

LNG Fuelling

AN LNG JOURNAL PUBLICATION

2nd Quarter 2021

Shell, SCF complete first US Aframax bunkering

Russian shipping line Sovcomflot (SCF Group) and energy firm Shell have completed the first LNG bunkering of an Aframax tanker in the US.

The Sovcomflot vessel *Gagarin Prospect* was refuelled en-route from Corpus Christi to Europe. On long-term charter to Shell, the vessel was delivered in 2018 and is the lead ship in a series of six sister dual-fuelled 'Green Funnel' Aframax vessels.

"This is another important milestone highlighting the progress of the combined efforts of Shell and Sovcomflot to reduce the environmental impact of energy shipping. Our work started back in 2018, with the first marine LNG fuelling operation of *Gagarin Prospect* in the Port of Rotterdam," Sergey Popravko, Chief Operating Officer of SCF Group, said.

LNG bunkering expansion

Despite the size of the Aframax, the bunkering operation was completed with little deviation from the vessel's usual voyage route due to the flexibility of the refuelling options available.

"The deviation... amounted to less than 150 nautical miles (0.5 days) and the bunkering time was 11 hours. LNG can now be supplied ship-to-ship on the principal transatlantic tanker trade routes between Europe and the US Gulf,



Gagarin Prospect

and the US Gulf and East Coast Canada, which has seen traffic increasing rapidly as a result of the growth in WTI crude exports from the US Gulf," SCF noted.

The *Gagarin Prospect* received 1,075 cubic metres of marine LNG from the Shell-chartered bunker vessel Q-LNG 4000 outside the Port of Canaveral, Florida.

"It is symbolic that the bunkering took place at the Port of Canaveral, being the space hub of the United States of America, involving the Russian tanker *Gagarin Prospect* named after Planet Earth's first cosmonaut... We are pleased that Shell has opened up LNG fuelling along this important transatlantic trade route, demonstrating that marine LNG fuelling infrastructure is no longer limited to hubs in Northern Europe and Singapore" Popravko added.

Green shipping

The LNG-bunkering was also hailed by Sovcomflot as the latest step in a green shipping strategy that has seen the firm invest 'significant efforts' to the transition of its fleet towards energy efficiency and the use of cleaner fuels.

"As part of Shell's target to be a net-zero emissions energy business by 2050, in step with society, we are working with customers across every sector to help them decarbonize. LNG is the choice today for new builds to help slow the rate of global greenhouse gas emissions while we work hard at developing zero-emissions fuels. I'm pleased to see the first Aframax tanker fuelled with LNG in the United States as this is an important milestone for the industry," Karrie Trauth, General Manager, Shell Shipping & Maritime Americas, said.

SCF Group is wholly-owned by the Russian government and specialises in the transportation of crude oil, petroleum products, and liquefied gas. The group has a global fleet of 145 vessels, including 80 ice class vessels and also provides servicing of offshore oil and gas facilities linked to LNG production.



Refuelling operations

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Gasrec acquires BOC BioLNG stations

Road transport fuel specialist Gasrec has expanded its refuelling network, with the addition of five BioLNG stations and four cryogenic trailers in the UK.

The firm purchased the assets from industrial gas company BOC which is withdrawing from the UK market. The investment is expected to support Gasrec's long-term commitment to help operators transition from diesel to cleaner and lower cost fuel.

"The additional refuelling facilities are the perfect size for helping operators begin the transition to Bio-LNG, ahead of more permanent infrastructure being built. Not all of them had been deployed, so they

give us immediate capacity to help new fleets - plus we are talking to several existing facility users about taking over their future Bio-LNG supply," James Westcott, Chief Commercial Officer at Gasrec, said.

Bio-LNG sales double

Founded in 2003, Gasrec is headquartered in London and has built nine refuelling stations across the UK, including the largest LNG refuelling station in Europe.

The firm reported that sales of biomethane across its refuelling network doubled in the first quarter of 2021, compared to the same period in 2020.

"It's a hugely exciting time and we're working closely with end-user fleets and developers of new logis-

tics parks to ensure we're putting dedicated infrastructure where it's needed to help operators scale fast. We're at advanced planning and development stages on a number of new sites," Westcott added.

The firm's flagship site at the Daventry International Rail Freight Terminal (DIRFT) grew by more than 250 per cent in the last 12 months alone.

Demand spike

The deal comes as competition in the LNG road fuelling sector heats up and follows a 'huge spike in demand' for Gasrec over the past two years.

"We are focused on ensuring the infrastructure and supply line is there for every operator in the country which wants to make the move to Bio-LNG, and this latest and significant investment will help us to press ahead with those

plans at pace... Bio-LNG is proven to be the most environmentally-friendly fuel currently on the market for long-haul operations and will continue to be so for some time to come," Westcott added.

The five refuelling stations will now undergo refurbishment and upgrade work before being deployed. The four tri-axle tankers are each capable of carrying up to 20 tonnes of Bio-LNG and will add further capacity to the network, joining the firm's three existing trailers in service.

"Operated by long-standing distribution partner Reynolds Logistics, they will be re-branded in Gasrec livery and used to replenish refuelling stations across the UK. Two further tankers are currently in build for Gasrec and due for delivery later this year - with more planned to follow early in 2022," a spokesperson for the firm said. ■



Gasrec refuelling station

Air Liquide equips BW Magna unit

French LNG fuelling firm Air Liquide has fitted two Turbo-Brayton cryogenic units for shipping company BW LNG to store LNG.

The installation procedure was carried out on a *BW Magna* floating storage and regasification unit (FSRU) and will support the vessels in supplying natural gas to the largest LNG-to-power complex in Latin America.

"This floating giant, *BW Magna*, is intended to store and regasify natural gas that is transported by sea from production regions of the world," a spokesperson for Air Liquide said.

Subcooling principle

The Turbo-Brayton solution prevents boil-off and maintains LNG at cryogenic temperature based

on the principle of subcooling, allowing the system to recondense 3.2 tonnes of LNG per hour.

"The Turbo-Brayton solution has many advantages. The system is extremely easy to install on the vessel, as it is delivered pre-assembled on its single skid, and it only requires water and electricity to operate in an optimized way," Air Liquide notes.

Relying on motors on magnetic bearings, the system eliminates oil while limiting the need for servicing to once every five years. This success once again shows that Turbo-Brayton technology is a great choice for maritime applications.

First plant online Q2

The system was deployed near Açú Port in the municipality of São João da Barra in the Brazilian state of Rio de Janeiro. Built by Gás Natural Açú (GNA) the facility will be partly fuelled by LNG stored at sea aboard the FSRU.

"Shipping company BW LNG has signed a 23-year contract to store and regasify natural gas at sea before transferring it to the electricity generation plant operated by



Turbo-Brayton unit aboard vessel

GNA. The *BW Magna* FSRU can hold 174,000 m³ of natural gas at -160 °C in its four cryogenic tanks," Air Liquide states.

The first plant in the complex is scheduled to start commercial operation in the second quarter of the year. ■

LNG Fuelling

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SeaspanLNG secures AiP for LNG bunker vessel

Canadian shipping firm SeaspanLNG has secured approval in principle (AiP) for a new for LNG bunker vessel from standards agency Bureau Veritas.

The approval covers the design for a 7,600 cubic metre vessel, equipped with 'state-of-the-art' technology for ship-to-ship LNG transfer as well as coastal/short sea shipping operations.

"This comprehensive AiP now enables a detailed design to be developed addressing classification, statutory and operational requirements. The development of LNG bunkering vessels is still relatively new, and Bureau Veritas has built considerable experience through multiple projects with different containment and gas handling systems - from the smallest to the very largest LNG bunkering vessels. Bureau Veritas is delighted to support the vision and leadership of Seaspan and Vard towards decarbonization of the marine industry on the West Coast of North America," Tim Protheroe, Regional Chief Executive at Bureau Veritas said.

Dual-fuel hybrid electric ferries

The vessel will operate alongside

Seaspan Ferries' fleet of dual-fuel hybrid electric ferries, developed by Vard Marine. Developed as part of the new line of Vard 9 series LNG bunker vessels, the design allows for refueling of multiple ship types as well as an ability to transfer to and from a wide range of terminals.

"Vard Marine is pleased to once again be partnering with Seaspan on environmental innovation in ship design with the Vard 9 511 LNG Bunker Vessel. Environmental stewardship is one of Vard's core values, pursued in facilities management, internal process, and product development. With this AiP, the Vard 9 511 is the ideal solution to solve the gap in LNG bunkering infrastructure in the Asia Pacific Gateway. We look forward to working again with the



3D render of Seaspan bunker vessel

Seaspan Ferries team," says Wade Carson, CEO, Vard Marine Inc.

The new vessel design is based on a Length Overall (LOA) of 112.8 metres, breadth of 18.6 metres, design draft of five metres, and design speed of 13 knots.

Emerging technologies

SeaspanLNG now plans to engage with major stakeholders to advance efforts for vessel construction.

"Seaspan is committed to

bringing clean LNG bunkers to the West Coast of North America through our LNG bunkering business, in order to assist ship owners in meeting their IMO2030 targets," says Gord Miller, Vice President.

The new design will incorporate a number of emerging technologies to boost electric storage system (ESS) capacity and reduce emissions while maintaining operability and flexibility. It will be fitted with two azimuthing thrusters and two bow thrusters. ■



Seaspan vessel



Power Play AWARDS

Presented by **ExxonMobil**

The third annual **Power Play Awards** are back, and with them, new categories to celebrate inclusion, diversity and advances and accomplishments in the LNG value chain. You can help us recognize these advances and the **remarkable women and men** who are making them happen in our industry.

To help shine a light on these leaders, we invite you to nominate the individuals that you believe are worthy of a Power Play Award in the following categories:

The Rising Star - Outstanding Young Professional

The Rising Star Award celebrates a **woman**, 35 or younger, who is excelling early in her LNG career. She shows tenacity, passion and positive energy through her already noteworthy contributions in the LNG sector. Known by peers and mentors as part of the next generation of LNG leadership, she's someone to watch.

The Ambassador - Outstanding Leadership

The Ambassador Award honors a **woman or man** who, through their words, actions and positive energy, inspires those who work with and around them. This individual has a collaborative leadership style that builds bridges and finds solutions. They create opportunities for others, and either consciously or not, act as a role model in their field. They carry a sense of purpose in all that they do, whilst maintaining a commitment to ethical work practices with the aim of being a responsible global citizen.

The Pioneer - Outstanding Business, Innovation and/or Technology Contribution

The Pioneer Award honors a **woman or man** who has delivered outstanding business results or innovation and technology leadership. Colleagues might note their unrelenting positive energy or unique ability to advance a technology, innovation or business goal, but they likely describe themselves as someone who thrives on success. Qualifying activities may include, for example, the close of a large deal, spearheading technology development/deployment, a new installation, a cost-saving initiative or an innovative commercial deal.

The Conqueror - Outstanding Resilience

The Conqueror Award recognizes a **woman** who, against all odds, has overcome many challenges particularly in light of the 2020 pandemic. She has discovered new ways to work and achieve positive outcomes. She is considered a resilient and determined team player, whose positive energy enables her to find solutions and new ways to thrive in the LNG sector. Her unwavering dedication, perseverance and work ethic grew even stronger in the past year as she rose to the occasion to face challenges head-on and continued to strive for excellence through these turbulent times.

If you know someone who deserves an award - nominate them today at bit.ly/PowerPlayAwards.

Nominations will close June 11, 2021.

ExxonMobil | LNG

KOGAS orders LNG bunker vessel

Korea Gas Corporation (KOGAS) has ordered a new LNG bunker vessel from shipbuilder Hyundai Heavy Industries.

The vessel will have capacity for 7,500 cubic metres of LNG and will be equipped with

efficient boil-off gas treatment technology.

“In this year, we plan to start

STS bunkering using *SM JEJU LNG 2*, Asia's first LNG bunkering vessel, as well as expand the supply of LNG through Korea's first dedicated bunkering ship from 2023,” an official from LNG Bunkering Korea commented.

LNG Bunkering Korea was formed last year as a joint venture between KOGAS and Busan Port Corp, shipping firm Hyundai Glovis, refinery operator S-Oil, Daewoo Logistics, and steel-maker Posco.

Ministry subsidy

Construction of the vessel will be supported by 15 billion won in subsidies from the Ministry of

Trade, Industry and Energy as part of the 'LNG Bunkering Ship Construction Support Project'.

“If the LNG bunkering business is activated in the future, it will greatly contribute to the development of the domestic shipbuilding industry by improving the domestic marine atmosphere and increasing orders for LNG propulsion vessels,” LNG Bunkering Korea stated.

Founded in 1983, KOGAS has grown to become one of the largest LNG-importing companies in the world and operates four LNG regasification terminals as well as 4,945 kilometres of natural gas pipelines in South Korea. ■



LNG bunker vessel

Cryo Shipping established South East Asia LNG bunker service

Norwegian firm Cryo Shipping has established a new LNG bunker service in South East Asia, expanding its refuelling capacity in the region.

The startup firm forecasts major growth in LNG bunkering for the region and aims to challenge “traditional and established multi-international energy companies” by offering lean, flexible and cost-effective LNG fuel supplies.

“We see a significant increase of interest in LNG as fuel for deep sea shipping, and it's strategically important for us to provide LNG bunker services within the major trade lanes to support deep sea shipping's energy transition from dirty oil to clean gas”, Nikolai H. Olsen, managing director of CRYO, said.

Altera Wind bunkers in Singapore Strait

The firm also announced the successful completion of bunkering operations for the shuttle tanker *Altera Wind* in the Singapore Strait last month.

The vessel was refuelled with 1,900 cubic metres of LNG, making it the second shuttle tanker owned by Altera Infrastructure (former Teekay) to be bunkered by CRYO in South East Asia.

“Our background and passion for shipping has been crucial in gaining market share. The bunker service is based on our experience and understanding of how dynamic, unique and operationally demanding the shipping industry is”, explains Nikolai H. Olsen.

Decade of growth

Looking further ahead, the firm foresees strong growth extending for the next decade or more as green shipping rises in prominence and sustainable energy becomes a priority for all the large global shipping lines.

“The market outlook for the next 10 years is strong and exponential growth, and Cryo Shipping is targeting a lead position in the disruptive marine energy market”, Mr. Olsen said.

Headquartered in Strusshamn, Norway, Cryo Shipping supplies LNG and Liquified Bio Gas (LBG) to off-grid markets such as LNG fuelled ships and land based industries. The firm offers Truck-to-Ship, Ship-to-Ship and Shore-to-Ship services. ■



Altera Wind pre-bunker operation

Sphera updates research on LNG fuelling benefits

A new study analysing the impacts on greenhouse gas (GHG) emissions from a switch to LNG as a marine fuel has concluded that reductions of up to 23% are achievable.

The Life Cycle GHG Emission Study is the 2nd edition of research conducted by Environmental, Social and Governance (ESG) consultancy Sphera, on behalf of industry associations SEA-LNG and the Society for Gas as a Marine Fuel (SGMF).

“It found that, in addition to the considerable air quality benefits it delivers, LNG can “beyond question” contribute significantly to the International Maritime Organization’s (IMO) GHG reduction targets,” the report’s authors note.

Latest consumption mixes

The first iteration of the report was launched in 2019 and despite a slowdown in deployment due to the pandemic since then the report’s authors note the rapid rate of development in the sector. As such the new report is the first in a series of updates based on the same methodology designed to provide industry-level insights.

“It is the first on a series of regular updates of GHG emissions to reflect ongoing technology developments in fuel supply and marine propulsion systems... The update includes the latest data for the fuel supply consumption

mixes, as well as latest fuel consumption and emission data for the different ship engines.

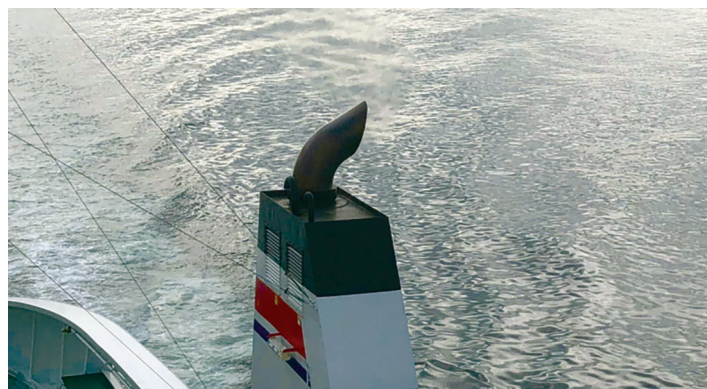
Well-to-Wake reductions

The researchers found that on an engine technology basis, Well-to-Wake GHG emissions reduction benefits are between 14% to 23% for 2-stroke slow-speed engines, and between 6% to 14% for 4-stroke medium-speed engines compared with oil-fuelled engines.

Looking ahead, Sphera predicts that 2-stroke engines using LNG will offer GHG benefits of up to 24% by 2030, with 4-stroke engines offering up to 22%, as technology continues to improve.

The study covers all major marine engine types and is based on data provided by original equipment manufacturers, including: Caterpillar MaK, Caterpillar Solar Turbines, GE, MAN Energy Solutions, Rolls Royce (MTU), Wärtsilä, and Winterthur Gas & Diesel. Leading energy firm ExxonMobil, Shell, and Total also provided ancillary data on the supply side.

The report’s authors outline a number of recommendations to increase the visibility and usage of LNG fuelling infrastructure, calling on industry stakeholders to foster



Vessel exhaust

greater collaboration and for government’s to improve the clarity of legislation.

“The overarching recommendation from this study is for further investigations to validate if additional energy efficiency measures and improved logistics and speed adaptations might close the gap between the GHG reduction provided by LNG and the 50 % absolute GHG emission reduction target to 2050 of the IMO. Beyond question, LNG has a potential to

contribute significantly, apart from the significant benefits in terms of air quality, to the GHG reduction target. However, methane emissions need to be reduced to the lowest value possible to increase the benefits and strengthen the factual base for discussions,” Sphera concludes.

Headquartered in Chicago, Sphera is a provider of ESG performance and risk management software, data and consulting services.

NEWS NUDGES

Gasum expands gas delivery in Sweden

Finnish fuelling specialist Gasum has expanded its presence in the Nordic region, signing a contract with Swedish oil and bitumen company Nynas.

Gasum will deliver natural gas to Nynas’ refinery in Gothenburg on the west coast of Sweden.

“We are extremely pleased with this contract. Nynas is our first industry customer in the Swedish gas grid, so this is a significant milestone for Gasum. This really emphasizes our role as a gas market operator serving the whole Nordic region. As a truly Nordic energy company, we hope to provide our industry customers with a unique and competitive offering, which will help them in transitioning towards more sustainable sources of energy,” Tommy Mattila, Vice President at Gasum, said.

Gazprom Neft to ramp up LNG bunkering

Russian gas giant Gazprom Neft has announced its intention to step up its LNG bunkering activities as it looks for new opportunities to add value.

“Our next step in bunkering is going to be moving into the LNG bunkering sector. Gazprom Neft was the first company in Russia to start building its own LNG bunkering vessel – which has already been successfully put to sea, for commissioning, we expect, later this year,” Alexander Dyukov, CEO and Chairman of the Management Board at Gazprom Neft, said.

The company aims to take a product-based approach to development of the LNG bunkering business as it seeks to develop and implement new technologies.



LNG bunker vessel during refuelling

First ship-to-containership LNG bunkering in France

Energy major Total has completed the first ship-to-containership LNG bunkering operation in France.

The refuelling operation was completed between the bunker vessel *Gas Agility* and CMA CGM's containership *Jacques Saade* at the port of Port of Dunkirk. A total of 16,400 cubic metres of LNG were transferred.

"We are pleased to partner with Dunkerque LNG for this unprecedented operation, and to

showcase the agility of our LNG bunkering solutions to serve the Northwestern Europe market... We will continue to grow our LNG bunker supply network, to help our customers take advantage of the confirmed reduction in greenhouse gases of up to 23% and its significant air quality benefits," Jérôme Leprince-Ringuet, Vice

President Marine Fuels at Total, said.

Green Loop consortium

The fuel transfer marked the inauguration of LNG bunkering at the Terminal des Flandres with simultaneous cargo operations.

The project was supported by partners in the 'Green Loop' project consortium, comprising Total, the Dunkerque LNG terminal, Mitsui O.S.K. Lines (MOL) and CMA CGM.

"Thanks to a close cooperation with Total, this new chapter showcases the terminal's commitment to provide the infrastructure and the services to unlock LNG as an alternative low-emission fuel for ships and heavy-duty road transport," Olivier Heurtin, CEO of Dunkerque LNG, said.

Gasum obtains LNG licence in France

Nordic energy group Gasum also expanded its presence in France, obtaining a distribution license for



Jacob Granqvist

LNG at the start of the year.

The move will allow the firm to deliver maritime LNG in France and bring availability of LNG to more areas and ports in the republic.

"Obtaining this licence marks another milestone in our quest to increase the outreach of our maritime LNG deliveries. It underlines Gasum's commitment to act as a reliable European maritime LNG supplier," Jacob Granqvist, Vice President at Gasum, stated. ■



Gas Agility

NEWS NUDGES

LNG bunkering market to hit US\$5.14 Billion by 2027

The LNG Bunkering Market is forecast to reach US\$5.14 Billion by 2027 at a CAGR 45.2%, according to the latest research by analyst Valuates.

The firm predicts that the global LNG bunkering market was worth just US\$0.38 Billion in 2019 but will grow at a compound annual rate (CAGR) of 45.2% to 2027.

"The ship-to-ship segment had the highest market share of about 60.5 percent in 2019 and is expected to hold this position during the forecast period. This is due to an increase in the number of ships using LNG as a cleaner fuel to comply with strict government regulations," a spokesperson for Valuates

Reports said.

Growth in the cargo fleet segment is expected to be fuelled by an increase in the number of manufacturing units and factories in regions such as Asia-Pacific and LAMEA.

Stabilis posts record LNG deliveries

Fuel supplier Stabilis Solutions has announced record first quarter results on the back of soaring demand for LNG and hydrogen.

The firm posted Q1 revenues in the range of US\$17.5 million to US\$17.8 million and reported deliveries of 13.4 million gallons of LNG during the quarter. This represents at least a 29% increase compared to the fourth quarter of 2020.

"Stabilis is proud to report record revenues for the quarter,

beating our prior record quarter, the first quarter of 2020, by well over 25%... The energy transition is underway and Stabilis' position as a premier supplier of clean LNG and hydrogen fuelling solutions is driving significant growth. We believe that this trend will continue into the remainder of 2021 and beyond," Jim Reddinger, CEO of Stabilis Solutions, said.

Fortistar creates renewable gas firm Opal Fuels

Investment company Fortistar has announced the merger of portfolio companies, Fortistar Methane Group (FMG) and TruStar Energy to create a new renewable gas entity, Opal Fuels.

The new firm will combine FMG's landfill gas-to-energy busi-

ness in the US with TruStar Energy's transportation fuel business. The company will handle 'every step' from project development and construction to producing, marketing, and dispensing renewable fuel.

"In the nearly 30 years since founding Fortistar, I have never been more excited about the opportunities ahead. Amid wildfires, heat waves, hurricanes, and other extreme weather that punctuated a tumultuous 2020, the world is now more determined than ever to address climate change. Opal will lead the effort to decarbonise the US's transportation industry, which generates the largest share of annual greenhouse gas emissions, by supplying clean, sustainable energy," Mark Comora, president of Fortistar, said. ■

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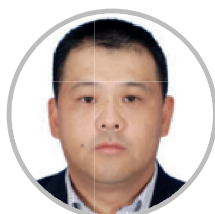
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ADNOC adds LNG-ready VLCC

Maritime transport group ADNOC Logistics and Services has announced the acquisition of a Very Large Crude Carrier (VLCC), equipped to run on LNG.

The LNG-ready vessel will support the group's commitment to increase crude oil production capacity and brings the total number of VLCCs added to its fleet in 2021 to eight.

"The acquisition of these VLCCs further consolidates our highly competitive offering, which covers the full spectrum of the oil and gas value chain," Captain Abdulkareem Al Masabi, CEO of ADNOC Logistics and Services said.

The new-build VLCC is expected to be delivered in Q1 2023, and was acquired alongside an existing vessel that will join the fleet in Q2 2021.

"The new build vessel, made by Daewoo (South Korea), is fitted with a propulsion dual-fuel engine, providing a more environment-friendly operation," a spokesperson for ADNOC L&S said.

Fleet expansion

The new dual-fuel vessel is 300,000 deadweight-tonnes and measures 336 metres in length, making it amongst the largest LNG-fuelled vessels on the water. It also comes equipped with exhaust gas cleaning scrubber system.

The firm has pursued a rapid expansion of its fleet over the last year, growing its fleet with 16 deep-sea vessel acquisitions in 2020 and developing one of the most sustainable, modern crude fleets in the world.

"Following our strategic vessel acquisitions in 2020-2021, and combined with our integrated logistics and marine solutions, we are confident that our customers will gain a significant edge in terms of time and cost savings for their upstream and downstream operations, including ADNOC



ADNOC VLCC

Group entities," Al Masabi added.

Improved capacity utilization

The use of LNG to power ADNOC's VLCC fleet is part of a shift across the crude transport sector, with LNG increasingly realised as a fuel for the largest of tankers. The group's existing fleet of 140 owned vessels and 100 chartered vessels, which includes deep-sea shipping, offshore support and

marine services vessels.

The expanded VLCC fleet is expected to play a 'significant role' in improving vessel capacity utilization and supporting ICE Murban Futures, boosting trade of the UAE's flagship Murban crude oil.

ADNOC L&S is part of state-owned energy group ADNOC and is the largest integrated maritime logistics and shipping company in the GCC, and operator of the largest shipping fleet in the UAE. ■

Atlas invests in 10 dual-fuel containerships

Asset management group Atlas has announced a major investment in its LNG fleet, ordering 10 dual-fuel containership newbuilds via subsidiary Seaspan.

The new vessels will have between 10,000 and 15,000 TEU capacity and are anticipated to begin deliveries in the first half of 2023.

"We are extremely honoured to facilitate our customers industry leading environmental initiative. Our commitment to ESG

principles, carbon reduction, and developing our fleet through increasingly environmental-friendly technologies is signified by our first LNG-powered investment.

We are expanding the scope of our customer solutions by elevating our focus on lowering the impact of emissions, which will

result from the adoption and addition of LNG-powered vessels to our fleet," Bing Chen, CEO of Seaspan, commented.

Sustainability-linked financing

The vessels will be financed by additional borrowings as well as cash on hand and is part of a surge in investment from the firm this year. Since December 2020, the firm has announced 17 newbuild vessels, including five 12,200 TEU, two 24,000 TEU, and the ten LNG dual-fuel 15,000 TEU.

"As we have executed sustainability-linked financing which parallels this fleet expansion, we are resolved to contribute to a greener business community in the future. These transactions clearly demonstrate our ability to seize opportunities to develop industry-leading customer solutions and our commitment for quality growth

backed by long-term committed partnerships. Seaspan will continue to lead the industry by offering our liner customers best-in-class service and creative solutions through exceptional fleet scale, an integrated platform and operational excellence."

12-year charter

Upon delivery, the new LNG-ready containerships will enter 12-year charters with a global liner.

"Seaspan continues to enhance its fleet makeup with continued focus on its core 9,000 to 15,000 TEU size category," a spokesperson for the firm said.

Seaspan owns and operates a containership fleet and provides global ship management services via a workforce of 5,200 worldwide. It is part of global asset management company Atlas Group alongside sister portfolio company, APR Energy. ■



Seaspan vessel in dock

Singapore completes first containership LNG refuelling in Asia

Authorities in Singapore have achieved the first containership LNG refuelling in Asia, completing ship-to-ship bunkering from the *FueLNG Bellina*.

The landmark bunkering operation saw the containership CMA CGM Scandola refuel in Singapore with 7,100 cubic metres of LNG.

"The use of more sustainable fuels is an important element of the decarbonisation strategy. As the shipping industry explores alternative zero-carbon fuels, LNG is a viable transitional fuel. As a global bunkering hub, we are pleased to partner CMA CGM, FueLNG, Keppel Offshore & Marine and Shell Eastern Petroleum, to provide more sustainable bunkering solutions for the shipping industry," Chee Hong Tat, Singapore's Senior Minister of State for Transport and Foreign Affairs, said.

50 STS bunkering operations in 2021

The *Bellina* is Singapore's first LNG bunkering vessel and launched at the start of the year as part of a joint venture between Keppel Offshore & Marine, Shell and the Maritime and Port Authority of Singapore (MPA)

"We are pleased to kickstart ship-to-ship LNG bunkering operations for the *FueLNG Bellina* in Singapore, which allows us to fuel larger vessels such as container-ships. We have a number of ships

lined up for *FueLNG Bellina*'s next bunkering operations, reflecting the strong demand for LNG bunkering in Singapore. LNG is an important part of the clean energy transition and this is in line with Keppel's Vision 2030 to pursue greener energy developments," Chris Ong, Chairman of FueLNG and CEO of Keppel O&M, stated.

FueLNG aims to complete a total of 30 to 50 ship-to-ship LNG bunkering operations in 2021, building on its experience delivering over 300 truck-to-ship LNG bunkering operations so far.

"Singapore is a new addition within our global LNG bunkering network of eight countries and nine ports. We plan to double this bunkering infrastructure on key international trade routes by the mid-2020s so that we can support the sector with the capabilities to tackle emissions with urgency," Tahir Faruqi, Director, FueLNG and Head of Shell Downstream LNG, said.

Simultaneous cargo operations

The operation also marked another major milestone as Asia's first ship-to-ship LNG bunkering operation with simultaneous cargo operations, allowing for shorter



FueLNG Bellina

port stay time.

"Today, LNG is the most advanced solution when it comes to preserving air quality... CMA CGM Scandola is the first of more CMA CGM-operated LNG vessels that will undergo simultaneous cargo and LNG bunkering operations in Singapore. The Group's fleet of LNG containerships will grow to 32 by the end of 2022," Stephane Courquin, Chief Executive Officer of CMA CGM Asia Pacific, said

The *Scandola* is the first of six new LNG-fuelled containerships, each with 15,000-TEU capacity, that CMA CGM will deploy on its MEX 1 service between Asia and the Mediterranean.

Alongside its planned bunker vessel fleet Keppel O&M is also developing a pioneering floating bunkering facility, set to become operational at the end of 2021. The LNG bunkering facility will be able to receive vessels such as harbour crafts and small vessels from the facility, with a capacity of 3,500 cubic metres. ■

NEWS NUDGES

CNOOC, CSSC partner to develop LNG river fleet

State-owned firm China National Offshore Oil Corporation (CNOOC) is to provide China State Shipbuilding (CSSC) with LNG bunker fuel for up to 50 bulk carriers operating in China.

The agreement is reported to cover fuelling for vessels in the Pearl river delta area and follows a framework agreement signed by the two parties last year for the conversion of inland river vessels in Guangdong.

The new fleet will include 25 vessels of 2,000 deadweight-tonne (dwt) capacity and a further 25 vessels with 3000dwt capacity. The Pearl river delta area includes the Yangtze river delta and the Bohai bay region and is one of the few emissions control zones in the country. ■



CMA CGM Scandola bunkering in Singapore

Japan waives port fees for LNG-fuelled vessels

Authorities in Japan have waived port entry fees for LNG-fuelled vessels at several key ports.

The allowance covers the ports of Yokohama, Kawasaki and Tokyo and entered force on 1 April. The scheme will include vessels with dual-fuel engines, capable of running on LNG or low-sulphur marine fuel.

The changes were introduced by Tokyo's port bureau and will allow operators of LNG-fuelled vessels to avoid the ¥2.70/gross tonne entry fee for ocean-going vessels. This equates to a saving of around ¥200,000 for an LNG-fuelled pure

car and truck carrier (PCTC) compared with a traditional PCTC. For larger coastal vessels, bigger than 700 tonnes, saving around ¥90,000 for an average LNG-fuelled coastal bulk carrier.

Alongside waiving fees for LNG vessels, the port bureau will also lift will entry fees for hydrogen-fuelled vessels. The fee waivers will remain effective for five years until 31 March 2026.

Kaguaya bunkers Century Highway Green

Last year, engineering firm Kawasaki Heavy Industries launched the first LNG bunkering vessel in Japan - Kaguaya - as part of a government-led push to switch marine transport to LNG in the country.

Owned and managed by joint venture developer Central LNG Shipping Japan Corporation the vessel is now based at Kawagoe Thermal Power Station operated by JERA, the largest power generation company in Japan.

In March, the Kaguaya conducted its first Ship-to-Ship LNG bunkering for a "K" LINE newbuild car carrier, *Century Highway Green*.

"[Kaguaya] will continue supplying LNG fuel to ships in the Chubu region using Ship-to-Ship bunkering," a spokesperson for Central LNG Shipping said.

Central LNG Shipping is jointly owned and operated by Nippon Yusen Kaisha (NYK Line), Kawasaki Kisen Kaisha, JERA, and Toyota Tsusho.



Port of Yokohama

Shell announces new LNG bunker vessel charter

Energy major Shell is to extend its LNG refuelling capacity with the charter of a new bunkering supply vessel in Spain.

The vessel will operate from the Port of Barcelona and will be constructed in Spain. It is set to have capacity to carry 5,000 cubic metres of LNG.

"In 2019 we completed the first LNG ship to ship bunkering in Barcelona and look forward to working with our partners in this project on the delivery of this vessel, demonstrating our ability and commitment to providing safe, reliable supplies to meet the growing need for cleaner-burning fuels," Tahir Faruqi, General Manager, Shell Global Downstream LNG, said.

Global network

The new vessel is expected to add 'further flexibility to customers' on key trade routes and is part of the firm's strategy to expand its LNG refuelling network globally.

"Shell plans to double its existing LNG bunkering infrastructure on key international trade routes by the mid-2020s and this vessel

will play an important role in that journey as we serve more customers across our global network with LNG," Faruqi added.

The proposed vessel will use the Enagás LNG terminal in Barcelona to load LNG and will be operated by Norwegian shipping line Knutsen OAS Shipping. Shell now holds LNG bunkering licences for multiple locations around the globe, including most recently in Gibraltar.

Net-zero journey

At the start of the year, Shell and partner Q-LNG Transport commenced operations from their first offshore LNG articulated tug and barge (ATB) in the US, the *Q-LNG 4000*, and the firm now has six LNG bunker vessels in service.

"Shell is aiming to become a net-zero emissions energy business by 2050 or sooner and believes LNG is the first essential step for decarbonisation of the maritime sector... decarbonisation of hard to



Port of Barcelona

abate sectors like shipping is complex and there is a need to accelerate the journeys to net-zero emissions for the sector... LNG is affordable, proven, safe and the cleanest fuel currently available to the maritime sector in meaningful volumes now," a spokesperson said.

To date, Shell has completed over 400 ship-to-ship LNG bunkering operations across a broad range of segments in seven countries and eight ports, including Rotterdam, Barcelona, Tenerife, La Spezia, Gothenberg and most

recently Jacksonville.

The new ATB compliments Shell's existing global network of six LNG bunker vessels. The firm aims to double its LNG bunkering network by the mid-2020s, to around 15 major ports on key international trading routes.

4,000 cubic metres capacity

The vessel was fabricated at VT Halter Marine shipyards in Pascagoula, Mississippi, and features capacity of up to 4,000 cubic metres of LNG.



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First Norwegian LNG bunker vessel certified

The first LNG bunkering vessel in Norway has completed gas and sea trials and received classification from standards agency Bureau Veritas.

Systems integration firm Høglund Marine Solutions assisted in the conversion of the conventional bunkering tanker, previously known as Oslo Tank, to create the new LNG bunker vessel, named *Bergen LNG*.

"The *Bergen LNG* conversion was both a demanding but fascinating project that was progressed and finalised in extraordinarily adverse conditions. The sheer adaptability and resilience demonstrated by our engineering team, along with our technical expertise, are living proof that, at Høglund, we make systems work no matter the complexity of the commission or the adversity of the conditions," Philipp Ulrich, Høglund's Senior Project Manager and project lead, said.

The *Bergen LNG* will be operated by Gasnor as a fuelling vessel for passenger ships operated by shipping lines Hurtigruten and Kysttruten.

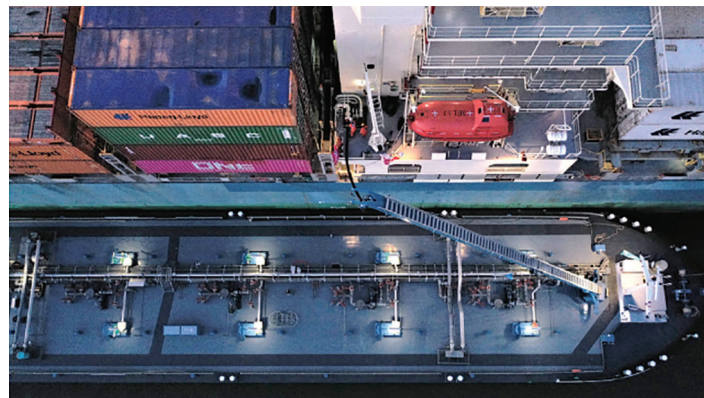
"Over the past years, we have gained a lot of experience with

conversion projects in the Nordic region. Our local plan approval capabilities and experienced surveyor team are a significant asset to our clients. In this respect, the *Bergen LNG* project stands out in terms of technical complexity and customer service," Gijsbert de Jong, Marine CEO for Bureau Veritas' Nordic region, said.

Integrated Automation System

The conversion involved the addition of an LNG gas handling system with Integrated Automation System (IAS), including essential gas control and safety system, and was carried out at Westcon Shipyards in Florø. Høglund equipped the vessel with a single Shell type-C tank, providing capacity of 850 cubic metres and a bunkering rate of 500 cubic metres per hour.

The refit was completed on behalf of owner Bergen Tankers and included installation of cargo pumps, bunker manifolds, custody transfer system, a ship-to-ship



LNG bunker vessel

transfer system, a cargo control and emergency shutdown (ESD) system, and ship-to-shore/ship-to-ship link systems to form the Automation System.

"It's fantastic to count on a partner like Høglund Marine Solutions for a project as complex as the *Bergen LNG* conversion, which will pave the way for LNG shipping's infrastructure in Norway," Ingemar Presthus, Technical Manager at Bergen Tankers, commented.

Engineering partnership

As part of this ambitious project,

Høglund worked closely with LNG tank manufacturer Gas & Heat Spa and German engineering services firm HB Hunte Engineering, which provided a 3D detail design of the Gas Piping System.

"We are very pleased to have witnessed the tenacity, expertise and technical proficiency of the Høglund team which has allowed for the successful progression of this conversion project at an incredibly challenging time, where disruptions to schedules and working conditions continuously threaten to jeopardise projects of this magnitude," Presthus concluded. ■



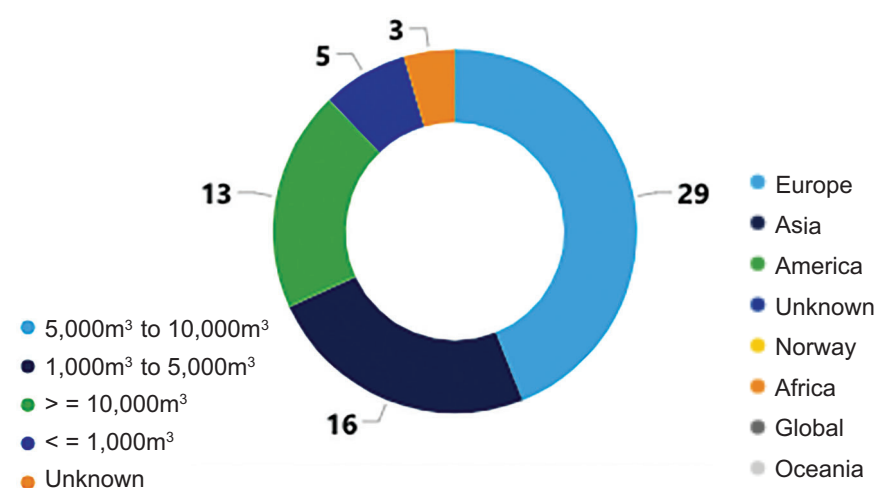
Oslo Tank

LNG BUNKER VESSELS

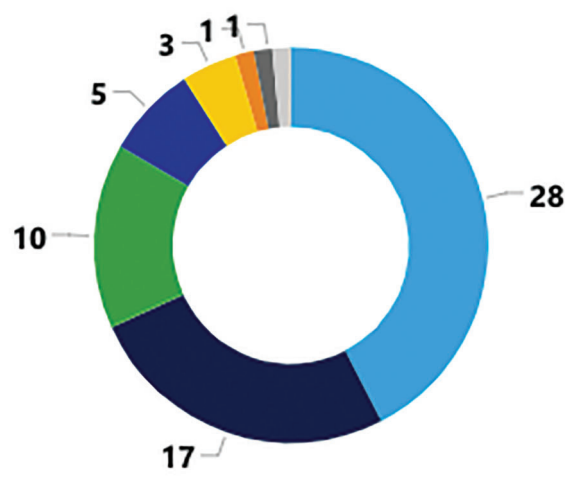
Vessel Name	Home Port	Project status	Delivery year	Country	LNG Tank Capacity	Owner	Operator
Yidu inland river LNG bunker barge	Yidu port	In operation	2014	China	500	Xilan Natural Gas Group	Xilan Natural Gas Group
FlexFueler 001	Amsterdam	In operation	2019	Netherlands	1480	Titan LNG	Titan LNG
FlexFueler 002	Antwerp	In operation	2020	Belgium	1480	Titan LNG	Titan LNG
Titan Hyperion	TBD	Decided	2021	Netherlands	8000	Titan LNG	Titan LNG
PRO1	Houston	Under discussion	Q42022	United States	7600	LNG PRO Bunkers	TBN (Probunkers group company)
PRO2	Hong Kong	Under discussion	Q12023	Hong Kong	7600	LNG PRO Bunkers	TBN (Probunkers group company)
Coralius	Risavika	In operation	2017	Norway	5600	Sirius Veder Gas	Sirius Rederi
Cardissa	Rotterdam	In operation	2017	Netherlands	6500	Shell	Shell
Coral Methane	Rotterdam	In operation	2018	Netherlands	7551	Anthony Veder	Shell
Green Zeebrugge	Zeebrugge	In operation	2017	Belgium	5100	NYK	NYK
Kairos	Lithuania	In operation	2018	Lithuania	7500	Bernhard Schulte	Nauticor
Naturgy LNG bunker vessel	Barcelona	Under discussion	2022	Spain	6000	Naturgy	Naturgy
Gas Agility	Northern Europe	In operation	2020	Netherlands	18600	Mitsui OSK Lines Ltd	Mitsui OSK Lines Ltd
Total / MOL Ltd. (MOL) & Gazocean		Decided	2021	--	18600		Mitsui O.S.K. Lines,
SM JEJU LNG2	Busan	In operation	2020	South Korea	7500	Korea Line	Korea Line
Korea Gas (KOGAS) LNG bunker vessel		Decided	2023	South Korea	7500	KOGAS	KOGAS
Pioneer Knutsen		In operation	2020	Norway	1100	Knutsen OAS Shipping	Knutsen OAS Shipping
LNG bunker barge shell	Barcelona	Decided	2022	Spain	5000		Knutsen OAS Shipping
Q-LNG 4000	Port Canaveral, FL	In operation	2020	United States	4000	Q-LNG	Harvey Gulf International Marine
Q-LNG ATB Bunker Barge 8000TBD		Under discussion	TBD	United States	8000	Q-LNG	Harvey Gulf International Marine
Dmitry Mendelev		Decided	Q3 2021	Europe	5800	Shturman Koshelev LLC	Gazpromneft Marine Bunker Ltd (Gazpromneft)
FueLNG Bellina	Singapore	In operation	2020	Singapore	7500	FueLNG	FueLNG
Clean Jacksonville	Jacksonville Jax LNG	In operation	2018	United States	2200	TOTE	FOSS Maritime
Xinao Putuo Hao	Zhoushan	Decided	2021	China	8500	ENN Energy	ENN Energy
Optimus		In operation	Q1 2021	Europe	6000	Eesti Gaas	Elenger
FUKUOKA FUKUOKA 1350	Yokohama	Decided	2021	Japan	2500	Ecobunker shipping	Ecobunker shipping
Kaguya	Chubu region (Central Japan)	In operation	2020	Japan	3500	CLS (JV established by K Line, JERA, NYK & Toyota Tsusho Corp.	CLMF (JV by CLS partners)
Oizmendi	Huelva	In operation	2018	Spain	600	Cepsa	Cepsa
Seagas	Stockholm (Louden)	In operation	2013	Sweden	187	Gasum	AGA
Avenir Accolade		In operation	2021	Brazil	7500	Avenir LNG	
Avenir Advantage		In operation	2020	Malaysia	7500	Avenir LNG	
Avenir bunker vessel 3	Oristano, Sardinia	Decided	2021	Europe	7500	Avenir LNG	
Avenir bunker vessel 4 (Location unknown)	Not yet decided (being built in China)	Decided	Aug 2021	China	7500	Avenir LNG	
Avenir bunker vessel 5 (Location unknown)	Not yet decided (being built in China)	Decided	Jun 2021	China	20000	Avenir LNG	
Avenir bunker vessel 6 (Location unknown)	Not yet decided (being built in China)	Decided	Sep 2021	China	20000	Avenir LNG	
Bergen LNG	Bergen	In operation	2021	Norway	850	Bergen Tankers	
Bunker Breeze	Algeciras	In operation	2018	Spain	1200	Suardiaz Energy Shipping	
Clean Canaveral	Jacksonville, FL	Decided	2022	United States	5400	Polaris New Energy	
Coral Anthelia		In operation	2013	Jamaica	6500	Anthony Veder	

Vessel Name	Home Port	Project status	Delivery year	Country	LNG Tank Capacity	Owner	Operator
Coral EnergiCE	Risavika	In operation	2018	Europe	18000	Anthony Veder	
Coral Energy	Risavika	In operation	2013	Europe	15000	Anthony Veder	
Coral Favia		In operation	2010	Russia	10000	Anthony Veder	
Coral Fraseri	Unknown	In operation	2019	Global	10000	Anthony Veder	
Coral Fungia		In operation	2011	Russia	10000	Anthony Veder	
Coral Furcata		In operation	2011	--	10000	Anthony Veder	
Cryopeak LNG	Vancouver	Under discussion	2022/3	Canada	4000	Cryopeak	
DEPA Limassol	Limassol	Under discussion	2022	Greece	4000	DEPA	
DEPA Piraeus	Piraeus	Under discussion	2022	Greece	4000	DEPA	
Domestic LNG Bunkering Vessel in China	To be decided (China)	Under discussion	2021	China	6000	CNOOC	
Domestic LNG Bunkering Vessel in China	To be decided (China)	Under discussion	2021	China	12000	CNOOC	
FlexFueler 003	Zeebrugge	Under discussion	TBD	Belgium	1480	Titan LNG	
FlexFueler 004	Lubeck	Under discussion	TBD	Germany	1480	Titan LNG	
FSU and LNG Bunker Barge, Port of Coega, South Africa	Port of Coega	Decided	2021	South Africa	145000	DNG Energy	
LNG Bunker & Feeder Vessel Reganosa	Mugardos	Decided	2023	Spain	10000	Reganosa	
LNG bunker barge GALP		Decided	2022	Portugal		GALP	
LNG bunker vessel Swinoujscie	Swinoujscie	Under discussion	2023	Poland		Polskie LNG	
LNG London	Rotterdam	In operation	2019	Netherlands	2998	LNG Shipping (Victrol & Sogestran)	
MOL LNG bunker vessel	Singapore	Decided	2021	Singapore	12000	Mitsui OSK Lines Ltd	
Polaris ATB No. 2	Jacksonville, FL	Under discussion	TBD	United States		Polaris New Energy	
Port of Algeciras LNG-Bunkering Vessel	Port of Algeciras	Under discussion	2023	Spain	12500	Enagás	
Poseidon Med II bunkering barge	Revithoussa	Decided	2022	Europe	4000	Venture led by DEPA	
Shell LBV	Rotterdam (to be confirmed)	Decided	2022	Singapore	18000	Korea Line LNG	
Shell LBV Gulf of Mexico	Gulf of Mexico	Decided	2023	United States	18000	Pan Ocean	
SM JEJU LNG1		In operation	2019	--	7500	Jeju LNG 1 SA	
Small LNG bunkering vessel in South Korea		Decided	2021	South Korea	500	Ministry of Oceans and Fisheries	
Woodside Western Australia LNG bunker vessel		Dampier	Under discussion		2023	Australia	12000

BUNKER VESSELS BY TANK CAPACITY



BUNKER VESSELS BY AREA OF OPERATION



WORLD SMALL SCALE LNG FLEET*

Built	Name	CBM	Cargo Type	Trading area	Trading in LNG?	Ship Owner / Operator
1974	Seagas	187	LNG	Sweden	Yes	AGA
1988	Kayoh Maru	1,517	LNG	Japan	Yes	Daiichi
1993	Aman Bintulu	18,928	LNG	Malaysia - Japan	Yes	Perbadanan/NYK
1996	Surya Aki	19,475	LNG	Indonesia - Japan	Yes	MCGC
1997	Aman Sendai	18,928	LNG	Malaysia - Japan	Yes	Perbadanan/NYK
1998	Pelita Energy	18,800	LNG	Malaysia - Japan	Yes	Perbadanan/NYK
2000	Triputra	23,096	LNG	Indonesia - Japan	Yes	MCGC
2003	Pioneer Knutsen	1,100	LNG	Norway	Yes	Knutsen
2003	Shinju Maru No.1	2,540	LNG	Japan	Yes	Shinwa
2005	North Pioneer	2,500	LNG	Japan	Yes	Japan Liquid Gas
2007	Sun Arrows	19,531	LNG	Malaysia - Russia - Japan	Yes	Mitsui
2008	Kakurei Maru	2,536	LNG	Japan	Yes	Hogaki Zosen
2008	Shinju Maru No.2	2,540	LNG	Japan	Yes	Shinwa
2009	Coral Methane	7,551	LNG/LPG/Ethylene	Northwest Europe/Baltics	Yes, sometimes	Anthony Veder
2010	Coral Favia	10,000	LNG/LPG/Ethylene	Worldwide	No	Anthony Veder
2010	Coral Fraseri	10,000	LNG/LPG/Ethylene	Worldwide	No	Anthony Veder
2011	Coral Furcata	10,000	LNG/LPG/Ethylene	Worldwide	No	Anthony Veder
2011	Coral Fungia	10,000	LNG/LPG/Ethylene	Worldwide	No	Anthony Veder
2011	Akebono Maru	3,556	LNG	Japan	Yes	Chuo Kaiun
2011	Vision Spirit	12,000	LNG/LPG/Ethylene	Worldwide	No	Teekay
2011	Unikum Spirit	12,000	LNG/LPG/Ethylene	Worldwide	No	Teekay
2012	Coral Energy	15,600	LNG	Northwest Europe/Baltics	Yes	Anthony Veder
2013	Coral Anthelia	6,500	LNG/Ethylene			Anthony Veder
2013	JX Energy TBN	2,500	LNG	Japan	Yes	JX Energy
2013	Kakuyu Maru	2,500	LNG	Japan	Yes	Tsurumi Sunmarine
2015	JS Ineos Ingenuity	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2015	JS Ineos Insight	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2015	JS Ineos Intrepid	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2015	LNG Barge TBN	3,000	LNG	US Coast	Yes	LNG America
2015	PetroChina TBN	30,000	LNG	China		PetroChina
2016	Hai Yang Shi You 301	30,000	LNG	Bali FSU	Yes	CETS (CNOOC)
2016	Clean Jacksonville	2,200	LNG	US Coast	Yes	CME
2016	JS Ineos Indevence	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	LNG Prime	2,250	LNG	Northwest Europe	Yes	Veka Deen LNG
2017	Coralius	5,800	LNG	Northwest Europe/Baltics	Yes, for Skangas	Anthony Veder
2017	Coral EnergICE	18,000	LNG	Northwest Europe/Baltics	Yes	Anthony Veder
2017	Coral Encanto	30,000	LNG	China	Yes	Anthony Veder
2017	JS Ineos Invention	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2017	JS Ineos Intuition	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2017	Oizmendi	600	LNG	Bilbao	Yes	Itsas Gas
2017	LNG-Gorskaya TBN	7,300	LNG	Russia	Yes	LNG-Gorskaya
2017	LNG-Gorskaya TBN	7,300	LNG	Russia	Yes	LNG-Gorskaya

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

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

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

** = project shelved † =Data to be verified Data last updated = 14 May 2021

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	Green Zeebrugge	5,000	LNG	Northwest Europe	Yes	NYK
2017	Cardissa	6,500	LNG	Northwest Europe	Yes	Shell
2018	Kairos	7,500	LNG	Baltic	Yes	Bernhard Schulte
2018	LNG London	3,000	LNG	Northwest Europe	Yes	Shell
2018	Shell Bunker Barge TBN 2	6,500	LNG	Northwest Europe	Yes	Shell
2018	Shell Bunker Barge TBN 3	6,500	LNG	Northwest Europe	Yes	Shell
2018	Bunker Breeze	1,200	LNG	Barcelona	Yes	Suardiaz Energy Shipping
2018	HUA XIANG 8	13,720	LNG	China	Yes	Zhejiang Huaxiang
2019	SM Jeju LNG1	7,500	LNG	Korea	Yes	Korea Line
2019	Gas Agility	18,600	LNG	NWE	Yes	MOL
2019	Flexfueller 001	1,480	LNG	Amsterdam	Yes	Titan LNG
2020	Avenir Advantage	7,500	LNG	Mediterranean	Yes	Avenir LNG
2020	Avenir Accolade	7,500	LNG	Mediterranean	Yes	Avenir LNG
2020	Avenir Aspiration	7,500	LNG		Yes	Avenir LNG
2020	Kaguya	3,500	LNG	Japan	Yes	CLS
2020	CNTIC VPOWER Global	28,000	LNG	Myanmar	Yes	Dalian Inteh Group
2020	Ecobunker Tokyo Bay	2,500	LMG	Japan	Yes	Ecobunkers
2020	Optimus	6,000	LNG	NWE	Yes	Elenger
2020	ENN TBN	8,500	LNG	China	Yes	ENN
2020	FueLNG Bellina	7,500	LNG	Singapore	Yes	FueLNG
2020	SM Jeju LNG2	7,500	LNG	Korea	Yes	Korea Line
2020	Q-LNG 4000	4,000	LNG	US Coast	Yes	Q-LNG Transport/Harvey Gulf
2020	Flexfueller 002	1,480	LNG	Antwerp	Yes	Titan LNG
2021	Avenir Ascension	7,500	LNG		Yes	Avenir LNG
2021	Avenir Allegiance	20,000	LNG	Worldwide	Yes	Avenir LNG
2021	Bergen LNG	850	LNG	Norway	Yes	Bergen Tankers
2021	Dmitry Mendeleev	5,800	LNG	Russia	Yes	Gazprom Neft
2021	JMU TBN	2,500	LNG	Japan	Yes	JMU
2021	Ravenna Knutsen	30,000	LNG	Mediterranean	Yes	Knutsen OAS
2021	PE TBN	12,000	LNG	Singapore	Yes	MOL
2021	TBN	18,600	LNG	Mediterranean	Yes	MOL
2021	TG TBN	500	LNG	Korea	Yes	Trans Gas
2022	Veder TBN	30,000	LNG	Worldwide	Yes	Anthony Veder
2022	Avenir Achievement	20,000	LNG	Worldwide	Yes	Avenir LNG
2022	Knutsen TBN	5,000	LNG	Spain	Yes	Knutsen OAS
2022	Clean Cañaveral	5,400	LNG	USG	Yes	PNE
2023	Cryopeak TBA	4,000	LNG	West Canada	Yes	Cryopeak
2023	Knutsen TBN	12,500	LNG	Spain	Yes	Knutsen OAS
2023	SM Jeju LNG3	7,500	LNG	Korea	Yes	Korea Line
2023	Pan Ocean TBN	18,000	LNG	USG	Yes	Pan Ocean Co
2024	Avenir TBN (option)	20,000	LNG	Worldwide	Yes	Avenir LNG
2024	Avenir TBN (option)	20,000	LNG	Worldwide	Yes	Avenir LNG
2026	Avenir TBN (option)	20,000	LNG	Worldwide	Yes	Avenir LNG
2026	Avenir TBN (option)	20,000	LNG	Worldwide	Yes	Avenir LNG

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

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

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

** = project shelved † =Data to be verified Data last updated = 4th May 2021