

LNG Fuelling

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Pivotal bunkers world first carbon-neutral PSV with RLNG

Fuel solutions provider Pivotal LNG has completed the first delivery of renewable LNG for a Platform Supply Vessel (PSV) at the Trussville LNG facility in Alabama.

The bunkering operation was carried out on behalf of Harvey Gulf International Marine, refuelling the world's first carbon-neutral PSV, the *Harvey America*.

"Pivotal LNG is always looking for innovative ways that our product can help transform our nation's energy landscape. We are pleased that we could partner with Harvey Gulf and Element Markets to effectuate this delivery, contributing to reducing carbon emissions and a cleaner environment," Roger Williams, VP Commercial LNG and Gas Development at BHE GT&S, the parent company of Pivotal LNG, said.

Tri-fuel vessel

The *Harvey America* is a tri-fuel vessel, operating primarily on LNG and battery power, with diesel fuel as a backup. The renewable LNG used for the bunkering operation was supplied by commodities group Element Markets.

"We look forward to growing our relationship with Pivotal LNG as our clients move towards RLNG in order to reduce emissions within 25 miles of a drilling location. My company is fully committed to carbon reduction and this



Pivotal LNG facility

partnership with Pivotal LNG is very much appreciated," Shane Guidry, Chairman & CEO of Harvey Gulf International Marine, said.

Headquartered in New Orleans, Harvey Gulf International Marine specializes in Offshore Supply, Fast Supply and Multi-Purpose Support Vessels for deepwater operations in the U.S. Gulf of Mexico and abroad. The firm also designs and equips some of its offshore supply vessels for dual operation as dive/construction and mooring line support vessels.

Carbon reduction

The vessel is one of five PSVs owned by Harvey Gulf that can be fuelled by RLNG, enabling clients to obtain Carbon Neutral Certifi-

cates for their related operations.

"We are pleased to be part of the significant progress underway in decarbonizing marine transportation and congratulate Pivotal LNG and Harvey Gulf for their sustainability leadership," Angela Schwarz, Co-President and CEO of Element Markets, said. "We also extend acknowledgement to Monarch Bioenergy for producing the ultra-low carbon RNG used in this latest bunkering event."

The renewable gas used is compatible with existing natural gas infrastructure and Pivotal hailed it as 'a clear pathway to net zero emissions for the marine industry', predicting it would also go on to displace traditional fuel usage in other sectors, such as road transportation, power generation, rail, and aerospace.

Produced from negative-carbon-intensity biomethane sourced from swine waste the renewable gas was sourced at Pivotal LNG's production facility in Trussville, which also supplies marine shipping firm JAX LNG.

In February this year, Element Markets and Bluesource announced the launch of a global decarbonization platform backed by TPG Rise. ■



Harvey Gulf Platform Supply Vessel

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TMR forecasts strong growth in LNG bunkering market

The LNG bunkering market is set to grow by more than half over the next decade, according to a new study by consultancy Transparency Market Research (TMR).

The TMR findings suggest that the LNG Bunkering Market will increase at a compound annual growth rate (CAGR) of 63.6% over the period 2021 to 2031.

“Stricter implementation of environmental regulations and standards for marine vessels particularly on its emission to air are

shaping the revenue potential of the LNG bunkering market,” Rohit Bhisey, director of TMR, said.

Enriched landscape

According to TMR’s forecast the global LNG bunkering market will reach a volume of 432.16 million tonnes by 2031 as compliance with sulphur emission regulation drives increased adoption.

“Various regulations and standards on the emission control by the maritime industry have enriched the LNG

bunkering market landscape. IMO 2020 in particular has spearheaded the initiatives toward promoting very low sulphur fuel oil (VLSFO) in marine vessels,” Bhisey notes.

Advanced infrastructure

North America is highlighted as one of the key growth regions for LNG as a transport fuel with TMR expecting revenues in the region to ‘expand considerably’ as advances in LNG refuelling infrastructure catalyse uptake in tankers and container ships.

Massive demand for LNG-fuelled ferries and Offshore Support Vessels (OSVs) is also expected to drive revenue growth, with Europe, the US, China and South

Korea all benefitting from improvements to bunkering infrastructure over the next 9 years.

“Advancements in infrastructure of refuelling of LNG powered ships at ports have extended the canvas for stakeholders in the LNG bunkering market,” Bhisey states. “A case in point is investment on developing LNG bunkering terminals in Norway.”

While some LNG growth is expected to come at the expense of traditional fuel oil, TMR also predicts that new infrastructure will feed ‘steadily growing demand’ for marine diesel oils in the maritime industry, expanding frontiers for market players to capitalize on during the forecast period. ■



LNG bunkering operation

Gasum secures Belgian LNG distribution license

Finnish state-owned energy company Gasum has obtained a license for distribution of LNG in Belgium.

The new LNG distribution license will allow the firm to expand its supply network and increase bunkering capabilities in the country as part of its strategy to extend the outreach and quality of its maritime LNG offering.

“Obtaining this license underlines Gasum’s commitment to act as a reliable European maritime LNG supplier and enabler of maritime decarbonization. It also supports our growth strategy and enables us to deliver safe and clean energy, which helps our customers to reduce their greenhouse gas emissions considerably,” Jacob Granqvist, Vice President at Gasum, commented.

ARA gateway

The Belgian market is seen as key for many LNG customers in Europe

as it lies at the heart of the Amsterdam-Rotterdam-Antwerp (ARA) region and Gasum expects the new license will be critical for the expansion of its supply network in Northwestern European ports and waters.

“The significance of the ARA region and Zeebrugge as a bunkering hub is likely to increase, which makes it a strategically important area for Gasum,” Granqvist added.

As part of this development, Belgium’s port of Zeebrugge is expected to be central to LNG growth, thanks to its position as one of Europe’s leading hubs for pure car/truck carriers (PCTCs). Gasum forecasts that a rise in LNG-fuelled PCTC vessels will boost deployment of bunkering infrastructure in the region over the medium term, with Granqvist not-

ing: “the number of LNG-powered car/truck carriers is growing rapidly, subsequently increasing the global demand for maritime LNG.”

Earlier this year, Norwegian shipping line United European Car Carriers (UECC) announced plans to introduce LNG-battery hybrid PCTCs on a new route connecting

Zeebrugge with Scandinavia.

Headquartered in Espoo, Finland, Gasum is responsible for import and sales of natural gas in Finland and has operations across Scandinavia. The company is the largest processor of biodegradable waste in the Nordic countries and owns 17 biogas refineries in Finland and Sweden. ■



Gasum LNG tanker

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SEA\LNG coalition expands membership

Multi-sector industry coalition SEA\LNG has expanded its membership with the addition of the Port of Zeebrugge, the largest port in Belgium, and Newport Shipping UK, specialist provider of dry-docking, retrofit, repair and conversions services.

The new members will strengthen the coalition's LNG value chain and support collaboration between ports in the EU.

"Sustainability and climate protection are high on the agenda of the port authority of Zeebrugge," Tom Hautekiet, CEO Port of Zeebrugge said. "This new partnership with SEA-LNG will definitely offer us new opportunities to stimulate the switch to eco-friendly fuels and pursue our ambitions to become a green energy hub internationally.

Pathway for decarbonisation

Located in the municipality of Bruges, West Flanders, Zeebrugge handles around 50 million tonnes of cargo annually. It is one of the world's leading roll-on/roll-off ports, Zeebrugge is also home to the deep-sea container terminal, CSP Zeebrugge Terminal, and serves some of the busiest shipping routes in north-western Europe.

Peter Keller, Chairman, SEA-LNG, added: "We're pleased to welcome the innovative Port of Zeebrugge to our coalition. We look forward to working with the

port and its users to continue to drive the growth of environmentally-friendly LNG-fuelled shipping in northwest Europe, creating a pathway for long term decarbonisation of the industry".

The port installed its first LNG storage infrastructure as far back as 1987 and has emerged as a leader in the bunkering sector in recent years. In 2017, introduced the world's first purpose-built LNG bunkering vessel - the Engie Zeebrugge, now known

as the *Green Zeebrugge*.

Infrastructure development

Today, the port is one of the main hubs for LNG supply in the region, receiving pipelines from Norway and the UK, and vessel imports from Qatar and featuring onsite storage equivalent to 9 billion cubic metres of LNG per year.

"It is vital to continue to support infrastructure development for LNG and bioLNG now and en-

sure this infrastructure is in place for use with renewable synthetic LNG in the future," a spokesperson for SEA/LNG said. "In 2021, nearly one-third of orders for vessel newbuilds, by capacity, were powered by LNG. Globally, LNG bunkering infrastructure is growing rapidly, with Clarksons forecasting that by the end of 2022 LNG bunkering will be available in 170 ports worldwide."

Belgian gas transmission system operator Fluxys manages the Zeebrugge's LNG terminal offering LNG bunkering services as well as regasification to supply the wider European gas network.

Widening skill base

The addition of Newport Shipping will strengthen the operational skill base of the coalition, bringing the firms' expertise working on dry-docking, retrofit, repair and conversion at 15 shipyards and 38 docks worldwide.

Lianghui Xia, Managing Director Operations at Newport Shipping said: "We are pleased to be joining the SEA-LNG coalition. Its ground-breaking work has stood out for a number of years, as it provides shipowners and operators with valuable analysis of the costs and benefits of the LNG pathway. ■



Newport Shipping vessel



The Port of Zeebrugge



Power Play AWARDS

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This year, the Power Play Awards will mark ExxonMobil LNG's fourth year supporting inclusion and diversity by connecting and celebrating women and men across the LNG industry. The key objective behind these awards is to recognize and celebrate the accomplishments of remarkable women and men who uphold the importance of supporting and empowering others in the workplace by demonstrating how a mutually supportive environment can help support great business outcomes across all parts of the LNG value chain.

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LNG

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Clean Canaveral completes inaugural LNG bunkering operation

The *Clean Canaveral*, the largest Jones Act-compliant LNG bunkering barge, has completed inaugural bunkering operations in Florida.

Featuring capacity of 5,500 cubic meters, the vessel is classed as an articulated tug barge (ATB) and is owned by Polaris New Energy, a subsidiary of Seaside LNG Holdings.

“As expected, the *Clean Canaveral* performed very well during the bunkering process,” Tom Sullivan, Senior Vice President of Operations for Seaside, explained. “The McAllister Towing crew operating the ATB, our vendors, regulatory agencies, JAXPORT and Polaris worked seamlessly together to ensure we were prepared for a successful bunkering.”

600 tonnes of LNG

The LNG refuelling process took place at JAX LNG’s facility dock in Jacksonville and involved the transfer of approximately 600

tonnes of LNG to the dual fuel tanker *Eagle Brasilia*, owned by Singapore-headquartered tanker firm AET.

“The working relationship between AET, its ship-manager, Eaglestar, and the crew on the ATB was key to the safe transfer of LNG. We greatly appreciate AET’s confidence in our ability to safely conduct this inaugural bunkering,” Sullivan commented.

The transfer involved a cool down operation to pre-cool the cargo tanks and lines prior to fuelling with super-cooled LNG and was the first barge-to-ship cool down carried out in the US.

The *Clean Canaveral* was built by Wisconsin shipyard Fincantieri Bay Shipbuilding and delivered in December last year. The ship-builder is currently constructing a sister vessel to the *Clean*



The *Clean Canaveral*

Canaveral that will also have capacity of 5,500 cubic metres and is scheduled for delivery by the end of 2023.

The new vessel will be operated by Polaris New Energy affiliate PNE Marine Holdings and will

dock at JAX LNG’s facility dock in Jacksonville once it enters commercial operation. JAX LNG is a joint venture between Northstar Jacksonville, a subsidiary of Seaside, and Pivotal LNG, a subsidiary of BHE GT&S. ■

Pavilion, TotalEnergies launch Brassavola in Singapore

Fuelling specialists Pavilion Energy and TotalEnergies have launched a new LNG bunker vessel in Singapore.

The *Brassavola* is owned by Japanese shipping group Mitsui O.S.K. Lines (MOL) and was fabricated by Singapore shipbuilder Sembcorp Marine.

“The vessel is the first LBV chartered by Pavilion Energy to supply LNG bunkers in the Port of Singapore, the world’s largest bunkering hub,” a spokesperson

for Pavilion Energy said.

GTT Mark III Flex tanks

The new vessel operates on dual-fuel engines, capable of using LNG or marine diesel oil, and when construction began in 2019 it was described as “Singapore’s largest” LNG bunker vessel.

“Owned by MOL and built by

Sembcorp Marine, the use of the 12,000-cubic-metre vessel will be shared with TotalEnergies Marine Fuels upon delivery,” a spokesperson for MOL said.

The *Brassavola* features two GTT Mark III Flex membrane tanks and measures 112 metres in length and 22 metres in width.

Sea and gas trials

Following its launch, the *Brassavola* is undergoing sea and gas trials before entering full commercial operation later this year. It is part of a concerted strategy by Singapore’s Maritime and Ports Authority (MPA) to establish LNG and clean fuels as the de facto solution for shipping in the nation.

Senior Minister of State for Transport and Foreign Affairs, Chee Hong Tat, called the use of more sustainable fuels “an important element of the decarbonisation strategy” and urged the

shipping industry to increase use of “alternative zero-carbon fuels” such as LNG.

The MPA first appointed Pavilion Energy as an official LNG bunker supplier at the Port of Singapore in 2016 and has since seen LNG bunker volumes rocket with the 100th truck-to-ship LNG bunkering operation completed at Jurong Port last year.

In April, Alan Heng took over as Group Chief Executive Officer of Pavilion to drive the group’s sustainability strategy forward.

“Alan has been a steady partner in Pavilion Energy’s business since the company’s inception. The Board is confident that Alan, together with the rest of the leadership, will ensure strong progress towards achieving our vision as Singapore’s global energy merchant,” Pavilion Energy Chairman, Tan Sri Mohd Hassan Marican, said. ■



The *Brassavola*

Achema, Avenir complete first LNG transfer at Klaipeda

Gas specialists Achema Gas Trade and Avenir LNG have collaborated on the first LNG ship delivery to the new LNG terminal at the port of Klaipeda, Lithuania.

The delivery marks the first step in the scale up of bunkering services at the port and saw the *Avenir Aspiration* transfer its first fuel on behalf of the FSRU Independence for delivery to the LNG reloading station.

Mindaugas Navikas, Chief Commercial Officer of KN, which operates the FSRU *Independence* and the Klaipeda LNG reloading station, praised the collaboration, congratulating Avenir LNG on the start of operations in the region and thanking them “for their professionalism and smooth execution of the reloading operation.”

Milestone delivery

The *Avenir Aspiration* features capacity for 7,500 cubic metres of LNG and will provide LNG and LBG to various marine bunker customers in the region. The fuel transfer at Klaipeda marked the first operation for the vessel in Northwest Europe.

“We are happy to see the start of operations for our vessel in Northwest Europe and are looking forward to provide our services in a variety of countries and ports along the North and Baltic Sea coast,” Peter Mackey, CEO of

Avenir LNG, said.

Headquartered in the London, Avenir LNG is a fully integrated small-scale LNG supplier and distributor.

Vital infrastructure

LNG operations at the port of Klaipeda have grown steadily since the first test load was handled in 2017 and today the terminal is at the centre of regional plans to expand the use of low-emission LNG for transport. The FSRU *Independence* was delivered in 2014 and can store 170,000 cubic metres of natural gas, enough to supply all of Lithuania's need for natural gas.

“Klaipeda LNG reloading station is designed to supply Baltic and Poland off-grid consumers and LNG fuel stations with energy resources. We believe that Avenir LNG, a growing leader in the integrated small-scale LNG distribution market, which has implemented its first small-scale LNG operation in Klaipeda, will together contribute to the common goal of creating value in the growing small-scale regional LNG market,” Navikas commented.

The importance of the Klaipeda



Avenir Aspiration

LNG distribution facility has been highlighted in recent weeks as Russia has cut-off pipeline supplies to Poland and Bulgaria, reinforcing the importance of LNG deliveries for Baltic states. The Klaipeda LNG distribution facility was backed by a €20 million credit agreement from Nordic Investment Bank and is connected to the country's natural gas system operator, Amber Grid.

“As small-scale LNG business is one of UAB Achema Gas Trade future strategic developments, we are very glad we could start this business along with strong partners such as Avenir LNG and PGNiG,” Gediminas Vasauskas, CEO of UAB Achema Gas Trade, said. ■

NEWS NUDGES

UECC assigns LNG-fuelled PCTC to new North Sea route

Norwegian roll-on/roll-off shipping line United European Car Carriers (UECC) has launched a new North Sea service, announcing plans to deploy one of its two new multi-fuel LNG battery hybrid vessels on the route.

The new service will connect the ports of Zeebrugge, Esbjerg, Gothenburg and Drammen on a weekly basis. It will initially be served by the pure car and truck carriers (PCTC) *Minchah* before being replaced by a new LNG-fuelled PCTC currently under construction.

“UECC is very pleased to launch this new North Sea service, and finally adding Denmark to our pan European short sea shipping network, as well as adding Gothenburg as our third port of call in Sweden in addition to our existing service to Malmo and Wallhamn, enabling us to provide our customers with a wider ranging sustainable product” Glenn Edvardsen, CEO of UECC, said. ■



LNG bunkering at the port of Klaipeda



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Titan, Petronas partner for STS bunkering of LNG-fuelled VLCC

Fuel supplier Titan LNG has partnered with Malaysian energy firm Petronas to carry out ship-to-ship (STS) bunkering of the world's first LNG-fuelled Very Large Crude Carrier (VLCC).

The Term Supply Agreement signed by the partners will see Titan LNG work with Petronas Marine, the marine solutions arm of Petronas to bunker the *Yuan Rui Yang*, 333-metre-long crude tanker currently sailing under the flag of China.

"We are proud of the strong and ongoing relationship with our supply partner, PETRONAS Marine, and the faith shown by our long-term customer, Koch Industries," Michael Schaap, Titan LNG's Commercial Director Marine said. "As the LNG pathway gains recognition and momentum, taking a collaborative approach enables us to continue to deliver LNG safely across Europe, Asia and around the world."

Low-pressure dual-fuel engines

The *Yuan Rui Yang* is owned by Chinese shipping firm Cosco and chartered by US industrial conglomerate Koch Industries. Measuring 60 metres in width and 30.5 metres in depth, the vessel is powered by WinGD low-pressure dual-fuel main engines, and feature two 3,500 cubic metre LNG storage tanks.

"Shipping companies such as Cosco and Koch are becoming much more aware of how to meet the 2030 and 2050 decarbonisation targets and recognise that the use

of LNG as a marine fuel has a multitude of benefits," Schaap commented. "Not only its negligible local emissions profile but its clear global emissions reduction pathway through the introduction of bioLNG and hydrogen-derived LNG. This is why Titan is committed to providing access to LNG, and all commercially viable alternative fuels, enabling more shipping companies to start the journey towards a zero-carbon future today."

The *Yuan Rui Yang* features two C-type storage tanks, each with capacity of 3,500 cubic metres, and achieves a design energy efficiency index (EEDI) roughly 39.3% lower than baseline, with a combined endurance when using fuel and gas of 24,000 nautical miles.

Pasir Gudang bunkering

Titan LNG and Petronas Marine completed the first delivery as part of the Term Supply Agreement at the port of Pasir Gudang in Malaysia. Fuel transfer was carried out from the LNG bunker vessel *Avenir Advantage*, which is under long term charter to Petronas.

"LNG, as the cleanest burning fossil fuel, is currently the best option for the energy transition. PETRONAS Marine as a one-stop marine solutions partner in the



The LNG-fuelled VLCC, *Yuan Rui Yang*

region, will continue to ensure reliable and competitive LNG supply for the Asia-Pacific and Europe Trading route," a spokesperson for the firms said.

Titan has invested heavily in new LNG projects over the last three years and forecasts that it will have the largest network of LNG bunkering vessels in Europe by 2025. The firm also aims to form several new strategic partnerships 'to ensure global accessibility' of LNG fuel for its customers.

Headquartered in Kuala Lumpur, Petronas is one of the largest state-owned firms in Malaysia and ranked among the largest corporations in the world. The firm employs around 50,000 staff globally with a wide range of assets across the energy sector. ■

NEWS NUDGES

GTT to design fuel tanks for four LNG-fuelled container vessels

Naval engineering group Gaztransport & Technigaz (GTT) has secured an order from Korean shipyard Samsung Heavy Industries (SHI) to design cryogenic fuel tanks for four LNG-fuelled container vessels.

The deal will see GTT supply Mark III membrane containment technology, for the mid-size container vessels which are scheduled for delivery between the second and fourth quarter of 2024.

"In addition to the engineering services and technical assistance at the shipyard, GTT will assist the operator throughout every step of its first LNG-fuelled projects (commissioning of the LNG tank, first LNG bunkering operations, specific LNG operations and maintenance of the vessels). Moreover, GTT will provide LNG training for the crews, supported by its proprietary G-Sim® training simulator, which replicates the future LNG operations of the vessels," a spokesperson for GTT said. ■



Yuan Rui Yang

Molgas adds Blue Grid, driving Mediterranean expansion

Spanish energy group Molgas Energía has acquired a controlling stake in Greek alternative fuels firm Blue Grid as part of its strategy to accelerate growth in LNG and bioLNG bunkering.

The Athens-based company will join the Molgas group following a 'significant investment' and brings expertise in LNG, renewable methane and bioLNG as well as hydrogen-enabled e-fuels.

"We are proud to have Molgas onboard and view this investment as a vote of confidence in the work that we have been doing in the region over the past years" Sofoklis Papanikolaou, founder and CEO of Blue Grid, commented.

SE European expansion

Molgas plans to expand LNG supply in Southeast Europe and the wider

Eastern Mediterranean region. The group's investment in Blue Grid is expected to broaden its services around onshore and offshore transportation of LNG, storage, and small-scale regasification.

Fernando Sarasola, CEO of Molgas, predicts that Southeastern European will be "the next frontier" for small-scale LNG and alternative fuels, and adds that "Blue Grid is perfectly positioned to capture this market. We are very excited to be joining our forces and I am confident that together we will be bringing a lot of value to a wide range of customers."

Blue Grid will continue its work to develop end-to-end supply chains delivering fuel to final customers and onshore sectors such as industries, greenhouses, commercial buildings and hotels. It will also develop LNG fuelling stations, remote city-grids, and serve marine customers in the region's main ports.

"Blue Grid will also actively develop bio-methane and bio-LNG production capabilities, as well as hydrogen production activities, where these are applicable," a spokesperson for Molgas said.

Piraeus bunkering

The investment from Molgas will also help Blue Grid's team to capitalise on the imminent commissioning of the Revithoussa truck-loading terminal in the Gulf of Megara, west of Athens. This new terminal is scheduled to open in the summer of 2022 and will allow reliable and competitive supply of LNG to final customers

in the SE European region.

The Revithoussa terminal will be owned by Greek natural gas transmission system operator DEFSa, a subsidiary of Public Gas Corporation of Greece (DEPA). The utility is building a small-scale LNG reloading jetty on the island of Revithoussa, which it expects to be fully operational by the end of 2023.

"Blue Grid aims to be one of the first physical suppliers of LNG to marine customers in the port of Piraeus, and to this end, is planning to have an LNG Bunkering vessel available in alignment with the commissioning of the jetty," Molgas said in a statement.

Headquartered in Madrid, Molgas operates across the LNG value chain delivering industrial, cogeneration, vehicular and maritime projects as well as distributing fuel and supplying storage solutions. Molgas is owned by French private equity firm InfraVia Capital Partners.



Blue Grid tanker

LNG bunker sales growth falters at Rotterdam

Sales of LNG bunker fuel at the port of Rotterdam increased last quarter but volumes remain dampened by soaring global prices.

The Port of Rotterdam Authority reported that LNG sales reached 111,804 cubic metres for the first quarter of 2022, up from 94,454 cubic metres in the final quarter of 2021.

The port's authority has been at the forefront of efforts to boost LNG uptake and in the third quarter last year reported a record volume of LNG bunkered at the port, with 212,719 cubic metres handled.

In total, the port posted year-end LNG bunker volume of 603,690 cubic metres, setting a new record and highlighting the rapid speed of deployment of LNG-fuelled vessels in the North Sea region.

Crisis dampens growth

Despite this strong momentum however, the current gas crisis has resulted in LNG prices soaring and many dual-fuel vessel operators

are temporarily looking to other sources of fuel in order to keep costs down.

Oil cartel OPEC has highlighted the challenges that LNG shipping faces, noting that "the future of LNG in marine bunkers remains uncertain for the time being, as some have voiced doubts about its long-term sustainability, in view of CO2 emission reduction targets, and have called for the increasing use of renewable hydrogen or ammonia instead."

Despite this gainsaying from the oil industry, maritime experts predict the LNG bunkering sector will return to its previous growth trend in the medium term as markets normalize. US FOB Gulf Coast LNG cargo values have dropped in recent weeks as falling prices in destination markets have weighed on netbacks.



LNG vessels at the Port of Rotterdam

Fuel oil sales rise

The Port of Rotterdam reported that volumes of high sulphur fuel oil (HSFO) and ultra-low sulphur fuel oil (ULSFO) increased rapidly in the first quarter, rising by around 14% and 41% respectively. HSFO sales reached 706,491 tonnes while ULSFO hit 284,134 tonnes and marine gasoil (MGO) sales also surged with 329,456 tonnes handled in Q1.

The Port of Rotterdam remains one of the leading LNG import sites in Europe and as such its bunkering infrastructure is well supplied, with the port's Gate terminal offering a throughput capacity of 12 billion cubic meters per annum (bcma), with further plans to extend this to 16 bcma in future. Covering over 12,600 hectares, the port of Rotterdam is the largest port in Europe.



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FueLNG bunkers dredger Vox Arianne

Bunkering specialist FueLNG has carried out its first LNG transfer for a Trailing Suction Hopper Dredger, refuelling the *Vox Arianne* in Singapore.

Launched earlier this year, the *Vox Arianne* is owned and operated by Dutch maritime contracting company Royal Van Oord.

“Congratulations to the Van Oord team, and we wish the *Vox Arianne* crew a safe journey ahead,” a spokesperson for FueLNG said.

FueLNG is a joint venture between Keppel Offshore & Marine and Shell Eastern Petroleum.

FueLNG Bellina

The successful refuelling operation was carried out by the *FueLNG Bellina*, the first bunker vessel to operate in Singapore when it launched last year.

“This marks the first dredger bunkered by the *FueLNG Bellina* and extends our track record in providing safe and reliable ship-to-ship bunkering for a wide range of vessels,” FueLNG stated.

Since it entered commercial operation, the *FueLNG Bellina* has primarily conducted ship-to-ship LNG bunkering for tanker and container vessels docking at Singapore. Measuring 120 metres



Vox Arianne

in length, and with a beam of 20 metres, the *FueLNG Bellina* has capacity for 7,500 cubic metres.

Smart design

Designed by Keppel Marine and Deepwater Technology (KMDTech), the technology division of Singaporean conglomerate Keppel, the *FueLNG Bellina* utilises its unique MTD 7500U LNG design, featuring a barge-like extended flat surface to provide greater flexibility. It was also the world's first bunkering vessel with integrated Smart Notation digital services, enabling remote monitoring and real-time

support of vessel operations.

The *Vox Arianne* was recently delivered to Van Oord by Keppel Offshore & Marine and is the first dual-fuel dredger built in Singapore. It is the first of three identical dredgers that Keppel O&M is building for the company, all of which feature hopper capacity of 10,500 cubic metres.

Van Oord is a Dutch family-owned firm with over 150 years of experience in international marine contracting. The company specializes in dredging, land reclamation and construction of man-made islands.

NEWS NUDGES

UK's first LNG-fuelled ferry reaches Bilbao

The UK's first LNG-fuelled ferry has completed its maiden voyage to Bilbao, bunkering for the first time at the LNG refuelling station at the Spanish port.

The *Salamanca* is operated by Brittany Ferries and is the first LNG-powered vessel to join its fleet.

“LNG-powered ships like *Salamanca* are a clear statement of our commitment to the future and to fleet renewal,” Christophe Mathieu, CEO of Brittany Ferries, said. “*Salamanca* is capable of running on future fuels like e-methane or bio-methane if these become available in volume. Either has the potential to cut carbon footprint significantly, in addition to the cleaner air that LNG-power brings from day one.”

The *Salamanca* will make two voyages from Portsmouth to Bilbao per week as well as a weekly return voyage to Cherbourg in France.



FueLNG Bellina

Consortium explores POME for bioLNG bunkering in Indonesia

A consortium of energy firms has announced a joint study to explore the use of palm oil mill effluent (POME) for bioLNG bunkering in Indonesia.

The partnership includes Indonesian energy group Pertamina and Japanese developers Osaka Gas, JGC Holding and Inpex. The proposed feasibility study will investigate the emissions from POME and the potential for sequestration of methane and conversion to biofuel.

“Through this joint study initiative, the parties will [cooperate] on the research and development of technologies and solutions pertaining to the production of bio-methane from POME resources located in Sumatra and Kalimantan and supplying to consumers in Indonesia, including Java,” a spokesperson for JGC said.

Vast palm oil potential

Indonesia is the largest producer and exporter of palm oil in the world and the palm oil industry generates approximately 4.5 per cent of the country's GDP. Last

year, Indonesia produced around 46.2 million tonnes of Palm Oil and forecasts suggest this could rise to around 60 million tonnes per year by 2045.

POME is produced as a by-product in many palm oil processes and contains large quantities of organic material, making it ideal for use as a feedstock for bioLNG. The partners will investigate the scope to leverage carbon crediting mechanisms and bio-methane certification schemes to secure carbon neutral gas.

“The joint study will involve identifying bio-methane/bio-LNG and bunker fuel marketing opportunities, including bio-LNG export to Japan and/or other countries,” a spokesperson for the firm added.

Joint effort

Pertamina will contribute several facilities in Kalimantan and Sumatra

as well as access to raw materials while Daigas Group, the parent company of Osaka Gas, will bio-methane production technology, pipeline injection knowhow, and gas marketing experience.

“[Inpex] aims to work closely with its partners to build a business framework contributing to climate change response and ex-

plore opportunities to provide clean LNG bunkering solutions at the Bontang LNG Terminal in Bontang, Indonesia,” a spokesperson for the firm added.

JGC will contribute program management expertise to the consortium and build on its wide experience building gas processing facilities in Indonesia. ■



Palm Oil Mill Effluent

HAM commissions Montmarault LNG refuelling station

Fuel services firm Ham Group has opened a new LNG service station in the Allier department in central France.

The new Montmarault refuelling station is located near exit 11 of the A71 motorway, on the route connecting Orleans with Clermont-Ferrand, and the E62, connecting Limoges with Macon.

“HAM has installed in this im-

portant logistics hub a new concept of mobile unit called HAM EDUX Extended, easily transportable, developed by the HAM Criogénica R&D team and adapted to French legislation,” a spokesperson for HAM Group commented.



HAM station in Montmarault

Rapid refuelling

The new station was developed and installed by HAM subsidiary LNG France and features a single dispenser with two LNG hoses, allowing quick and safe refuelling.

The service station will accept the dedicated HAM Card, a payment card designed for companies and freelancers refuelling regularly at the firm's filling stations, as well as all debit or credit cards.

“The new LNG service station in Montmarault, France, is open 24 hours a day throughout the year and is remotely monitored to guarantee its perfect operation and to quickly resolve any incident,” HAM states.

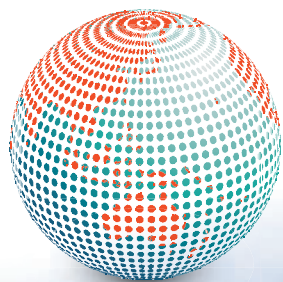
Expanding network

The addition of the Montmarault

service station, expands HAM's network of gas stations and strengthens the links for transport operators moving cargoes between Spain and central Europe.

“HAM continues to bet on Natural Gas for Vehicles (NGV), a sustainable and real alternative to other more polluting fuels, reducing emissions and respecting the environment,” a spokesperson for HAM said.

Registered in Barcelona, HAM Group currently operates refuelling stations across Europe and estimates that it has designed and built one out of every four LNG service stations that currently exist in the continent. The firm has undertaken more than 300 projects worldwide, with experience building LNG facilities for multiple sectors. ■



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Gothenburg issues methanol STS bunkering guidance

Authorities at the Port of Gothenburg have published the first guidance for ship-to-ship methanol bunkering at the port, as part of an ambition to accelerate the uptake of 'carbon neutral marine fuel'.

The port authority also announced plans to establish Gothenburg as the primary bunkering hub for renewable methanol in Northern Europe, building on existing LNG infrastructure. The next step in the port's plans to diversify clean fuel bunkering is a proposed methanol hub at the site, a move which was recently approved by the Swedish Transport Agency.

"From the Port of Gothenburg, we want to support this by enabling these vessels to take bunker at their convenience. Therefore, we are happy to share that we have received acceptance from the Swedish Transport Agency for the general methanol operating regulations for ship-to-ship bunkering. This work has been finalized after great support from Saeed Mohebbi from the Swedish Transport Agency," Christoffer Lillhage, Senior Business Development Manager Energy at the Gothenburg Port

Authority, commented.

Transition pathway

The Gothenburg Port Authority has long supported LNG as a pathway fuel to reduce emissions and has invested heavily in bunkering infrastructure to drive the transition to bioLNG. In 2019, the port opened its first bioLNG bunkering facilities, signing an agreement with agreement FordonsGas and Swedegas to ensure supply of the fuel.

Last year, the port opened a new route to the Port of Zeebrugge, served by a newbuild LNG vessel utilising bioLNG.

The Port of Gothenburg is the largest port in Scandinavia and handles around 30% of Swedish domestic and foreign trade and around 50% of all container traffic.

Methanol growth

The widespread availability of methanol globally and its relative ease of production have spurred



Methanol fuel line

many manufacturers to invest in development of methanol ready engines. Methanol is available for bunkering at over 88 of the world's top 100 ports and is one of the top five chemical commodities shipped globally.

"We hope to see Maersk, X-press Feeders and many other shipping lines routing their new methanol vessels to the North of Europe and we would be delighted

to welcome them with open arms to the largest port in Scandinavia," Elvir Dzanic, CEO of the Gothenburg Port Authority, said.

X-Press Feeders is currently the world's largest independent feeder carrier and has announced major investment in methanol as a shipping fuel, with plans to launch new vessels in 2023.

"As a technology solution provider, we follow the market demand and do not have any particular say in which future fuel is the most ideal in the short- and long-term future-fuel landscape," Hrishikesh Chatterjee of MAN Energy Solutions explains. "However, we see a very strong market pull towards Methanol as a future fuel and our well proven technology is an enabler for Methanol to be competing with LNG & other future fuels."



Port of Gothenburg

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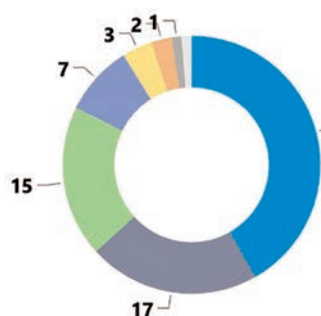
LNG BUNKER VESSELS

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
Gas Vitality	Marseille	In operation	2021	France	18600	MOL	V Ships
FlexFueler 001	Amsterdam	In operation	2019	Netherlands	1480	Titan LNG	Titan LNG
FlexFueler 002	Antwerp	In operation	2021	Belgium	1480	Titan LNG	Titan LNG
Titan Hyperion	TBD	Under discussion	2024	Netherlands	8000	Titan LNG	Titan LNG
Titan Krios	Zeebrugge	Under discussion	2024	Belgium	4200	Titan LNG	Titan LNG
PRO1	Houston	Undefined	Q42022	United States	7600	LNG PRO Bunkers	TBN (Probunkers group company)
PRO2	Hong Kong	Undefined	Q12023	Hong Kong	7600	LNG PRO Bunkers	TBN (Probunkers group company)
Coralius	Risavika	In operation	2017	Norway	5600	Sirius Veder Gas	Sirius Rederi
Coral Methane	Rotterdam	In operation	2018	Netherlands	7551	Anthony Veder	Shell
Crowley/Shell LNG bunker barge	U.S. East Coast	Decided	2024	United States	12000	Crowley Maritime Corporation	Shell
New Frontier 1	Rotterdam	In operation	2017	The Netherlands	6500		Shell Shell
Seaspan LNG bunker vessel	Vancouver	Decided	2024	Canada	7600	Seaspan Marine Transportation	Seaspan Marine
Seaspan LNG bunker vessel 2	Vancouver	Decided	2024	North America	7600	Seaspan Marine Transportation	Seaspan Marine
Seaspan LNG bunker vessel 3	Vancouver	Under discussion	2024	North America	7600	Seaspan Marine Transportation	Seaspan Marine
Petronas LNGBV		Under discussion	2024	Malaysia	13000	Petronas	Petronas
Peninsula/Enagas LNG bunker vessel	Port of Algeciras	Decided	2023	Gibraltar	12500	Peninsula/Enagas	Peninsula/Enagas
Hai Gang Wei Lai	Yangshan Port	In operation	2022	China	20000	Shanghai International Port	Pacific Gas
Green Zeebrugge	Zeebrugge	In operation	2017	Belgium	5200	NYK	NYK
Kairos	Lithuania	In operation	2018	Lithuania	7500	Bernhard Schulte	Nauticor
Naturgy LNG bunker vessel	Barcelona	Undefined	2022	Spain	6000	Naturgy	Naturgy
Gas Agility	Northern Europe	In operation	2020	Netherlands	18600	Mitsui OSK Lines Ltd	Mitsui OSK Lines Ltd
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	Scale Gas / Knutsen JV	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 8000 TBD		Under discussion	TBD	United States	8000	Q-LNG	Harvey Gulf International Marine
Dmitry Mendelev		In operation	2021	Europe	5800	Shturman Koshelev LLC	Gazpromneft Marine Bunker Ltd
FueLNG Bellina	Singapore	In operation	2020	Singapore	7500	FueLNG (JV Keppel and Shell)	FueLNG
Fratelli Cosulich Mediterranean Sea	Mediterranean Sea	Decided	2023	Italy	8000	Fratelli Cosulich	Fratelli Cosulich LNG
Fratelli Cosulich Mediterranean Sea 2	Mediterranean Sea	Decided	2024	Italy	8000	Fratelli Cosulich	Fratelli Cosulich LNG
Clean Jacksonville	Jacksonville Jax LNG	In operation	2018	United States	2200	TOTE	FOSS Maritime
Xinao Putuo Hao	Zhoushan	Decided	2022	China	8500	ENN Energy	ENN Energy
Optimus		In operation	2021	Europe	6000	Eesti Gaas	Elenger
Ecobunker Tokyo Bay	Yokohama	Decided	2022	Japan	2500	Ecobunker shipping	Ecobunker shipping
Kaguya (Central Japan)	Chubu region	In operation	2020	Japan	3500	CLS (JV established by K Line, JERA, NYK and 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 Achievement	Caribbean-US Region	Decided	Q2 2022	America	20000	Avenir LNG	
Avenir Advantage		In operation	2020	Malaysia	7500	Avenir LNG	

Vessel Name	Home Port	Project status	Delivery year	Country	LNG Tank Capacity	Owner	Operator
Avenir Ascension	Oristano, Sardinia	Decided	2022	Europe	7500	Avenir LNG	
Avenir Aspiration	Oristano, Sardinia	In operation	2021	Europe	7500	Avenir LNG	
Bergen LNG	Bergen	In operation	2021	Norway	850	Bergen Tankers	
Brassavola	Singapore	Decided	2022	Singapore	12000	Mitsui OSK Lines Ltd	
Bunker Breeze	Algeciras	In operation	2018	Spain	1200	Suardiaz Energy Shipping	
Clean Canaveral	Jacksonville, FL	In operation	2021	United States	5400	Polaris New Energy	
Coral Anthelia		In operation	2013	Jamaica	6500	Anthony Veder	
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	Undefined	2022	Greece	4000	DEPA	
DEPA Piraeus	Piraeus	Undefined	2022	Greece	4000	DEPA	
Domestic LNG Bunkering Vessel in China	To be decided (China)	Decided	2024	China	12000	CNOOC	
Domestic LNG Bunkering Vessel in China	To be decided (China)	Under discussion	2024	China	6000	CNOOC	
FlexFueler 003	Zeebrugge	Under discussion	TBD	Belgium	1480	Titan LNG	
FlexFueler 004	Lubeck	Under discussion	TBD	Germany	1480	Titan LNG	
FSU and Bunker Barge	Port of Coega / Algoa Bay	Under discussion	2023	South Africa	144994		
Woodside Western Australia LNG bunker vessel	Port of Coega	Under discussion	2023	South Africa	10000	DNG Energy	
K. Lotus	Rotterdam	In operation	2022	Europe	18000	Korea Line	
Kanfer Shipping LNG bunker vessel 1	Not yet decided	Under discussion	2024	--	6000	Kanfer Shipping	
Kanfer Shipping LNG bunker vessel 2	Not yet decided	Under discussion	2024	--	6000	Kanfer Shipping	
KEYS Bunkering West Japan LBV	Kyushu and Setouchi regions	Decided	2024	Japan	3500	KEYS Bunkering West Japan Co	
Korea Line/Shell LBV	Singapore	Decided	2023	Singapore	18000	Korea Line	
LNG bunker barge GALP		Under discussion	2024	Portugal		GALP	
LNG bunker vessel Swinoujscie	Swinoujscie	Under discussion	2025	Poland		Polskie LNG	
LNG London	Rotterdam	In operation	2019	Netherlands	2998	LNG Shipping (Victrol & Sogestran)	
Polaris ATB No. 2	Jacksonville, FL	Decided	2024	United States	5500	Polaris New Energy	
Poseidon Med II bunkering barge	Revithoussa	Under discussion	2024	Europe	4000	Venture led by DEPA	
Scale Gas Algeciras	Algeciras	Undefined	2023	--	12500	Scale Gas	
Shell LBV Gulf of Mexico	Gulf of Mexico	Decided	2023	United States	18000	Pan Ocean	
SM JEJU LNG1		In operation	2019	--	7500	Korea Line	
Small LNG bunkering vessel in South Korea		Decided	2023	South Korea	500	Ministry of Oceans and Fisheries	
Woodside Western Australia LNG bunker vessel	Dampier	Under discussion			2025	Australia	12000

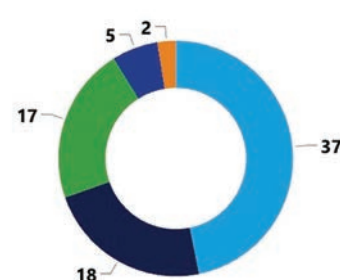
Bunker vessels by area of operation

- Europe
- Asia
- America
- Unknown
- Norway
- Africa
- Global
- Oceania



Bunker vessels by tank capacity

- 5,000m³ to 10,000m³
- 1,000m³ to 5,000m³
- >= 10,000m³
- <= 1,000m³
- Unknown



WORLD SMALL SCALE LNG FLEET*

Built	Name	CBM	Cargo Type	Trading area	Trading in LNG?	Ship Owner / Operator
1974	Seagas	187	LNG	Sweden	Yes	AGA
1988	Kayoh Maru	1,517	LNG	Japan	Yes	Daiichi
1993	Aman Bintulu	18,928	LNG	Malaysia - Japan	Yes	Perbadanan/NYK
1996	Surya Aki	19,475	LNG	Indonesia - Japan	Yes	MCGC
1997	Aman Sendai	18,928	LNG	Malaysia - Japan	Yes	Perbadanan/NYK
1998	Pelita Energy	18,800	LNG	Malaysia - Japan	Yes	Perbadanan/NYK
2000	Triputra	23,096	LNG	Indonesia - Japan	Yes	MCGC
2003	Pioneer Knutsen	1,100	LNG	Norway	Yes	Knutsen
2003	Shinju Maru No.1	2,540	LNG	Japan	Yes	Shinwa
2005	North Pioneer	2,500	LNG	Japan	Yes	Japan Liquid Gas
2007	Sun Arrows	19,531	LNG	Malaysia - Russia - Japan	Yes	Mitsui
2008	Kakurei Maru	2,536	LNG	Japan	Yes	Hogaki Zosen
2008	Shinju Maru No.2	2,540	LNG	Japan	Yes	Shinwa
2009	Coral Methane	7,551	LNG/LPG/Ethylene	Northwest Europe/Baltics	Yes, sometimes	Anthony Veder
2010	Coral Favia	10,000	LNG/LPG/Ethylene	Worldwide	No	Anthony Veder
2010	Coral Fraseri	10,000	LNG/LPG/Ethylene	Worldwide	No	Anthony Veder
2011	Coral Furcata	10,000	LNG/LPG/Ethylene	Worldwide	No	Anthony Veder
2011	Coral Fungia	10,000	LNG/LPG/Ethylene	Worldwide	No	Anthony Veder
2011	Akebono Maru	3,556	LNG	Japan	Yes	Chuo Kaiun
2011	Vision Spirit	12,000	LNG/LPG/Ethylene	Worldwide	No	Teekay
2011	Unikum Spirit	12,000	LNG/LPG/Ethylene	Worldwide	No	Teekay
2012	Coral Energy	15,600	LNG	Northwest Europe/Baltics	Yes	Anthony Veder
2013	Coral Anthelia	6,500	LNG/Ethylene			Anthony Veder
2013	JX Energy TBN	2,500	LNG	Japan	Yes	JX Energy
2013	Kakuyu Maru	2,500	LNG	Japan	Yes	Tsurumi Sunmarine
2015	JS Ineos Ingenuity	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2015	JS Ineos Insight	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2015	JS Ineos Intrepid	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2015	LNG Barge TBN	3,000	LNG	US Coast	Yes	LNG America
2015	PetroChina TBN	30,000	LNG	China		PetroChina
2016	Hai Yang Shi You 301	30,000	LNG	Bali FSU	Yes	CETS (CNOOC)
2016	Clean Jacksonville	2,200	LNG	US Coast	Yes	CME
2016	JS Ineos Indepence	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2016	JS Ineos Innvovation	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2016	JS Ineos Inspiration	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2016	LNG Prime	2,250	LNG	Northwest Europe	Yes	Veka Deen LNG
2017	Coralius	5,800	LNG	Northwest Europe/Baltics	Yes, for Skangas	Anthony Veder
2017	Coral EnergiCE	18,000	LNG	Northwest Europe/Baltics	Yes	Anthony Veder
2017	Coral Encanto	30,000	LNG	China	Yes	Anthony Veder
2017	JS Ineos Invention	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2017	JS Ineos Intuition	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2017	Oizmendi	600	LNG	Spain	Yes	Itsas Gas
2017	LNG-Gorskaya TBN	7,300	LNG	Russia	Yes	LNG-Gorskaya
2017	LNG-Gorskaya TBN	7,300	LNG	Russia	Yes	LNG-Gorskaya
2017	LNG-Gorskaya TBN	7,300	LNG	Russia	Yes	LNG-Gorskaya
2017	Green Zeebrugge	5,000	LNG	Northwest Europe	Yes	NYK
2017	New Frontier 1	6,500	LNG	Northwest Europe	Yes	Shell
2018	Kairos	7,500	LNG	Baltic	Yes	Bernhard Schulte
2018	LNG London	3,000	LNG	Northwest Europe	Yes	Shell

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