleet, Pacific Gas, "Fleet Xpress helps us to scale

our digital activities and complement the shipmanagement software that we installed for resource planning on vessels.

"With real-time data exchange, vessels are now an extension to our shore office and we base our operational efficiency and performance gains on continuous monitoring and real-time upgrades and assistance. Internet access at sea is also vital for crew welfare and essential to attracting and retaining talented crew," he said.

Capt Tao Yong added that always-on connectivity and shipping's progress towards digi-

talisation creates new requirements to protect ships against cybercriminals. For example, stable connections are vital for a company continuously monitoring its ships remotely using CCTV for security.

"With our growing dependence on technology and providing open internet access we could be susceptible to cyberattacks, so we needed more than a conventional anti-virus to protect our systems 24/7 and from the various kinds of evolving threats," Capt Tao Yong added. "As a modern shipowner, we ensure that all our vessels are equipped with state-of-the-art

technology and security systems that complement Inmarsat's global, secure and reliable connectivity."

"Pacific Gas is one of the growing number of quality operators adopting practical and pragmatic mitigation strategies that prioritise cybersecurity on shore and at sea," said Peter Broadhurst, Inmarsat's Senior Vice President of Safety and Security. "These companies recognise that the risks of a cyberattack on a vessel extend beyond loss of reputation; they include the risk of delays to the ship and cargo delivery or increased insurance premiums."

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	Akebono Maru	3,556	LNG	Japan	Yes	Chuo Kaiun
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	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 Innvation	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

For more information please visit <http://small-lng.com>

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

TBN = To Be Nominated indicates ships are still at construction/planning stage

** = project shelved † = Data to be verified Data last updated = 3rd October 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 EnergICE	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	Coral Encanto	30,000	LNG	China	Yes	Anthony Veder
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	Q-LNG 4000	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
2022	PNE TBN	5,400	LNG	USG	Yes	PNE
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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*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 = 3rd October 2019

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

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 = 6th August 2019



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