

# LNG Shipping News

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6 August 2020

## US extends LNG export period to 2050

In a move to boost US investment in LNG exports, the period allowed when gas can be shipped to non-free trade agreement (non-FTA) countries will be extended through 2050.

This was confirmed in a speech given by US President Trump in Texas. It will replace the present US Government position of granting 20-year export terms.

"This policy to utilise export terms through 2050 is the latest of several measures DOE, under President Trump, has taken to support US LNG exports and the benefits they bring both to the US and to our allies around the world," said US Secretary of Energy Dan Brouillette, who was with President Trump when he made the announcement.

"Just this year, LNG exports from the US will reduce our trade deficit by over \$10 bill. Furthermore, LNG exports in the US are providing tens of thousands of jobs and have led to the investment of billions of dollars in infrastructure. This Administration is following through on our commitment to make US LNG - a long-term, reliable, cleaner-burning energy source - available to the world," he said.

The 2050 term extension was

originally aired in a proposed policy statement that was issued for public notice and comment on 11th February, 2020. In this final policy statement, DOE has responded to the comments received and finalised the earlier proposal.

### Applications allowed

This move will allow existing non-FTA authorisation holders to apply to extend their export term through 2050 and would also allow existing applicants to amend their pending non-FTA applications to request an export term to the same year.

"The growth of US LNG exports over the last few years has redefined the global energy landscape, with exports more than quadrupling during the Trump Administration," said US Under Secretary of Energy, Mark Menezes. "These exports are creating thousands of jobs and enormous opportunity here at home, while increasing US LNG competitiveness in the global market. I am proud to be



US Secretary of Energy, Dan Brouillette

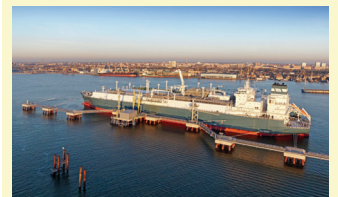
part of a department that is making sure these benefits can continue for the American people for the long term."

"Especially in these times of uncertainty, this policy will provide further regulatory certainty for US exporters competing for market share around the world," said US Assistant Secretary for Fossil Energy, Steven Winberg. "Importing US LNG makes sense from an economic and environmental perspective for countries looking to have reliable, low-emissions energy supplies. With this policy, US exporters will be better positioned to meet long-term global demand."

The final policy statement was signed for issuance in the US Federal Register.

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## NEWS NUDGE

### Great Lakes to dredge Sabine Pass expansion project

Great Lakes Dredge & Dock Corp has signed a sub-contract with Bechtel Oil, Gas and Chemicals to dredge the Sabine Pass expansion project.

Bechtel is the engineering, procurement & construction (EPC) contractor for the Train 6 and third berth expansion projects at the Sabine Pass liquefaction project for subsidiaries of Cheniere Energy Partners.

The LNG terminals' expansion project consists of adding a third marine berth with supporting facilities. It will be built to

accommodate LNGCs with capacities of between 125,000 and 180,000 cu m.

Great Lakes had previously worked as a Bechtel sub-contractor on the Australian Wheatstone LNG project and was also employed by another subsidiary of Cheniere on the Corpus Christi LNG export terminal project.

## Sinopec seeks long-term LNG deals

China Petroleum & Chemical Corp (Sinopec) is seeking the delivery of LNG over a 10-year period.

This move has been initiated to take advantage of the current low prices, as gas demand has fallen due to the coronavirus pandemic.

Sinopec was said to be asking for 1 mill tonnes of LNG per year for delivery over 10 years starting from 2023, industry sources told Reuters.

Offers were due by last week and will remain valid until mid-August.

Asian spot LNG prices LNG-AS, which buyers are increasingly using as a gauge to negotiate their long-term contracts, are hovering at near record lows.

In addition, prices of long-term contracts that are typically priced on Brent are also being negotiated at lower levels.

"Expectations for long-term demand are still bullish so it's a good time to buy long-term cargoes," a Beijing-based source said. "It's the lowest price range now and so is a good time to discuss long-term deals."

Sinopec is also looking for US cargoes, as part of the tender requirement, another source said.

The company had been in discussions with Cheniere Energy to sign a 20-year deal but Reuters reported earlier this year that both companies had planned to review the terms of the deal after a sharp drop in prices.

## FSRU numbers to increase

More FSRUs could be needed, as there are about 45 LNG-to-power projects proposed worldwide, a recent webinar said.

"There are good prospects for further growth," Poten's Melanie Lovatt said in one of the regular LNG webinars, explaining that there were a large number of countries looking to employ FSRUs on the back of power projects.

In general, the financing of these units is undertaken by the shipowner who then charters the units out. The peak of this activity was seen in 2018, while 2020 was thus far characterised by re-financing, Lovatt said. However, there could be more conversion work financing needed in the near future, she thought.

Many of the large LNG-to-power projects' funding is centred on Brazil with Golar Power in the vanguard (see page 3).

There are at least three potential FSRU projects in South Africa, including Matola Bay, Maputo, Mozambique, which is targeting sales to South Africa via a pipeline. The other two are at Coega, Port Elizabeth and Transet's LNG facility in Richards Bay. Saldhana Bay could also be developed in the future, Lovatt said.

As for West Africa, Benin, Ivory

Coast, Ghana and Nigeria, have plans for LNG projects. However, High West African Gas Pipeline (WAGP) tariffs are making progress slow, coupled with COVID-19.

In the Lebanon, Qatar Petroleum, working with ENI, has been selected as a potential bidder for a project and there could be at least three FSRUs placed in different locations around the country's coastline.

Egypt, India, Pakistan, Bangladesh and Sri Lanka all have projects that are either using FSRUs or have included their use in their plans.

In Asia/Pacific, projects are being planned in Vietnam, The Philippines, New Caledonia, Malaysia, Myanmar, Thailand and Australia, among others.

### Foreign investments

Many of these proposed projects will hinge on domestic government policies, while the question of funding in emerging markets will often depend on foreign investments, Poten's Wong Kit Ling explained.

Development banks will cater

for much of the financing in the developing economies, working closely with governments. However, commercial banks could struggle with the risks involved.

She explained that five or six years ago, these projects were 'flavour of the month' and today, .... "we are currently back in another cycle when a lot of interest is being shown again," she said.

However, due to the low gas and oil prices, there is much uncertainty as to how and if these projects are going to pan out. One problem is that the land-based infrastructure is often not ready to accommodate the FSRU, as this takes longer and is more costly to construct.

An FSRU is the easy part, it was explained, as a conversion can be undertaken in as little as six months, while a newbuilding could be completed in around 18 months, if the equipment has already been pre-ordered.

Poten thought that more TFDE type LNGCs could be earmarked for conversion projects, as they had been superseded by the more economic WinGD X-DF and MAN MEGI propulsion units.

In general, each project involving an FSRU faces unique demand aggregation challenges. There is no 'one size fits all' anywhere in the world, the speakers warned.

Since the first unit entered service in 2005, there are now around 38 FSRUs on the water, plus another six on order of which four were already committed to projects, while the remaining two were thus far uncommitted, Poten said.



More FSRUs could be needed for various projects

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# Golar Power signs MoU for Brazilian LNG terminal

Golar Power Limited has signed a Memorandum of Understanding (MoU) with Norsk Hydro to develop northern Brazil's first LNG terminal.

This project will enable LNG to be supplied to Norsk Hydro's Alunorte refinery located close to the Vila do Conde Port in the Municipality of Barcarena, in the Brazilian State of Pará.

Alunorte will also be the first operational customer for the Barcarena FSRU that Golar Power plans to bring into operation during the first half of 2022.

Concluding final agreements with Norsk Hydro will therefore be an important step toward a final investment decision (FID) within the next four to six months, Golar said.

Once built, the LNG terminal will supply gas to Alunorte and also to the Centrais Elétricas Barcarena 605 MW thermal power plant, which is a subsidiary of Golar Power, previously contracted under a 25-year PPA.

## Distribution network

Golar Power said that it also expected to operate a comprehensive LNG distribution network across Pará state and the region. This LNG supply chain will cover an area larger than Eastern Europe and consist of thousands of kilometres of river and road transportation systems, serving numerous industrial, commercial, and transportation customers.

Golar Power CEO, Eduardo Antonello, commented: "We are delighted to be helping Norsk Hydro achieve its ambitious global sustainability goal of reducing CO2 emissions by 30% by 2030, and at the same time contributing to a significant reduction in energy prices and environmental emissions within the entire North Region of Brazil.

"The project should have the potential to significantly reduce energy costs, support environmentally responsible and sustainable industrial growth throughout this immense region, and facilitate the unlocking of its unique natural resource endowment and economic potential.

"Golar Power estimates a potential for replacing approximately 1.8 mill tonnes of LNG equivalents per annum of LPG, diesel, fuel oil, and coal with the terminal - creating the foundation for a broader transition away from carbon-intensive energy sources in the region.

"The reduction in LNG prices we have seen in recent years has significantly increased LNG's relative competitive position, not only versus diesel and fuel oil, but also now coal. The Norsk Hydro project illustrates the economic and environmental benefits

which can be achieved by global industry and mining companies by transitioning their energy sourcing to LNG. This trend creates a massive opportunity for Golar Power to replicate the initiative in different countries over the years to come," he concluded.

John Thuestad, Hydro Bauxite and Alumina Vice President, added: "Hydro is committed to sustainable best practices and we consistently invest in solutions to reduce our impact and bring benefits to neighbouring communities, as well as foster responsible industrial development. This LNG project will help make our operation more sustainable and will facilitate access to cleaner burning natural gas for other industries and consumers in the state of Pará."

The planned transition from heavy fuel oil to LNG will not only underpin the long-term future of the Alunorte facility and the many thousands of jobs that it supports, but it will also be an important springboard for the rapid start-up of small-scale LNG distribution operations.

Golar Power is a joint venture between Golar LNG and Stonepeak Infrastructure Partners. ■

# Freeport Train 4 to be delayed

Freeport LNG Development has asked the US Federal Energy Regulatory Commission (FERC) for a three-year extension to complete its planned Train 4.

In a filing, the company requested an extension to 17th May, 2026.

Train 4 was originally scheduled for completion by 17th May, 2023. However, construction has not started and it will take at least 42 months to complete, Freeport told FERC. Meeting the original deadline was not possible, the company said.

"Additionally, the current worldwide economic climate and depressed global LNG prices resulting from the coronavirus pandemic make it challenging to complete long-term contracts with potential customers, resulting in associated delays for LNG projects in the US and around the world," the company said in the filing.

It was also reported that last May, Freeport had contracted KBR to handle Train 4's engineering, procurement, construction (EPC) and commissioning at Quintana Island, Texas.

However, last month, KBR announced that it was quitting the LNG EPC business to focus on government contracts and technology businesses.

As a result, Freeport LNG has to hold another tender for the EPC contract and this had resulted in "additional uncertainty," it said.

Freeport LNG's three operating trains are able to produce a total 15 mill tonnes of LNG per year. The fourth train, once completed, would add an additional 5 mill tonnes per year to the mix.

Constructing the first three trains took five and a half years at a cost of \$13.5 bill, the company said. ■

# First Ecuadorian FSRU import terminal

US engineering company, Sycar is working with an undisclosed LNG Trading firm to develop an LNG import terminal in Ecuador.

This project includes port facilities for the berthing of an FSRU to supply LNG to an existing power plant and an LNG truck filling station.

It is also intended to introduce natural gas to the Ecuadorian energy matrix as a first phase with an onshore LNG storage terminal.

The project is being developed

for Bajo Alto in El Oro Province near the existing Thermo Gas Machala Power Plant. The location, offers water depths of up to 36 ft and it is sheltered being in inland waters.

This location was assessed from a maritime perspective and the project has been awarded a concession from the

Ecuadorian Under-secretary of Ports, as well as the FSRU operation approval from the Secretary for the Regulation and Control of Hydrocarbons.

Sycar said it was now in the process of environmental licensing, which is expected to be granted by the fourth quarter of this year. ■

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## Mexico's Pacific project awaits permitting

Mexico's IEnova is confident of securing a government permit this year to allow a final investment decision (FID) to be taken on its planned Energia Costa Azul LNG liquefaction project.

The company, the Mexican-based subsidiary of US utility Sempra Energy, is working closely with the authorities as they evaluate the merits of the permit, the company said during its 2Q20 earnings conference call.

"We are quite confident that we are going to get it before the year ends," said Carlos Ruiz Sacristan, Chairman of the board.

IEnova had expected to reach

a FID for Energia Costa Azul, to be located on Mexico's Pacific coast, in the first quarter of the year, but the coronavirus pandemic caused government offices to shut thus halting all permit processing.

The company, which operates storage terminals around Mexico, has one-year permits to export pipeline gas to the US.

Once built, Energia Costa Azul will be the country's first LNG ex-

port terminal. It will also be the first permit to be granted for 20 years, Alexandra Violante, Investor Relations Officer, told S&P Global Platts following the call.

It was believed that the LNG will probably be exported to Asia and Europe. The Asian route from the Pacific Coast is shorter than from the US Gulf Coast and avoids Panama Canal congestion and fees.

IEnova said that it had met all the requirements and no major issues were raised by the authorities that were impossible to address, CFO, Nelly Molina, confirmed during the call.

The company has also made progress on other requirements for reaching FID this year. For exam-

ple, during 2Q20, IEnova executed sale-and-purchase agreements (SPAs) with Total and Mitsui & Co that, together with the import permit, are key to reaching FID, Ortiz Mena said.

IEnova had signed heads of agreement (HoAs) with Total, Mitsui and Tokyo Gas for the full export capacity of Phase I of the project, which is expected to produce 2.4 mill tonnes per year of LNG.

Ruiz Sacristan also said that one of the offtakers had expressed interest in "acquiring equity" in the project, without providing details, which parent Sempra had successfully concluded with other projects. ■



Sempra's Mexican subsidiary is to take FID on a liquefaction plant

## Subic Bay STS operations restart

LNG cargo ship-to-ship transfer (STS) operations have resumed in Subic Bay, Philippines.

An LNGC arrived at the designated slot last weekend, but the crew were not allowed to disembark in strict observance of health protocols in this Freeport area.

SBMA Chairman and Administrator, Wilma Eisma, said that the agency had made it clear that the officers and crew of the 142,800 cu m LNGC 'Methane Shirley Elisabeth', which arrived to transfer LNG to smaller feeder ships, would remain on board throughout the two-week operation.

"No one from the ship can be allowed to come ashore, sadly not even the 16 Filipinos among the 31 crew members, because of the health measures we must observe," she said in a statement.

She added that the same policy will be implemented for the crew members of the small-scale LNGCs that will tranship the LNG to Chinese ports.

Eisma described the resumption of LNG STS transfer operations in Subic as a "welcome boost to the economy" but stressed that

health safety should be a paramount concern for both the ship's and port's personnel.

SBMA Seaport Manager, Jerome Martinez, said that the LNGC had arrived from Qatar and called at Hong Kong to pick up three Mooring Masters before proceeding to Subic.

The ship is expected to stay at anchor until 15th August for the STS operations.

He said that aside from the 16 Filipino crew, 15 other foreign nationals were on board the vessel - nine Greeks, two Croatians, two Ukrainians, a Romanian, and a Latvian.

Martinez also said that upon her arrival at the anchorage area outside of the bay, a team from the Bureau of Quarantine (BOQ) immediately boarded the LNGC for health inspections and safety protocols, and was followed by a team from the Bureau of Customs (BoC) and Bureau of Immigration (BoI).

Following 'Methane Shirley Elisabeth', the LNGC 'Lerici', was due to conduct an STS transfer at Subic. ■

## Gorgon Train 2 to resume service

Chevron's Gorgon LNG plant's Train 2 is due to restart operations in early September after the completion of repairs.

Repair work is being carried out after a routine inspection during planned maintenance of the train's propane heat exchangers found weld quality issues, a Chevron spokesman told Reuters.

The maintenance began on 23rd May and a restart was originally planned for 11th July.

Scheduled work has been completed but repairs were underway on the exchangers, the spokesman

said. Train 2 is fitted with eight propane heat exchangers.

Australia's Department of Mines, Industry Regulation and Safety (DMIRS) has said that it planned to inspect the Gorgon plant "as soon as possible," following calls by a trade union for the plant's closure.

The three-train Gorgon project can produce 15.6 mill tonnes of LNG a year. ■



Gorgon's Train 2 is due back in service next month

# GTT's revenue and earnings up sharply

LNG services provider GTT has reported a 66.2% rise in revenue to €203.8 mill and EBITDA up by 92.7% to €136.6 mill for the first half of this year.

The company received 18 orders for containment system designs for - 12 LNGCs, two FSUs, one FSRU and three onshore storage tanks.

Commenting on the results, Philippe Berterottière, GTT Chairman and CEO, said: "In a context of health and economic crisis, the first half of 2020 was characterised by sustained business activity. After two years of very strong activity, LNG carrier orders remain at satisfactory levels and are accompanied by orders for floating units and onshore storage tanks that demonstrate GTT's ability to cover the entire LNG market value chain.

"This level of activity is reassuring as to the dynamics of the LNG market and its long-term prospects. However, GTT keeps a special focus on developments in the markets in which it operates.

"In the field of LNG as fuel, the

decline in fuel prices and the decline in new shipbuilding weighed on the six-month period. However, GTT continues to explore and support all possibilities for the development of this activity, which is a positive contributor to sustainable environmental improvement. In this regard, in order to highlight the importance of environmental factors in the Group's conduct, we are now adopting a new base line for our logo: 'Technology for a Sustainable World'.

"From a financial perspective, revenue for 1H20 benefited from the flow of orders over the last two years and results were up sharply. As a result, considering the backlog in our orderbook and shipbuilding schedules, we are confirming our outlook for revenues and EBITDA for the full 2020 financial year. We are also proposing an interim dividend of €2.50, in line with our

long-term policy," he said.

## Satisfactory level

With 12 orders for LNGCs booked during 1H20, GTT's core business activity now stands at a very satisfactory level, particularly given the situation (Covid-19 and lower energy prices) that is very unfavourable to investment decisions, the company said.

All of the LNGCs will be equipped with GTT's recent technologies (Mark III Flex+, Mark III Flex and NO96 GW). They will be delivered between the beginning of 2022 and the end of 2023.

The 1H20 also marked a diversification in its orderbook winning orders for an FSRU, FSUs and tank storage projects.

In addition, GTT signed a technical assistance and license agreement (TALA) with the Russian yard Zvezda Shipbuilding Complex

(Zvezda) for the construction of LNGCs using GTT membrane tank systems. In July, five Arc7 LNGCs, equipped with GTT's membrane containment system, were ordered.

Several service and support contracts were signed - with CMA CGM, Excelerate Energy, Knutsen and more recently, Fleet Management.

As at 30th June, 2020, the orderbook, excluding LNG as fuel, stood at 135 units, while for LNG as fuel, the number of vessels in the orderbook stood at 18 units.

GTT predicted revenues of €832 mill over the 2020-2023 period - €374 mill in 2020, €266 mill in 2021, €151 mill in 2022 and €41 mill in 2023.

The company also confirmed its targets for the 2020 financial year as being consolidated revenues of between €375 mill and €405 mill and consolidated EBITDA of around €235 mill to €255 mill. ■

## NEWS NUDGE

### Orders and deliveries

Smart LNG, the Sovcomflot-NOVATEK joint venture, was thought to have ordered another 10 Arc7s.

If this contract is confirmed, it will bring the number of LNGCs ordered at Zvezda to 15.

Shell Tankers (Singapore) has signed long-term charter contracts for another six newbuilding LNGCs.

Similar to the earlier contracts, Shell was said to have signed separate deals with Knutsen LNG, Korea Line Corp and ICBC Financial Leasing and institutional investors advised by JP Morgan Asset Management, for two vessels each.

They will be of 174,000 cu m capacity, will be built by Hyundai Heavy Industries and Hyundai Samho Heavy Industries and will be fitted with dual-fuel X-DF engines, boil-off management plants, Silverstream air lubrication systems and shaft generators

for auxiliary power.

They will join the eight ships similar ships ordered in December, 2019.

Elsewhere, Samsung Heavy Industries (SHI) launched the first of three 174,000 cu m LNGCs, 'Minerva Kalymnos', on 18th July.

Building for Greek-controlled Minerva Gas, the LNGC is fitted with GTT's Mark III Flex + containment system and 2-stroke X-DF propulsion units.

In addition, Flex LNG has taken delivery of its first newbuilding this year - the 174,000 cu m 'Flex Aurora', which was handed over by Hyundai Samho Heavy Industries last week.

She is fitted with twin WinGD low-pressure X-DF engines and a GTT Mark III Flex containment system.

South Korea's shipbuilding conglomerate, Korea Shipbuilding & Offshore Engineering, said that its two affiliates had won contracts to build four LNGCs for delivery in 2023.

Hyundai Heavy Industries will construct two LNGCs for a Bermuda-based owner, while Hyundai Samho Heavy Industries will build two for a European company, Korea Shipbuilding said in a regulatory filing.

### Nakilat takes another Q-Max in-house

Nakilat took over the full ship-management and operations of Q-Max LNGC 'Al Samriya' from Shell Trading and Shipping Company Limited (Shell) on 27th July, 2020.

With a cargo carrying capacity of 263,300 cu m, 'Al Samriya' is wholly-owned by Nakilat and chartered by Qatargas. She was built by Daewoo Shipbuilding & Marine Engineering (DSME) and was delivered in February, 2009.

She is the fourth vessel to come under the management of Nakilat Shipping Qatar Ltd (NSQL) this year, bringing the total number of vessels managed in-house to 23, comprising of 19 LNG and 4 LPG carriers.

### Qatar to host LNG2025

It has been announced that Qatar is to host LNG2025, the 21st LNG International Conference and Exhibition.

International Gas Union (IGU) President, Prof Joe Kang, Chairman of the LNG Events Series Steering Committee, made the announcement following the conclusion of the process to decide who would hold the event.

Prof Kang, representing the three owners of the event - the IGU, the Gas Technology Institute (GTI), and the International Institute of Refrigeration (IIR) - said, "Qatar's key role in the future of the global LNG industry and the innovations it has proposed for LNG2025 made it an ideal host for the world's premiere LNG industry event."

This will be the second time that Qatar will host the global LNG event, following 2004, when Doha hosted LNG 14.

The last event, LNG2019, was held in Shanghai and the forthcoming LNG2022 will be hosted in St Petersburg, Russia. ■



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## SHI and ABS in 3D LNGC model approval

Samsung Heavy Industries (SHI) has established a 3D model-based ship design approval process with American Bureau of Shipping (ABS).

This was claimed to be one of the difficulties for SHI's digital transformation strategy. Shipbuilders are required to obtain approval for ship designs, including rule satisfaction, safety verification, etc, from a class society.

As a result, SHI tied up with ABS to establish a new process to enable verification and approval of designs based on digital-type 3D models without existing 2D paper drawings. The process will be applied to LNGCs to be built this year.

Patrick Ryan, ABS Global Engineering & Technology Vice President, said, "The implementation of the 3D model-based approval process has proven that design, review and inspection can be done using 3D instead of 2D. This digital innovation will lower the risk of ship building and further improve quality and safety."

"Digitised design information can be easily connected to artificial intelligence (AI), augmented reality and AR/VR technologies without any data processing," said Jeong Ho-hyun, head of Samsung Heavy Industries' Technology Development Division.

"Smartisation will be further accelerated throughout the shipyard's operations, including design, production and purchase," he added.

SHI is currently implementing 'Smart SHI' to maximise efficiency by connecting entire business areas, such as design and purchase, with ICT technologies, including smart yards that aim for the highest productivity. ■

## Witherby publishes LNGC ship vetting guidance

Witherby Publishing Group has published 'Ship Vetting and its Application to LNG, 2nd Edition'.

This revised edition of SIGTTO's 2003 publication describes the importance of the vetting of LNG ships as a risk assessment tool.

It includes an overview of the trade of LNG by sea, covers technical aspects of LNG ships relevant to vetting and describes the current vessel clearance processes. The book also details the use of the SIRE vessel inspection questionnaire for assessing risk and includes up-to-date industry best practices and recommendations.

This second edition was revised by Capt Juan Pablo Presedo. It responds to the need for charterers, buyers, terminal operators and sellers to be able to assure themselves that the condition, operation and ownership of any ship used are of an acceptable stan-

dard by applying their inspection and vetting systems to LNG shipping, the publishers claimed.

Iain Macneil, Witherby Publishing Group's CEO, commented:

"LNG Shipping has developed and grown significantly over the last 20 years and Witherbys are pleased to be responding to these changes through releasing an updated edition of 'Ship Vetting and its Application to LNG'. This new release draws on information learned from the oil industry and passes it on to all concerned parties involved in vetting LNG ships."

Author Capt Presedo added: "Witherbys has been crucial in the release of the updated edition of this specialised guide. The presentation of the information through detailed charts, tables and dia-



grams, and the valuable contribution of prestigious LNG professionals paired with the up to date and pressing subject matter makes this a vitally important read for all those involved in ship vetting and the LNG industry."

This title is available online at [www.witherbys.com](http://www.witherbys.com) and other maritime book stockists. ■

## Silverstream secures LNGC orders

UK-based clean technology company, Silverstream Technologies, is to fit its air lubrication system (ALS) on board at least eight newbuilding LNGCs.

The vessels are under construction at Hyundai Heavy Industries and Hyundai Samho Heavy Industries in South Korea.

Four of the 174,000 cu m LNGCs are owned by Knutsen LNG. Another two are owned by investors advised by JP Morgan Asset Management, while the remaining two vessels are owned by Korea Line Corp.

All of the LNGCs are being built under long-term charter agreements with Shell.

The patented Silverstream System ALS is claimed to be particularly effective with LNGCs hull form and operational profile and is suitable for both newbuilding and retrofit applications.

Noah Silberschmidt, CEO, Silverstream Technologies, said: "We are delighted to secure this ground-breaking major order of the Silverstream System. The support shown by the yard, owners, and charterers for our technology in the LNGC sector has been substantial and is hugely encouraging in terms of the potential to support the wider global shipping fleet."

"Working with some of the best known names in the maritime sector is an immense privilege and our expert team of commercial and supply chain professionals, alongside our world-beating naval architects and engineers, are fully focused on installing, testing, and

commissioning our system on these vessels - and delivering market-leading efficiency savings once they are in operation," he said.

Last year, Silverstream announced that it had signed a framework agreement with Shell UK to drive the inclusion of the Silverstream System across its LNGC fleet.

In August 2019, the company announced it had signed a MoU for Silverstream Systems to be fitted at Hudong-Zhonghua, a subsidiary of the China State Shipbuilding Corporation (CSSC) and a builder of LNGCs.

It has since been reported that the order has been increased by another six LNGCs (see page 6). ■

## NEWS NUDGE

### Medium-scale Yangtze LNGC design

LNT Marine, Wuhu Shipyard and Shanghai Merchant Ship Design and Research Institute (SDARI)

are jointly developing a design for a 40 000 cu m LNGC.

This medium sized LNGC will be based on the patented LNT A-BOX containment system.

Referred to as the 'WuhuMax', it will be designed to trade on the Yangtze river where there are air

and water draught restrictions.

LNG shipments along the Yangtze River are expected to fuel a second wave of Chinese LNG import and distribution interest, as 10 planned new LNG terminals will be completed in this area in the next few years. ■

# First X-DF LNGC engines overhauled

China State Shipbuilding Corp (CSSC) subsidiary, CSSC Marine Service Co (CMS), has completed the first major overhaul of two WinGD X-DF engines in just nine days.

The twin 6X62DF engines were the first X-DF units fitted and were installed on SK Shipping's 2017-built 180,000 cu m LNGC, 'SK Audace'.

In the three years since the vessel was delivered, the X-DF engines had reached 18,000 operating hours, >99% of which were in gas operation and <1% diesel operation, needed for manoeuvring. Therefore, scheduled maintenance was required to ensure continuous uninterrupted operation.

CMS' Korea team completed the full maintenance on the two engines in nine days, when the ship was anchored off Sabine Pass in Texas. She returned to service after successful sea trials.

This operation was accomplished despite the travel, logistics, health, and safety working plans problems caused by COVID-19.

CMS and WinGD collaborated to execute the work according to the standard manual for this engine

type. Original spare parts, such as piston rings and gas components, were delivered to the vessel's location at Sabine Pass by CMS.

The CMS Korea team claimed that the 6X62DF engine parts were in incredibly good condition, compared to engines historically overhauled by CMS that operate on heavy fuel oil (HFO).

## Common components

To ensure optimal engine operating standards through to the next scheduled maintenance, the CMS Korea team conducted maintenance on common components, such as pistons, exhaust valves, while flow limiting valve were overhauled and fuel pump component replacements were made where necessary.

In addition, the overhaul included complex gas components, such as gas admission valves (GAV), pre-chamber replacements



X-DF engines fitted on board 'SK Audace' have been overhauled

and gas valve units (GVU).

In total, 10 X-DF engines fitted on five vessels will be overhauled by CMS in the coming months. Results of the ongoing condition-based investigation on all five will enable increased TBO (time between overhaul) or CBM (condition based maintenance) decisions, to be agreed between the shipowner and class society.

SK Shipping's 'SK Audace's'

superintendent, said: "As the first ever X-DF engines, I had concerns about the scope of the project. But the CSSC Marine Service team demonstrated their ability with a fast and professional overhaul. Working closely with WinGD really made a difference to how quickly we were able to resume operations. We look forward to working with the team again in the future."

## NEWS NUDGE

### OLT Toscana reaches 100 not out

Italian offshore receiving terminal OLT Toscana has handled its 100th LNGC cargo.

This was achieved on 31st July, 2020 when the TMS Cardiff Gas 2020-built LNGC 'Bonito LNG' arrived at the FSRU for a ship-to-ship transfer.

The total amount of LNG discharged thus far is around 13.8 mill cu m since October, 2018. The Terminal has been working at 100% of capacity, OLT claimed.

OLT's remaining available



OLT has received its 100th cargo

capacity from October, 2020 up to the end of the Gas Year has been published on its website.

The first available product capacity consists of 10 delivery slots and runs from October, 2020 to September, 2021, while the second, consisting of five delivery slots, runs from October, 2020 to August, 2021.

\*\*\*Dunkerque LNG is also offering its 2021 available regasification capacity.

The binding phase will start on 11th August, 2020 and close on 28th August, 2020, operator Fluxys said.

### FERC looks at Noble Gas project

The US Federal Energy Regulatory Commission (FERC) is to prepare an environmental assessment (EA) on the environmental impacts of Freeport LNG's Noble Gas project.

The project involves the construction and operation of facilities by Freeport LNG Development, FLNG Liquefaction, FLNG

Liquefaction 2 and FLNG Liquefaction 3 in Brazoria County, Texas.

Comments must be received by 17th August, FERC said.

### Arc7 delivers Japanese cargo via NSR

NOVATEK Gas & Power Asia, a wholly owned subsidiary of PAO NOVATEK, recently shipped its first LNG cargo from Yamal to Japan via the Northern Sea Route (NSR).

The cargo was delivered by the Arc7 'Vladimir Rusanov' under a spot contract. She discharged at the Ohgishima LNG Terminal in Japan in accordance with the

contract's delivery schedule.

This was NOVATEK's first Arc7 discharge in a Japanese port, which will allow the company to increase the volume of LNG supplies to the country, it said.

"We focus a significant amount of attention to develop and enhance the logistical scheme for our LNG projects," said Lev Feodosyev, NOVATEK's First Deputy Chairman of the Management Board. "The future launch of a transshipment terminal in Kamchatka will significantly expand our opportunities to cost competitively deliver and supply LNG to the entire Asia/Pacific region."

## LNG rate assessments

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

| Region       | This week | Change*  |
|--------------|-----------|----------|
| East of Suez | \$34,000  | +\$1,000 |
| West of Suez | \$39,000  | +\$3,000 |
| 12 mos T/C   | \$44,000  | -        |

\*Since last report (22/07/20)

Source: Fearnleys (05/08/20)

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## WORLD LNG CARRIER ORDERBOOK

| Name                   | Containment system | Yard            | Propulsion | Capacity | Delivery date | Primary Owner      |
|------------------------|--------------------|-----------------|------------|----------|---------------|--------------------|
| Flex Artemis           | GT NO 96           | DSME            | MEGI       | 173400   | 01/07/2020    | Flex LNG           |
| Lng Pheceda            | GT NO 96           | Hudong-Zhonghua | MEGI       | 174000   | 01/07/2020    | MOL                |
| Cool Discoverer        | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/08/2020    | Thenamaris         |
| Energy Pacific         | GT NO 96           | DSME            | MEGI       | 173400   | 01/08/2020    | Alpha Gas          |
| Flex Aurora            | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/08/2020    | Flex LNG           |
| Pearl Lng              | GTT Mark III Flex  | Samsung         | XDF        | 174000   | 01/08/2020    | TMS Cardiff Gas    |
| Vivit Americas Lng     | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/09/2020    | TMS Cardiff Gas    |
| Scf Barents            | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/09/2020    | Sovcomflot         |
| Flex Resolute          | GT NO 96           | DSME            | MEGI       | 173400   | 01/09/2020    | Flex LNG           |
| Gaslog Galveston       | GTT Mark III Flex  | Samsung         | XDF        | 174000   | 01/10/2020    | GasLog             |
| Gaslog Georgetown      | GTT Mark III Flex  | Samsung         | XDF        | 174000   | 01/10/2020    | GasLog             |
| Aristos I              | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/10/2020    | Capital Gas        |
| Yiannis                | GT NO 96           | DSME            | MEGI       | 173400   | 01/10/2020    | Maran Gas Maritime |
| Dorado LNG             | GTT Mark III Flex  | Samsung         | XDF        | 174000   | 01/10/2020    | TMS Cardiff Gas    |
| Lng Megrez             | GT NO 96           | Hudong-Zhonghua | MEGI       | 174000   | 01/10/2020    | MOL                |
| Cobia Lng              | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 31/10/2020    | TMS Cardiff Gas    |
| Celsius Copenhagen     | GTT Mark III Flex  | Samsung         | XDF        | 180000   | 31/10/2020    | Celcius Shipping   |
| Aristidis I            | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/11/2020    | Capital Gas        |
| Diamond Gas Metropolis | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/11/2020    | NYK                |
| Flex Freedom           | GT NO 96           | DSME            | MEGI       | 173400   | 01/11/2020    | Flex LNG           |
| Flex Amber             | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/11/2020    | Flex LNG           |
| Celsius Canberra       | GTT Mark III Flex  | Samsung         | XDF        | 180000   | 01/12/2020    | Celcius Shipping   |
| Global Star            | GT NO 96           | DSME            | MEGI       | 173400   | 01/12/2020    | Nakilat            |
| Energy Endeavour       | GT NO 96           | DSME            | MEGI       | 173400   | 01/12/2020    | Alpha Gas          |
| Lng Rosenrot           | GT NO 96           | DSME            | MEGI       | 180000   | 01/01/2021    | MOL                |
| Samsung 2304           | GTT Mark III Flex  | Samsung         | XDF        | 174000   | 01/01/2021    | Minerva Marine     |
| Daewoo 2481            | GT NO 96           | DSME            | MEGI       | 173400   | 01/01/2021    | Minerva Marine     |
| Samsung 2313           | GTT Mark III Flex  | Samsung         | XDF        | 180000   | 01/02/2021    | Celcius Shipping   |
| Bw Lesmes              | GT NO 96           | DSME            | MEGI       | 174000   | 01/02/2021    | BWGas              |
| Gail Bhuwan            | GT NO 96           | DSME            | MEGI       | 180000   | 01/02/2021    | MOL                |
| Cool Racer             | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/02/2021    | Thenamaris         |
| Scf Timmerman          | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/02/2021    | Sovcomflot         |
| Flex Volunteer         | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/02/2021    | Flex LNG           |
| Minerva Limnos         | GT NO 96           | DSME            | MEGI       | 173400   | 01/02/2021    | Minerva Marine     |
| Marvel Swan            | GTT Mark III Flex  | Samsung         | XDF        | 173400   | 01/03/2021    | Navigare           |
| Bw Helios              | GT NO 96           | DSME            | MEGI       | 174000   | 01/03/2021    | BWGas              |
| LNG Ships Express      | GTT Mark III Flex  | Samsung         | XDF        | 174000   | 01/03/2021    | TMS Cardiff Gas    |
| Hellas Diana           | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/03/2021    | Latsco Shipping    |
| Lngships Athena        | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/03/2021    | TMS Cardiff Gas    |
| Lngship Manhattan      | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/03/2021    | TMS Cardiff Gas    |
| Aristarchos            | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/03/2021    | Capital Gas        |
| Samsung 2302           | GTT Mark III Flex  | Samsung         | XDF        | 174000   | 01/04/2021    | NYK                |

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 = 28th July 2020

| Name                   | Containment system | Yard            | Propulsion | Capacity | Delivery date | Primary Owner            |
|------------------------|--------------------|-----------------|------------|----------|---------------|--------------------------|
| Celcius #4             | GTT Mark III Flex  | Samsung         | XDF        | 180000   | 15/04/2021    | Celcius Shipping         |
| DSME 2485              | GT NO 96           | DSME            | MEGI       | 173400   | 15/04/2021    | Alpha Gas                |
| Diamond Gas Crystal    | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/05/2021    | NYK                      |
| Flex Vigilant          | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/05/2021    | Flex LNG                 |
| Daewoo 2501            | GTT Mark III Flex  | DSME            | MEGI       | 174000   | 01/06/2021    | Maran Gas Maritime       |
| Hudong-zhonghua H1827a | GT NO 96           | Hudong-Zhonghua | XDF        | 174000   | 01/06/2021    | CSSC                     |
| Daewoo 2495            | GT NO 96           | DSME            | XDF        | 174000   | 01/06/2021    | Maran Gas Maritime       |
| Daewoo 2500            | GT NO 96           | DSME            | MEGI       | 174000   | 01/06/2021    | Alpha Gas                |
| Attalos                | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/06/2021    | Capital Gas              |
| SHI Gaslog CE #1       | GTT Mark III Flex  | Samsung         | XDF        | 180000   | 15/06/2021    | GasLog                   |
| Daewoo 2505            | GT NO 96           | DSME            | MEGI       | 173400   | 01/07/2021    | MOL                      |
| Asterix 1              | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/08/2021    | Capital Gas              |
| Adamastos              | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/08/2021    | Capital Gas              |
| SHI Gaslog CE #2       | GTT Mark III Flex  | Samsung         | XDF        | 180000   | 15/08/2021    | GasLog                   |
| Daewoo 2504            | GT NO 96           | DSME            | XDF        | 174000   | 01/09/2021    | Maran Gas Maritime       |
| Daewoo 2502            | GTT Mark III Flex  | DSME            | XDF        | 173400   | 01/09/2021    | Nakilat                  |
| Samsung 2305           | GTT Mark III Flex  | Samsung         | XDF        | 174000   | 01/09/2021    | Minerva Marine           |
| Diamond Gas Victoria   | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/09/2021    | NYK                      |
| Hellas Athina          | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/09/2021    | Latsco Shipping          |
| Askipios               | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 15/09/2021    | Capital Gas              |
| Samsung 2355           | GTT Mark III Flex  | Samsung         | XDF        | 174000   | 01/10/2021    | NYK                      |
| Daewoo 2507            | GT NO 96           | DSME            | XDF        | 174000   | 01/10/2021    | Maran Gas Maritime       |
| Hyundai Ulsan 2939     | GTT Mark III Flex  | Hyundai         | XDF        | 180000   | 01/10/2021    | SK Shipping              |
| Samsung 2306           | GTT Mark III Flex  | Samsung         | XDF        | 174000   | 01/10/2021    | NYK                      |
| Hyundai Samho 8025     | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/12/2021    | H-Line                   |
| Hyundai Ulsan 3157     | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/12/2021    | Tsakos Energy Navigation |
| Samsung 2336           | GTT Mark III Flex  | Samsung         | XDF        | 174000   | 01/12/2021    | JP Morgan                |
| Daewoo 2503            | GTT Mark III Flex  | DSME            | XDF        | 173400   | 01/12/2021    | Nakilat                  |
| Samsung 2307           | GTT Mark III Flex  | Samsung         | XDF        | 174000   | 01/12/2021    | NYK                      |
| Daewoo 2508            | GT NO 96           | DSME            | XDF        | 174000   | 01/01/2022    | Maran Gas Maritime       |
| Hyundai Samho 8032     | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/01/2022    | NYK                      |
| Hudong-zhonghua H1828a | GT NO 96           | Hudong-Zhonghua | XDF        | 174000   | 01/01/2022    | CSSC                     |
| Samsung 2315           | GTT Mark III Flex  | Samsung         | XDF        | 173400   | 01/03/2022    | SinoKor                  |
| Samsung 2319           | GTT Mark III Flex  | Samsung         | XDF        | 174000   | 01/03/2022    | JP Morgan                |
| Elisa Aquila           | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/03/2022    | NYK                      |
| Samsung 2332           | GTT Mark III Flex  | Samsung         | XDF        | 174000   | 01/03/2022    | Minerva Marine           |
| Hudong-zhonghua H1788a | GT NO 96           | Hudong-Zhonghua | XDF        | 80000    | 01/04/2022    | K-Line                   |
| Hyundai Ulsan 3137     | GTT Mark III Flex  | Hyundai         | XDF        | 178000   | 01/04/2022    | Dynagas                  |
| Hudong-zhonghua H1789a | GT NO 96           | Hudong-Zhonghua | XDF        | 80000    | 01/05/2022    | K-Line                   |
| Samsung 2316           | GTT Mark III Flex  | Samsung         | XDF        | 173400   | 01/05/2022    | SinoKor                  |
| DSME May19             | GT NO 96           | DSME            | MEGI       | 174000   | 15/05/2022    | Maran Gas Maritime       |
| Hyundai Samho 8033     |                    | Hyundai         | XDF        | 173000   | 01/06/2022    | NYK                      |
| Hyundai Samho 8026     | GTT Mark III Flex  | Hyundai         | XDF        | 174000   | 01/06/2022    | H-Line                   |

| Name               | Containment system | Yard            | Propulsion  | Capacity | Delivery date | Primary Owner      |
|--------------------|--------------------|-----------------|-------------|----------|---------------|--------------------|
| Samsung 2337       | GTT Mark III Flex  | Samsung         | XDF         | 174000   | 01/07/2022    | JP Morgan          |
| Hyundai Ulsan 3138 | GTT Mark III Flex  | Hyundai         | XDF         | 178000   | 01/07/2022    | Dynagas            |
| Hyundai Samho 8091 | GTT Mark III Flex  | Hyundai         | XDF         | 174000   | 01/08/2022    | Knutsen            |
| Hyundai Ulsan 3185 | GTT Mark III Flex  | Hyundai         | XDF         | 174000   | 01/08/2022    | Korea Line         |
| Samsung 2317       | GTT Mark III Flex  | Samsung         | XDF         | 173400   | 01/08/2022    | SinoKor            |
| Daewoo 2509        | GT NO 96           | DSME            | MEGI        | 174000   | 01/08/2022    | BWGas              |
| Samsung 2318       | GTT Mark III Flex  | Samsung         | XDF         | 173400   | 01/09/2022    | SinoKor            |
| Daewoo 2510        | GT NO 96           | DSME            | MEGI        | 174000   | 01/09/2022    | BWGas              |
| Hyundai Ulsan 3145 | GTT Mark III Flex  | Hyundai         | XDF         | 180000   | 01/09/2022    | SK Shipping        |
| Hyundai Samho 8092 | GTT Mark III Flex  | Hyundai         | XDF         | 174000   | 01/10/2022    | Knutsen            |
| Hyundai Ulsan 3186 | GTT Mark III Flex  | Hyundai         | XDF         | 174000   | 01/10/2022    | Korea Line         |
| Hyundai Ulsan 3187 | GTT Mark III Flex  | Hyundai         | XDF         | 174000   | 01/11/2022    | JP Morgan          |
| Hyundai Samho 8093 | GTT Mark III Flex  | Hyundai         | XDF         | 174000   | 01/11/2022    | Knutsen            |
| Cosco PCI #1       | GT NO 96           | Hudong-Zhonghua | XDF         | 174000   | 15/11/2022    | China LNG Shipping |
| Hyundai Ulsan 3188 | GTT Mark III Flex  | Hyundai         | XDF         | 174000   | 01/12/2022    | JP Morgan          |
| Hyundai Samho 8094 | GTT Mark III Flex  | Hyundai         | XDF         | 174000   | 01/12/2022    | Knutsen            |
| Samsung 2364       | GTT Mark III Flex  | Samsung         | XDF         | 174000   | 01/01/2023    | MISC               |
| Cosco PCI #2       | GT NO 96           | Hudong-Zhonghua | XDF         | 174000   | 15/01/2023    | China LNG Shipping |
| Samsung 2365       | GTT Mark III Flex  | Samsung         | XDF         | 174000   | 01/02/2023    | MISC               |
| Zvezda 041         | GTT Mark III Flex  | Zvezda SSK      | TFDE-Azipod | 172600   | 01/03/2023    | Novatek            |
| Cosco PCI #3       | GT NO 96           | Hudong-Zhonghua | XDF         | 174000   | 15/03/2023    | China LNG Shipping |
| Zvezda 042         | GTT Mark III Flex  | Zvezda SSK      | TFDE-Azipod | 172600   | 01/09/2023    | Novatek            |
| Zvezda 043         | GTT Mark III Flex  | Zvezda SSK      | TFDE-Azipod | 172600   | 01/10/2023    | Novatek            |
| Zvezda 044         | GTT Mark III Flex  | Zvezda SSK      | TFDE-Azipod | 172600   | 01/11/2023    | Novatek            |
| Zvezda 045         | GTT Mark III Flex  | Zvezda SSK      | TFDE-Azipod | 172600   | 01/12/2023    | Novatek            |

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 = 28th July 2020



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## WORLD SMALL SCALE LNG FLEET\*

| Built | Name                 | CBM    | Cargo Type       | Trading area              | Trading in LNG?   | Ship Owner / Operator |
|-------|----------------------|--------|------------------|---------------------------|-------------------|-----------------------|
| 1974  | Seagas               | 187    | LNG              | Sweden                    | Yes               | AGA                   |
| 1988  | Kayoh Maru           | 1,517  | LNG              | Japan                     | Yes               | Daiichi               |
| 1993  | Aman Bintulu         | 18,928 | LNG              | Malaysia - Japan          | Yes               | Perbadanan/NYK        |
| 1996  | Surya Aki            | 19,475 | LNG              | Indonesia - Japan         | Yes               | MCGC                  |
| 1997  | Aman Sendai          | 18,928 | LNG              | Malaysia - Japan          | Yes               | Perbadanan/NYK        |
| 1998  | Pelita Energy        | 18,800 | LNG              | Malaysia - Japan          | Yes               | Perbadanan/NYK        |
| 2000  | Triputra             | 23,096 | LNG              | Indonesia - Japan         | Yes               | MCGC                  |
| 2003  | Pioneer Knutsen      | 1,100  | LNG              | Norway                    | Yes               | Knutsen               |
| 2003  | Shinju Maru No.1     | 2,540  | LNG              | Japan                     | Yes               | Shinwa                |
| 2005  | North Pioneer        | 2,500  | LNG              | Japan                     | Yes               | Japan Liquid Gas      |
| 2007  | Sun Arrows           | 19,531 | LNG              | Malaysia - Russia - Japan | Yes               | Mitsui                |
| 2008  | Kakurei Maru         | 2,536  | LNG              | Japan                     | Yes               | Hogaki Zosen          |
| 2008  | Shinju Maru No.2     | 2,540  | LNG              | Japan                     | Yes               | Shinwa                |
| 2009  | Coral Methane        | 7,551  | LNG/LPG/Ethylene | Northwest Europe/Baltics  | Yes, sometimes    | Anthony Veder         |
| 2010  | Coral Favia          | 10,000 | LNG/LPG/Ethylene | Worldwide                 | No                | 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         |
| 2015  | LNG Barge TBN        | 3,000  | LNG              | US Coast                  | Yes               | LNG America           |
| 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  | 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)          |
| 2017  | Oizmendi             | 600    | LNG              | Bilbao                    | Yes               | Itsas Gas             |
| 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          |

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\*\* = project shelved † =Data to be verified Data last updated = 28th July 2020

| Built | Name                     | CBM    | Cargo Type   | Trading area             | Trading in LNG?   | Ship Owner / Operator       |
|-------|--------------------------|--------|--------------|--------------------------|-------------------|-----------------------------|
| 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               |
| 2018  | HUA XIANG 8              | 13,720 | LNG          | China                    | Yes               | Zhejiang Huaxiang           |
| 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  | Bunker Breeze            | 0      | LNG          | Barcelona                | Yes               | Suardiaz Energy Shipping    |
| 2019  | SM Jeju LNG1             | 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           |
| 2019  | Gas Agility              | 18,600 | LNG          | NWE                      | Yes               | MOL                         |
| 2019  | Flexfueller 001          | 1,480  | LNG          | Amsterdam                | Yes               | Titan LNG                   |
| 2020  | SM Jeju LNG2             | 7,500  | LNG          | Korea                    | Yes               | Korea Line                  |
| 2020  | CNTIC VPOWER Global      | 28,000 | LNG          | Myanmar                  | Yes               | Dalian Inteh Group          |
| 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  | 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                         |
| 2020  | Flexfueller 002          | 1,480  | LNG          | Antwerp                  | Yes               | Titan LNG                   |
| 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                         |
| 2021  | TBN                      | 18,600 | LNG          | Mediterranean            | Yes               | MOL                         |
| 2021  | TG TBN                   | 500    | LNG          | Korea                    | Yes               | Trans Gas                   |
| 2022  | Stolt TBN                | 20,000 | LNG          | Worldwide                | Yes               | Stolt-Nielsen Gas           |
| 2022  | Stolt TBN                | 20,000 | LNG          | Worldwide                | Yes               | Stolt-Nielsen Gas           |
| 2022  | Clean Cañaveral          | 5,400  | LNG          | USG                      | Yes               | PNE                         |
| 2023  | Cryopeak TBA             | 4,000  | LNG          | West Canada              | Yes               | Cryopeak                    |
| 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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