

LNG Shipping News

AN LNG JOURNAL TITLE ON LNG CARRIERS

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China's changing import patterns

Last year, China's LNG imports soared 40.4% year-on-year to a record 53.8 mill tonnes, according to figures from the Chinese General Administration of Customs.

China retained its position as the world's second LNG largest importer after Japan, having overtaken South Korea the year before, reported Italian broker and researcher Banchero Costa.

This year, imports have slowed slightly but growth remains impressive, with imports in the first five months of 2019 up 20.4% year-on-year to 23.9 mill tonnes.

The 2018 hike was driven by a major government push for households to shift from coal to gas for heating.

This year however, the focus of the domestic anti-pollution campaign has changed to clean coal rather than coal-to-gas switching, according to local analysts.

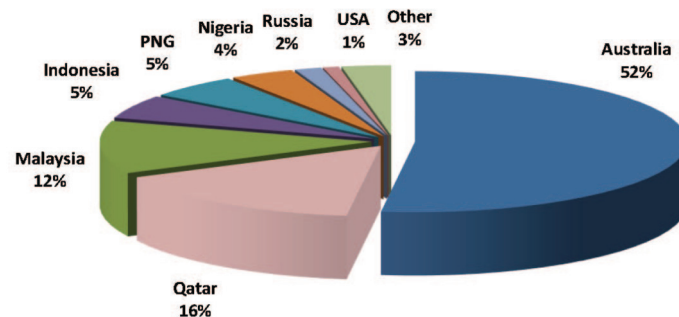
In addition, temperatures this winter have been higher than usual, and there have also been some backlogs at receiving terminals. Still, China is on track to overtake Japan this year as the world's top LNG importer, Banchero Costa said.

Asia dominated

The market is very much dominated by Asia, which accounts for 75% of global LNG imports. For example, three countries - China, Japan and South Korea - account for 55% of global LNG imports.

China - Sources of LNG Imports in Jan-May 2019

(source: customs data; in million tonnes)



Source: Banchero Costa

In terms of supply, the big winner at the moment is Australia. In the first five months of this year, Australia accounted for 52% of China's total LNG imports.

This is a significant increase from the 45% share Australia had in the same period last year, thanks to a 37% jump in volumes between the two countries on a year-on-year basis.

Australia is benefiting from a number of new liquefaction projects that are being commissioned. With more projects coming onstream, such as Shell's 'Prelude', Australia is on track to soon overtake Qatar as the largest LNG exporter.

Qatar, on the other hand, saw its share of the Chinese market shrink to just 16% in the first five months of 2019, from 20% in the

same period last year.

In terms of absolute volumes, there was a 5% decline year-on-year. The trade war clearly had an impact on US exports, as volumes of LNG from the US to China fell by 86% year-on-year.

So far this year, the US had just a 1% share of the Chinese LNG market.

Aside from Australia, another producer, which is benefiting from this trade realignment is Papua New Guinea, which almost doubled both its volumes and its market share in China from 3% to 6%.

Other countries increasing both volumes to China and their share of the Chinese market are Malaysia - from 10% to 12% - and Indonesia - from 5% to 6%, Banchero Costa concluded. ■

4,000th cargo handled at Chita

Towards the end of last month, the LNGC 'Senshu Maru' became the 4,000th gas vessel to berth at the Chita LNG terminal complex in Japan.

The LNGC arrived from Indonesia.

Operated by JERA, the termi-

nal is used in conjunction with Toho Gas Co Ltd.

The terminal received its first LNGC in September, 1977. Since then, the total amount of LNG unloaded at the terminal has totalled around 236 mill tonnes.

Chita is a facility for receiving,

storing, and vaporising imported LNG and sending it out to consumers in response to the demand.

It consists of three terminals - Chita LNG joint terminal, Chita LNG terminal operated by Chita LNG Co Ltd. and Toho Gas' Chita Midorihama Works. ■

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CIMC Raffles to build CNGs

Australian Compressed Natural Gas (CNG) project developer, Global Energy Ventures (GEV), has signed a Letter of Intent (LOI) with Yantai CIMC Raffles Offshore (CIMC Raffles) to build the company's CNG Optimum 200 ships.

This LOI is based on a firm order for four 200 mill cu ft capacity CNG carriers with an option to order up to another four.

The parties have executed the LOI, with the intention of entering a shipbuilding engineering, procurement & construction (EPC) contract, employing GEV's CNG Optimum design.

Earlier, three shipyards had completed comprehensive technical specifications for the vessels using the CNG Optimum design,

which has been approved by American Bureau of Shipping (ABS).

Selection process

This followed a targeted selection process led by GEV Director, Jens Martin Jensen, lasting for the past 12 months supported by the company's shipbroker, Clarksons Platou (Clarkson's) and SeaQuest Marine Project Management (SeaQuest), which provided ship engineering experience to assist in finalising the technical specifications.

The selection of CIMC Raffles was driven by the commercial terms under the LOI, track record of delivering in excess of \$6 bill in EPC contracts since 2012, experience with CNG systems, and moving forward, its scale of operations with three yards to support GEV's growth aspirations of multiple CNG projects requiring shipbuilding contracts, the company explained.

Martin Jensen said: "In my 30 years of new shipbuilds, CIMC Raf-

fles have proven to be a highly credible and very capable yard for new-builds, and they are without doubt an investment grade shipyard for GEV's first marine CNG project.

"They are the logical choice for GEV given their scale of operations to support a multiple ship order, their history of building the only CNG ship to date, and a track record in successful EPC delivery.

"Together with our ad-

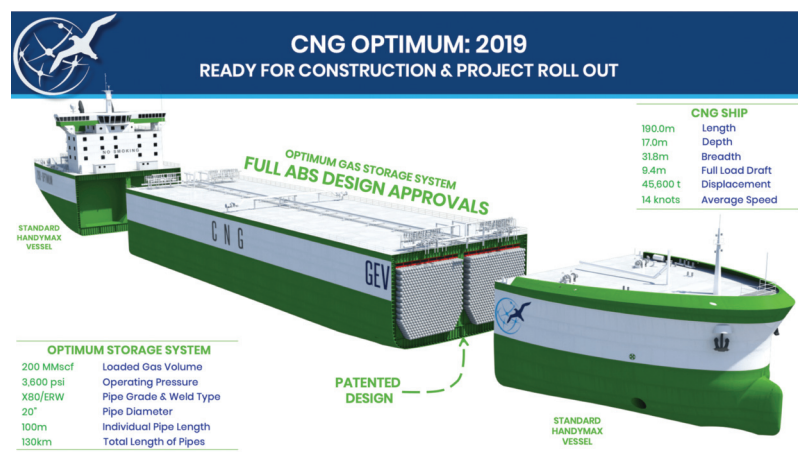
visors, Clarksons and SeaQuest, we continue to focus on our preferred shipyards to refine their technical specification and capital cost improvements, and work towards a final draft contract.

"Executing our first LOI with a respected shipyard to deliver our first CNG Optimum contract is indeed a key milestone for GEV representing a major de-risking event," he said.

Under the proposed shipbuilding contract, the CNG Optimum ships will be delivered on a 30 month construction schedule for the first ship, then every four months for the following three firm orders.

CIMC Raffles has offered a contract price in the range of \$135-140 mill per ship, subject to the contract terms being finalised.

The cost remains within GEV's capital range to ensure the CNG projects in development are commercially viable and provide the required rate of return to fund the future debt and equity requirements, the company added. ■



A LOI has been signed with the Raffles shipyard to build four CNG carriers

First commissioning cargo at Corpus Christi Train 2

Bechtel and Cheniere Energy have announced the completion of the first commissioning LNG cargo from Train 2 at the Corpus Christi liquefaction (CCL) export terminal in Corpus Christi, Texas.

Through its partnership with Cheniere, Bechtel has now delivered seven LNG trains at two sites on the US Gulf Coast since 2015.

"We are pleased to have achieved another key milestone, LNG first cargo, on the Corpus Christi Liquefaction Train 2, as part of the commissioning and

startup process. This is the result of thoughtful planning and execution, and excellent teamwork with Bechtel," said David Craft, Cheniere's Senior Vice President Engineering and Construction.

"Together we will continue to work towards reaching other milestones for the Corpus Christi facility, including completion of Train 2

later this year and Train 3 in 2021."

"The collaboration between Cheniere and Bechtel has been critical in delivering success on these projects," said Darren Mort, Bechtel's LNG general manager. "This milestone shows once again that our integrated, direct-hire EPC model and our philosophy of

'design it once and build it many times' means lower cost, shorter delivery schedules, and greater certainty of outcome for our customers."

Since 2015, Bechtel has delivered 15 large-scale LNG production trains for customers worldwide, including eight trains in Australia, the company said. ■

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AGL picks 'Höegh Esperanza' for Crib Point project

Following last year's timecharter agreement between Höegh LNG and Australian AGL Shipping Pty Ltd (AGL) for an FSRU, AGL has selected 'Höegh Esperanza'.

She will be used as an FSRU at the Crib Point project in Victoria, Australia, as opposed to 'Höegh Giant' originally communicated by the charterer in December, 2018.

'Höegh Esperanza' is fitted with both a closed loop and an open loop system and this was considered by AGL to be a better fit for the operational requirements arising from the Environment Effects Statement (EES) currently being undertaken by the Victorian Government.

The EES is expected to be concluded no earlier than late in the first half of 2020. Final investment decision (FID) will be taken subject to and following the EES.

As 'Höegh Esperanza' is currently under contract with CNOOC until June, 2021, taking into account the time needed for relocation, commissioning and start-up

at Crib Point, this fits well with AGL's planned commercial start-up in 1H22, Höegh said.

The AGL charter is for 10 years and remains conditional on the board of directors of AGL Energy agreeing the FID for the project.

'Höegh Esperanza' is expected to generate an annual EBITDA of \$31 mill from the charter.

Meanwhile, Höegh LNG has named its 10th FSRU - 'Höegh Galleon'.

The naming ceremony for HN2220 was held at Samsung Heavy Industries (SHI) shipyard on 26th June, 2019.

At the ceremony, Höegh LNG welcomed Kylie Hargreaves as a sponsor. Hargreaves is Head of Government and Stakeholder Relations for Australian Industrial Energy (AIE) and works with the Port Kembla LNG import project where



The FSRU 'Höegh Esperanza' has been chosen for the Crib Point project

Höegh LNG has been selected as the FSRU provider.

Under an exclusive agreement reached last year, AIE has the right

to lease one of Höegh LNG's 170,000 cu m FSRUs.

'Höegh Galleon' is scheduled for delivery in August this year. ■

Arc7 NSR transit underway as Norway STS project closes

The first Northern Sea Route (NSR) transit this summer by an LNGC carrying Yamal gas to Asia without the need for icebreaker escort is currently underway.

The Arc7 'Vladimir Rusanov' left Sabetta on 29th June. She is one of 126 shipments made thus far this year from Yamal, which has produced 9 mill tonnes of LNG and 0.6 mill tonnes of stable gas con-

densate thus far this year.

All three LNG trains were running above nameplate capacity in the first half of this year, according to operator Novatek.

Most of the LNG was trans-

shipped from ice-class LNGCs to conventional vessels near Honningsvåg, Norway. From the start of the project in November, 2018, 123 ship-to-ship transfer operations have been conducted, according to local sources.

However, the last LNGC left Honningsvåg on 29th June, as the Norwegian company, Tschudi Shipping's agreement with Novatek has come to an end.

Transshipment activities will now switch to Russia with operations due to start near Kildin Island, Kola Bay, later this year, according to the local reports.

Novatek intends to build a permanent transshipment terminal near Murmansk with a capacity to handle 20 mill tonnes per year. ■



'Vladimir Rusanov' is undertaking this summer's first NSR transit without an icebreaker

NEWS NUDGE

GTT to fit Maran Gas quartet

Last Month, GTT received an order from Daewoo Shipbuilding & Marine Engineering (DSME) concerning the tank design for four new 174,000 cu m LNGCs on behalf of Maran Gas.

The delivery of the ships is planned between the end of 2021 and early 2022.

Awilco confirms charter

Awilco LNG has confirmed that the 2013-built 156,000 cu m TFDE 'WilPride' has been inspected and accepted by an undisclosed charterer and was due to be delivered on or about 10th July, 2019.

The eight month timecharter is estimated to contribute an annualised EBITDA of about \$23 mill during the period, the company said. ■

McDermott joint venture extends agreement with Cameron LNG

McDermott International, together with its joint venture partner Chiyoda, has signed an agreement with Cameron LNG related to the construction of the LNG liquefaction project in Louisiana.

The agreement includes the following key components:

- Provides the opportunity for incentive bonus payments for achieving construction and commissioning milestones on specified dates for Trains 2 and 3.
- Aligns the start dates for any schedule-related liquidated damages to be consistent with the current schedule.
- Fully aligns and strengthens the commitment of the JV to com-

plete the project in accordance with the current schedule.

"Over the past year, we have further strengthened our relationship with Cameron LNG and our leadership, oversight, execution, forecasting and reporting on the project. In the last few months, the joint venture project team has made tremendous progress, including first liquid and first cargo from Train 1," explained Samik Mukherjee, McDermott Group Senior Vice President, Projects. "We

are extremely pleased with the agreement, which is a testament to the progress and the strong performance of our project team. It was crafted with the full support and collaboration of Cameron LNG to optimise the timing and cost-effectiveness of the remaining work - and it does so in a way that we believe will benefit all involved parties."

Since the initial contract award in 2014, McDermott and Chiyoda have provided the engineering,

procurement and construction (EPC) for the Cameron LNG project. The project includes three liquefaction trains with a projected export capacity of more than 12 mill tonnes per annum of LNG, or about 1.7 bill cu ft per day.

The project was around 90% complete as of the end of the first quarter of 2019. The company said it expects initial production from Trains 2 and 3 in the first quarter of 2020 and the second quarter of 2020, respectively. ■

Woodfibre a step closer

Woodfibre LNG has received a facility permit from Canada's British Columbia Oil & Gas Commission.

President David Keane explained; "Following a rigorous process, Woodfibre LNG is pleased to have received our facility permit issued from the BC Oil and Gas Commission (BC OGC), one of the key permits required for construction and operation of the project.

"This is a positive step forward as we work to build the cleanest LNG export facility in the world.

"This permit specifies requirements the project must comply with for design, construction and operation of the Woodfibre LNG Project, with a focus on public and environmental safety.

"Previous to this permit, Woodfibre LNG is proud to have received three major environmental assessment approvals. Our environmen-

tal assessment process with the Squamish Nation is the first of its kind in Canada. The progress we have made would not be possible without the contributions and feedback made by our First Nation partners and the Squamish community.

"We are dedicated to bringing benefits to British Columbia through jobs and economic development, and ultimately a project that will have significant positive impact on global climate and human health.

"As we move towards construction, we will strive to exceed the high standards of public and environmental safety that are expected of us by the Canadian, BC, and Squamish Nation governments,

and the Squamish community.

"This permit is a large piece of our puzzle, and with it in place, we are working towards a final decision to proceed with this project this summer," he concluded.

SPA signed

Earlier, Pacific Oil & Gas (PO&G) had announced that its wholly-owned subsidiary, Woodfibre LNG Export had signed a binding LNG sales and purchase agreement (SPA) with BP Gas Marketing for the delivery of LNG from the Squamish export facility.

Under the terms of the SPA, BP will receive 0.75 mill tonnes per annum of LNG over 15 years on a free on board (FOB) basis, with first delivery expected in 2023. ■

NEWS NUDGE

MOL names another MOSS type LNGC

Mitsui OSK Lines. (MOL) has named a newbuilding LNGC ordered by Trans Pacific Shipping 8 Ltd, a 50:50 joint venture between MOL and JERA, at the Sakaide Works of Kawasaki Heavy Industries.

She was named 'Sohshu Maru' and is fitted with a DFDE propulsion system.

The MOSS type 177,000 cu m LNGC will transport natural gas purchased by JERA from the US Freeport LNG project, plus other suppliers.

Landbridge to develop Rizhao LNG terminal

Shandong Landbridge Group is to build an LNG receiving terminal at Landbridge Port in Rizhao in conjunction with the Beijing Energy Group.

Under the agreement, the two parties will invest RMB6.7 bill (about \$973 mill) to construct the terminal, which will have a design capacity to handle 5 mill tonnes of LNG per year.

In addition, the two companies said that they plan to jointly develop overseas energy projects. ■



The Canadian Woodfibre project has come a step closer

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Venture Global raises Plaquemines cash

At the end of last month, Venture Global LNG announced that it has raised \$675 mill of additional capital from institutional investors.

The capital will be used primarily to further develop the company's 20 mill tonnes per annum Plaquemines LNG export project in Plaquemines Parish, Louisiana.

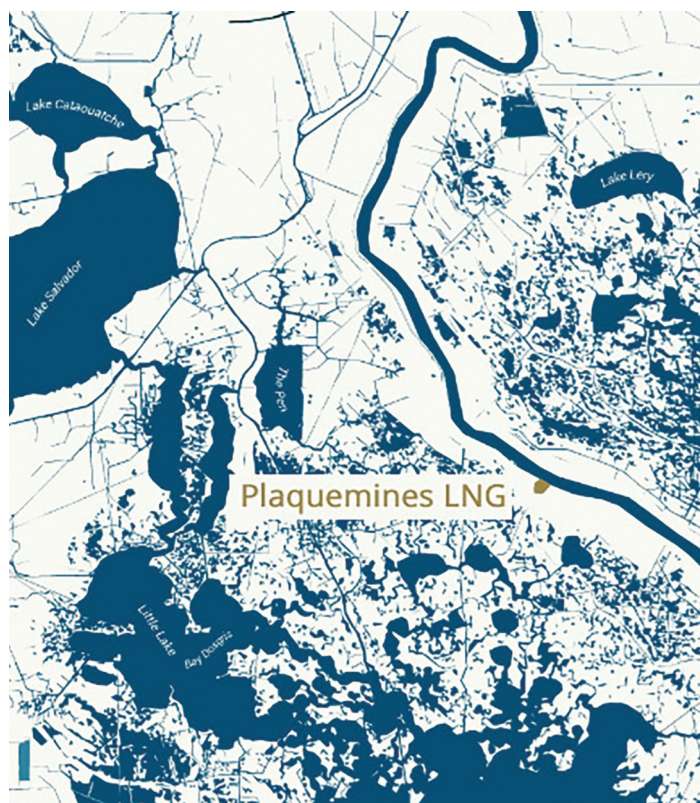
In addition to the \$855 mill of capital previously raised by the company and the \$1.3 bill project-level equity commitment from Stonepeak Infrastructure Partners for the Calcasieu Pass LNG project, Venture Global LNG has now raised total committed capital of over \$2.8 bill to support the development of its LNG export facilities.

Co-CEOs, Mike Sabel and Bob Pender, jointly said, "With the expansion of our Plaquemines LNG sales and purchase agreement (SPA) with PGNiG to 2.5 mill tonnes per annum and in anticipa-

tion of additional near-term commercialisation, we are excited to add significant new resources as we prepare to commence early works at Plaquemines later this year."

Plaquemines will employ a comprehensive process solution from Baker Hughes, a GE company (BHGE) that uses mid-scale, modular, factory-fabricated liquefaction trains in an identical configuration to the Calcasieu Pass LNG project, currently under construction in Cameron Parish, Louisiana.

The Final Order for Plaquemines LNG from the US Federal Energy Regulatory Commission (FERC) is currently scheduled to be issued no later than 1st August, 2019, the company said. ■



Venture Global has secured finance for the Plaquemines LNG export project

EXMAR meets financial covenants

Belgian gas carrier owner, EXMAR has provided an update on various financing schemes announced earlier.

On 26th June, 2019 the company fully repaid its outstanding senior unsecured bond. This was partly financed with a new, unsecured NOK650 mill (about \$75 mill) bond issued by the company on 16th May, 2019, with final maturity in May, 2022 and partly with available resources.

EXMAR had previously announced the financing of an FSRU barge in the second quarter of 2019.

This financing package has since been approved by the credit committee of CSSC, but due to a delay in the documentation with CSSC, the financing has not been concluded yet. It is expected to be completed during the third quarter of this year.

Further to the successful performance acceptance tests of the 'Tango' FLNG on 5th June,

2019, EXMAR has met all the conditions for the partial release of the debt service reserve amounts for the repayment of the \$200 mill loan with Bank of China and Deutsche Bank (\$40 mill in a first phase).

This repayment is subject to the approval of SINOSURE, which was taking more time than previously communicated. EXMAR said that it will do its utmost to expedite this repayment, which was expected to occur during 3Q19.

Pending the settlement of the above mentioned credit files, EXMAR took a bridge loan of \$30 mill to temporarily increase its liquidity.

Office sale

In addition, at the end of June, EXMAR signed an agreement with Compagnie Maritime Belge (CMB)

for the sale of 50% of its shares in RESLEA, owner of the office buildings in Antwerp.

EXMAR will realise a capital gain of about \$19 mill and therefore reinforce its balance and liquidity position, it said.

The company also gave instructions to pay the first instalment for the building of two VLGCs, with a value date of 8th July, 2019, which is in accordance with the shipbuilding contract with Jiangnan Shipyard.

Both vessels are under construction in Shanghai and will serve under a firm five-year charter with Equinor after their delivery in 2021.

EXMAR said that as per 30th June, 2019 all financial covenants were met and said it believed that they will also be met in December of this year. ■

NEWS NUDGE

FERC updates

The US Federal Energy Regulatory Commission (FERC) has prepared a draft environmental impact statement (EIS) on the construction and operation of the Alaska LNG Project.

The project was proposed by the Alaska Gasline Development Corp (AGDC) to commercialise the natural gas resources of Alaska's North Slope, by converting the existing natural gas supply to LNG for export and also provide gas for users within the State of Alaska.

The draft EIS comment period closes on 3rd October, 2019.

FERC has also said that it intends to prepare a supplementary environmental review for the proposed expansion of production capacity at Magnolia LNG facility in Lake Charles. ■

Nakilat increases profit

Nakilat achieved a net profit increase of 7% in the first half of this year.

The company recorded a profit of QR476 mill, compared to QR445 mill for the same period in 2018.

This increase was driven by long-term strategic plans towards achieving the company's goals, Nakilat said.

The acquisition of two additional LNGCs and one FSRU in 2018 was among the main contributor to the positive financial results, as well as the increased volume of projects at Nakilat's Erhama Bin Jaber Al Jalahma Shipyard, which recently welcomed its 200th LNGC repair.

Nakilat continued to expand through the acquisition of another four LNGCs earlier this year.

With the four new vessels that will be managed and marketed by Nakilat, this not only affirms our

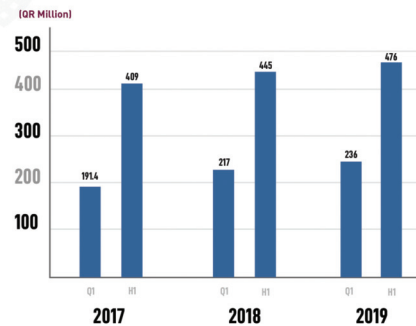
global leadership in energy transportation but also bears testament to vessel management and marketing capabilities, as the world's largest LNG fleet, the company said.

In addition, Nakilat achieved positive results across its operations through the rationalisation of operational expenses, which in turn resulted in a strong first half of the year, leading to a solid stock price performance for year to date 2019.

Commenting on the company's results, Nakilat CEO, Eng Abdullah Al Sulaiti, said: "Nakilat's commitment to deliver value for our shareholders and maintain our leadership in energy transportation have been the main driving forces behind the solid perfor-



NAKILAT FINANCIAL PERFORMANCE FIRST HALF 2019



mance achieved today.

"While we remain focused on achieving our strategic goals, we are also continually assessing the market and our current investments in relation to profitability to address any risk involved for the company and our shareholders. This enables us to prudently navigate anticipated or unexpected challenges, in an effort to steer the company forward as a

global leader and provider of choice for energy transportation and maritime services.

"The huge demand for cleaner energy supports LNG trade growth, hence increases demand for LNG shipping industry. Nakilat strives to meet the growing energy transportation needs by capitalising on the potential investment opportunity in promising strategic projects," he concluded.



'Saga Dawn' to be delivered this month

LNT Marine has completed gas trials of its patented LNT A-BOX containment system on board 'Saga Dawn', a mid-size LNGC, due for delivery this month from China Merchants Heavy Industry (Jiangsu) shipyard.

Saga LNG Shipping and China Merchants Industry Holdings (CMIH) signed a contract for the 45,000 cu m-capacity LNGC in late 2015. Subsequently, the yard entered into a license agreement with Singapore's LNT Marine for the new containment system.

Kjetil Sjølie Strand, LNT Marine CEO, said: "The success of the gas trials - the culmination of nearly 10 years' research and development - verifies that the LNT A-BOX concept is a viable solution for flexible LNG carriers. We are delighted that the gas trials have

been a success and now look forward to seeing 'Saga Dawn' entering commercial service."

The ABS-classed LNGC is based on LNT Marine's LNT45 design whereas the basic design was developed in co-operation with Sweden's FKAB.

Stein Foss, LNT Marine COO, added: "LNG carriers are among the most sophisticated and expensive merchant ships to build, with construction traditionally limited to a few shipyards around the world. However, the cost and complexity of traditional LNG containment systems does not make smaller LNG projects commercially feasible. LNT A-BOX does. It offers a simple, flexible and efficient cargo containment system enabling more shipyards to build

LNG vessels at more attractive prices."

LNT A-BOX is based on proven technologies, but in a new patent-protected configuration. The design is based on an independent tank type 'A' as the primary barrier and a full secondary barrier.

"The potential for LNT A-BOX to revolutionise existing and emerging LNG shipping markets is a very exciting prospect," Strand said, adding that the technology completely "supports the growth of the expanding LNG sector going forward."

While the concept has initially been focused on the small-to-mid-size LNGC segment, Strand said the technology can be scaled up or down. "We are currently involved in a number of projects to develop new LNGC designs based on the LNT A-BOX concept, including an 80,000 cu m LNG carrier, shallow draught vessels and small and mid-size FSRUs."



'Saga Dawn' seen on gas trials

Large capacity LNGC design

A joint venture group has been formed to develop a 220,000 cu m LNGC fitted with a Mark III containment system.

Lloyd's Register (LR) has signed the agreement with COSCO Shipping LNG Investment (Shanghai) Co, COSCO Shipping Heavy Industry Co Ltd, Jiangnan Shipyard (Group), Marine Design and Research Institute of China (MARIC), Shanghai Ship and Shipping Research Institute (SSRI) and China Classification Society (CCS) to design and develop the LNGC.

The seven members of the group will use their expertise, experience and research capabilities to define the ship's technical specifications and general arrangement of the main systems, factoring in route and capacity requirements, LR said.

LR and CCS will provide technical support and consultancy services to ensure that the design meets all international regulations, industry-wide conventions and standards, and that it complies with each society's class rules. LR and CCS will also offer technical support for ship/shore matching, focusing particularly at upstream and downstream loading

and unloading terminals.

AiP in prospect

Once the LNGC has been designed, LR and CCS will look to grant the design approval in principle (AiP), which will further enhance the project partners' competitiveness in the large LNGC market. The parties will conduct hydrodynamic assessments on the design to optimise its performance and plan to continually improve it.

Zhu Cangman, Vice Director, Safety Committee, COSCO Shipping LNG investment (Shanghai), said: "All of the partners involved in this project hope to achieve complementary advantages through close co-operation, which will further enhance the competitiveness in the large LNG carrier market within China and local areas."

Zhu Jianzhang, Assistant President, MARIC, said: "As global demand for LNG trade continues to grow, the shipping industry will require more LNG carriers, specifically for newbuilding orders. As China's demand for LNG continues



The signing ceremony for the 220,000 cu m LNG project

to increase, more Chinese shipowners with need LNG carriers and this JIP will provide our customers with a suitable and competitive design to support their business requirements."

Hu Keyi, Chief of Global Technology, Jiangnan Shipyard, said: "The membrane type LNG carrier is Jiangnan's strategic and long-term product and expanding our LNG series will allow Jiangnan to support the rapid growth in Chinese LNG demand. Jiangnan has successfully co-operated with LR and MARIC on an AiP for standard size membrane type LNG carrier 'LNG Jumbo', and a joint development project for applying LNG fuel tank on larger containerships. These working arrangements and experience can be replicated on this new project."

Wei Ying, LR's senior vice President, Greater China, added: "LR is the clear leader for gas ship construction in China, with 48% of capacity ordered to date being classed by us. We couldn't have reached this position without the support of our partners in this project, including COSCO Shipping LNG Investment, who we have worked with for a total of 10 x 174,000 cu m LNGCs to date; and Jiangnan Shipyard, where we currently have 10 VLGCs and two Mark III LNGCs in progress.

"We remain committed to supporting the growth in the LNG shipping market in China, and we look forward to contributing to the success of this JIP through our unmatched local gas ship experience and expertise," he said. ■

MAN's dual-fuel engines pass milestone

MAN Energy Solutions 2-stroke, dual-fuel portfolio recently logged over 500,000 operational hours.

The milestone stems from the 250 plus sales the company has concluded within its entire portfolio of dual-fuel engines - running on LNG or other clean fuels, such as LPG or methanol.

MAN's ME-GI (gas injection) and ME-LGI (liquid gas injection) engines form the core of its 2-stroke, dual-fuel portfolio and have notched many industry-firsts since their introduction to the market, including the first deepsea ships driven by LNG, methanol, ethane and LPG, respectively.

Service reports have also been positive with the company stating that recent experience from a

174,000 cu m LNGC powered by an ME-GI engine, logged reliability and availability figures of 99%.

With the marine industry waiting to see how fuel prices and availability evolve after 2020, which will have a significant impact on shipowners' choice of new engines, MAN said that it expected - for new or existing, electronically-controlled MAN B&W-branded engines - the choice of retrofitting to ME-GI or ME-LGI engines to ultimately become a necessity.

MAN claimed that the ME-GI engine has set a new industrial standard for 2-stroke propulsion engines on board LNGCs and other vessel types. ■



MAN has passed a milestone with its gas engines

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WORLD LNG CARRIER ORDERBOOK

Yard	Containment System	Capacity	Propulsion	Delivery Date	Ordered	Primary Owner
JMU	SPB	165000	TFDE	Apr-19	Feb-14	MOL
JMU	SPB	165000	TFDE	Jul-19	Feb-14	MOL
JMU	SPB	165000	TFDE	Apr-19	Feb-14	NYK
DSME	GT NO 96	173400	MEGI	May-19	Jun-14	Maran Gas Maritime
DSME	GT NO 96	172000	TFDE - Azipod	Jul-19	Jul-14	Teekay LNG
DSME	GT NO 96	172000	TFDE - Azipod	Aug-19	Jul-14	Teekay LNG
DSME	GT NO 96	172000	TFDE - Azipod	Oct-19	Jul-14	Teekay LNG
DSME	GT NO 96	172000	TFDE - Azipod	Nov-19	Jul-14	Teekay LNG
DSME	GT NO 96	172410	TFDE - Azipod	Sep-19	Jul-14	MOL
Kawasaki	Moss	155000	TFDE	Dec-19	Sep-14	MOL
DSME	GT NO 96	173400	MEGI	Apr-19	Nov-14	BP
Mitsubishi H.I.	Moss	177000	STaGE	Sep-19	Jan-15	MOL
DSME	GT NO 96	173400	MEGI	Sept-19	Sep-15	BWGas
Kawasaki	Moss	177000	STRH	Jul-19	Sep-15	MOL
Mitsubishi H.I.	Moss	165000	STaGE	May-19	Nov-15	Mitsubishi
Mitsubishi H.I.	Moss	180000	STaGE	Jun-19	Nov-15	NYK
Mitsubishi H.I.	Moss	180000	STaGE	Feb-19	Nov-15	NYK
Hyundai Heavy	GTT Mark III Flex	180000	XDF	Apr-19	May-16	SK Shipping
Hyundai Heavy	GTT Mark III Flex	180000	XDF	May-19	May-16	SK Shipping
DSME	GT NO 96	173400	MEGI	Oct-19	Jun-16	Maran Gas Maritime
DSME	GT NO 96	173400	MEGI	Nov-19	Jun-16	Maran Gas Maritime
DSME	GT NO 96	173400	MEGI	Apr-20	Dec-16	Maran Gas Maritime
Hyundai Heavy	GTT Mark III Flex	180000	MEGI	May-19	Mar-17	Knutsen
DSME	GT NO 96	173400	MEGI	Jun-19	Mar-17	Flex LNG
DSME	GT NO 96	173400	MEGI	Aug-19	Mar-17	Flex LNG
Hyundai Heavy	GTT Mark III Flex	180000	MEGI	Jun-19	May-17	Knutsen
Hudong-Zhonghua	GT NO 96	174000	MEGI	Dec-19	Jul-17	MOL
Hudong-Zhonghua	GT NO 96	174000	MEGI	Mar-20	Jul-17	MOL
Hudong-Zhonghua	GT NO 96	174000	MEGI	Jul-20	Jul-17	MOL
Hudong-Zhonghua	GT NO 96	174000	MEGI	Oct-20	Jul-17	MOL
Samsung	GTT Mark III Flex	180000	XDF	Jun-19	Dec-17	GasLog
DSME	GT NO 96	173400	MEGI	May-20	Dec-17	Maran Gas Maritime
Hyundai Heavy	GTT Mark III Flex	174000	XDF	Mar-20	Jan-18	NYK
Hyundai Heavy	GTT Mark III Flex	174000	XDF	Jan-20	Jan-18	Cardiff Marine
Hyundai Heavy	GTT Mark III Flex	174000	XDF	Feb-20	Jan-18	Sovcomflot
DSME	GT NO 96	173400	MEGI	Dec-19	Feb-18	BWGas
DSME	GT NO 96	173400	MEGI	Jun-20	Feb-18	BWGas
Hyundai Heavy	GTT Mark III Flex	174000	XDF	Mar-20	Feb-18	Cardiff Marine
Hyundai Heavy	GTT Mark III Flex	174000	XDF	Apr-20	Feb-18	Cardiff Marine
DSME	GT NO 96	173400	MEGI	Aug-20	Feb-18	John Fredriksen
DSME	GT NO 96	173400	MEGI	Sep-20	Feb-18	John Fredriksen
Hyundai Heavy	GTT Mark III Flex	174000	XDF	May-20	Mar-18	Flex LNG
Hyundai Heavy	GTT Mark III Flex	174000	XDF	Jul-20	Mar-18	Flex LNG
Samsung	GTT Mark III Flex	180000	XDF	Apr-20	Mar-18	GasLog

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 = 4th April 2019

Yard	Containment System	Capacity	Propulsion	Delivery Date	Ordered	Primary Owner
Samsung	GTT Mark III Flex	174000	XDF	Mar-20	Mar-18	Cardiff Marine
DSME	GT NO 96	173400	MEGI	Dec-20	Mar-18	Minerva Marine
DSME	GT NO 96	173400	MEGI	Jan-21	Mar-18	Minerva Marine
Hyundai Heavy	GTT Mark III Flex	180000	MEGI	Jun-20	Mar-18	Knutsen
DSME	GT NO 96	173400	MEGI	Aug-20	Mar-18	Alpha Gas
DSME	GT NO 96	173400	MEGI	Dec-20	Mar-18	Alpha Gas
Samsung	GTT Mark III Flex	180000	XDF	Sep-20	May-18	GasLog
DSME	GT NO 96	173400	MEGI	Oct-20	Jun-18	Maran Gas Maritime
DSME	GT NO 96	173400	TFDE	Apr-21	Jun-18	Maran Gas Maritime
DSME	GT NO 96	173400	MEGI	Apr-21	Jun-18	Alpha Gas
Hyundai Heavy	GTT Mark III Flex	174000	XDF	Sep-20	Jun-18	Thenamaris
Hyundai Heavy	GTT Mark III Flex	174000		Feb-21	Jun-18	Flex LNG
Hyundai Heavy	GTT Mark III Flex	174000		May-21	Jun-18	Flex LNG
Hyundai Heavy	GTT Mark III Flex	174000		Oct-20	Jul-18	Capital Gas
Hyundai Heavy	GTT Mark III Flex	174000		Nov-20	Jul-18	Capital Gas
Hyundai Heavy	GTT Mark III Flex	174000		Mar-21	Jul-18	Capital Gas
Hyundai Heavy	GTT Mark III Flex	174000		Jun-21	Jul-18	Capital Gas
DSME	GT NO 96	173400	MEGI	Nov-20	Jul-18	John Fredriksen
Samsung	GTT Mark III Flex	180000	XDF	Dec-20	Aug-18	Celsius Shipping
Samsung	GTT Mark III Flex	180000	XDF	Mar-21	Aug-18	Celsius Shipping
Hyundai Heavy	GTT Mark III Flex	174000	XDF	Sep-20	Aug-18	Cardiff Marine
Samsung	GTT Mark III Flex	174000	XDF	Oct-20	Aug-18	GasLog
Samsung	GTT Mark III Flex	174000	XDF	Dec-20	Aug-18	GasLog
Hyundai Heavy	GTT Mark III Flex	174000	XDF	Feb-21	Sep-18	Cardiff Marine
Hyundai Heavy	GTT Mark III Flex	174000	XDF	Feb-21	Sep-18	Thenamaris
Samsung	GTT Mark III Flex	174000	XDF	Mar-21	Sep-18	NYK
Samsung	GTT Mark III Flex	174000	XDF	Jan-21	Oct-18	Minerva Marine
Samsung	GTT Mark III Flex	174000	XDF	Sep-21	Oct-18	Minerva Marine
Samsung	GTT Mark III Flex	174000	XDF	Feb-21	Nov-18	Cardiff Marine
Samsung	GTT Mark III Flex	174000	XDF	Jan-21	Nov-18	Cardiff Marine
Hyundai Heavy	GTT Mark III Flex	174000	XDF	Mar-21	Nov-18	Cardiff Marine
Hyundai Heavy	GTT Mark III Flex	174000	XDF	Apr-21	Nov-18	Cardiff Marine
Hyundai Heavy	GTT Mark III Flex	174000	XDF	Feb-21	Nov-18	Latsco Shipping
Hyundai Heavy	GTT Mark III Flex	174000	XDF	Mar-21	Nov-18	Latsco Shipping
Samsung	GTT Mark III Flex	174000	XDF	Aug-21	Dec-18	NYK
Samsung	GTT Mark III Flex	174000	XDF	Nov-21	Dec-18	NYK
DSME	GT NO 96	174000	MEGI	Feb-21	Dec-18	BWGas
DSME	GT NO 96	174000	MEGI	Jun-21	Dec-18	BWGas
DSME	GT NO 96	173400	MEGI	Jun-21	Dec-18	Maran Gas Maritime
Hyundai Heavy	GTT Mark III Flex	174000	XDF	Nov-20	Dec-18	NYK
Hyundai Heavy	GTT Mark III Flex	174000	XDF	Mar-21	Dec-18	NYK
Hyundai Heavy	GTT Mark III Flex	174000	XDF	Jun-21	Dec-18	NYK
DSME	GT NO 96	180000	MEGI	Dec-20	Dec-18	MOL
DSME	GT NO 96	173400	MEGI	Jun-21	Dec-18	MOL
Hyundai Heavy	GTT Mark III Flex	174000	XDF	Sep-20	Dec-18	Sovcomflot

Yard	Containment System	Capacity	Propulsion	Delivery Date	Ordered	Primary Owner
Hyundai Heavy	GTT Mark III Flex	174000	XDF	Feb-21	Dec-18	Sovcomflot
Samsung	GTT Mark III Flex	180000	XDF	Jun-21	Dec-18	GasLog
Samsung	GTT Mark III Flex	180000	XDF	Aug-21	Dec-18	GasLog
Samsung	GTT Mark III Flex	174000	XDF	Mar-21	Dec-18	Cardiff Marine
DSME	GT NO 96	174000	MEGI	Jun-21	Dec-18	Alpha Gas
Samsung	GTT Mark III Flex	174000	XDF	Mar-21	Dec-18	Navigare
Samsung	GTT Mark III Flex	180000	XDF	Jun-21	Feb-19	Celsius Shipping
Samsung	GTT Mark III Flex	180000	XDF	Sep-21	Feb-19	Celsius Shipping
Hudong-Zhonghua	GT NO 96	178000	XDF	Sep-21	Feb-19	CSSC
Hudong-Zhonghua	GT NO 96	178000	XDF	Feb-22	Feb-19	CSSC
DSME	GTT Mark III Flex	174000	MEGI	May-21		Nakilat
Samsung		174000		Sep-22		Sinokor
Samsung		174000		Sep-22		Sinokor
Samsung		174000		Sep-22		Sinokor
Samsung		174000		Sep-22		Sinokor
DSME	GTT Mark III Flex	173400	XDF	Aug-21		Nakilat
DSME	GTT Mark III Flex	173400	XDF	Oct-21		Nakilat
Hyundai Heavy	GTT Mark III Flex	174000	XDF	Jun-21		Capital Gas
Samsung		174000		Mar-22		Nisshin Shipping

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 = 4th April 2019



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WORLD SMALL SCALE LNG FLEET*

Built	Name	CBM	Cargo Type	Trading area	Trading in LNG?	Ship Owner / Operator
1974	Seagas	187	LNG	Sweden	Yes	AGA
1988	Kayoh Maru	1,517	LNG	Japan	Yes	Daiichi
1993	Aman Bintulu	18,928	LNG	Malaysia - Japan	Yes	Perbadanan/NYK
1996	Surya Aki	19,475	LNG	Indonesia - Japan	Yes	MCGC
1997	Aman Sendai	18,928	LNG	Malaysia - Japan	Yes	Perbadanan/NYK
1998	Aman Hakata	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	Norgas Creation	10,000	LNG/LPG/Ethylene	Worldwide	No	Norgas Carriers
2010	Norgas Innovation	10,000	LNG/LPG/Ethylene	Worldwide	No	Norgas Carriers
2011	Akebono Maru	3,556	LNG	Japan	Yes	Chuo Kaiun
2011	Norgas Conception	10,000	LNG/LPG/Ethylene	Worldwide	No	Norgas Carriers
2011	Norgas Invention	10,000	LNG/LPG/Ethylene	Worldwide	No	Norgas Carriers
2011	Vision Spirit	12,000	LNG/LPG/Ethylene	Worldwide	No	Teekay
2011	Unikum Spirit	12,000	LNG/LPG/Ethylene	Worldwide	No	Teekay
2012	Coral Energy	15,600	LNG	Northwest Europe/Baltics	Yes	Anthony Veder
2013	JX Energy TBN	2,500	LNG	Japan	Yes	JX Energy
2013	Kakuyu Maru	2,500	LNG	Japan	Yes	Tsurumi Sunmarine
2013	Coral Anthelia	6,500	LNG/Ethylene			Anthony Veder
2014	LNG-Oil combi**	2,000	LNG	Germany	Yes	Veka
2014	Short Sea LNG Tanker **	4,000	LNG	Germany	Yes	Veka
2015	LNG Inland bunker**	800	LNG	Germany	Yes	Veka
2015	LNG bunker barge 1†	2,250	LNG	China	Yes	Anhui Huaqiang Natural Gas
2015	LNG bunker barge 2†	2,250	LNG	China	Yes	Anhui Huaqiang Natural Gas
2015	LNG bunker barge 3†	2,250	LNG	China	Yes	Anhui Huaqiang Natural Gas
2015	LNG Barge TBN	3,000	LNG	US Coast	Yes	LNG America
2015	10 small carriers TBN**	5,000	LNG			Bimantara Group
2015	Jahre TBN**	6,200	LNG	Norway	Yes	Donsotank/Jahre Marine
2015	Norgas TBN**	17,000	LNG/LPG/Ethylene	Worldwide		Norgas Carriers
2015	Norgas TBN**	17,000	LNG/LPG/Ethylene	Worldwide		Norgas Carriers
2015	JS Ineos Ingenuity	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2015	JS Ineos Insight	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2015	JS Ineos Intrepid	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2015	TBN 1	27,500	LNG	China?		Danyang?
2015	TBN 2	27,500	LNG	China?		Danyang?
2015	TBN 3	27,500	LNG	China?		Danyang?
2015	PetroChina TBN	30,000	LNG	China		PetroChina
2016	Clean Jacksonville	2,200	LNG	US Coast	Yes	CME
2016	LNG Prime	2,250	LNG	Northwest Europe	Yes	Veka Deen LNG
2016	JS Ineos Indepence	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2016	JS Ineos 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

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*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 = 4th March 2019

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

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