

LNG Fuelling

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Sohar Port and Freezone joins SEA\LNG

Sohar Port and Freezone in Oman has announced plans to develop major new LNG infrastructure as it joins cross-sector coalition SEA\LNG.

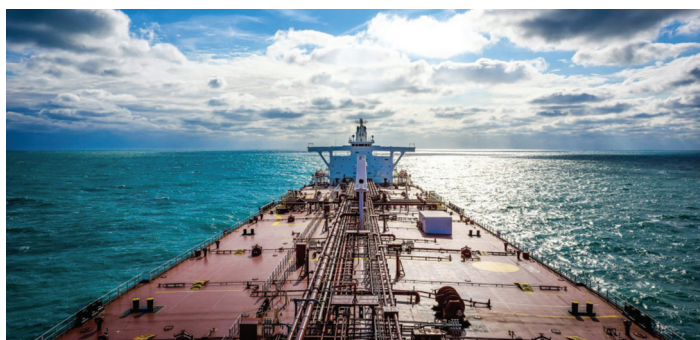
Sohar is the first Middle Eastern port member of the consortium and is expected to drive significant uptake of the fuel through its close links with regional shipping.

"We are excited to welcome SOHAR to the SEA-LNG coalition... From our perspective, this is an opportune time to develop LNG capabilities in Oman given the expansive growth of marine activity within the region. We welcome SOHAR to our cause of furthering the use of LNG as an important, environmentally superior maritime fuel," Peter Keller, Chairman of SEA-LNG, said.

LNG bunkering hub

Central to the port authorities plans for LNG will be the construction of major new LNG bunkering facilities, designed to position the port as a vital LNG bunkering hub in the Middle East.

"This major LNG Bunkering project will generate in-country value and job opportunities, and will support industry diversification efforts by promoting shipping



Sohar will offer LNG bunkering facilities for all shipping

activities in Oman. The establishment of this facility will make SOHAR one of the key LNG bunkering facilities on the main shipping trade routes, alongside other strategic ports, many of whom are already SEA-LNG Members, such as the Port of Singapore. MARSALNG will supply LNG sourced locally in the Sultanate," Mark Geilenkirchen, CEO of SOHAR Port, said.

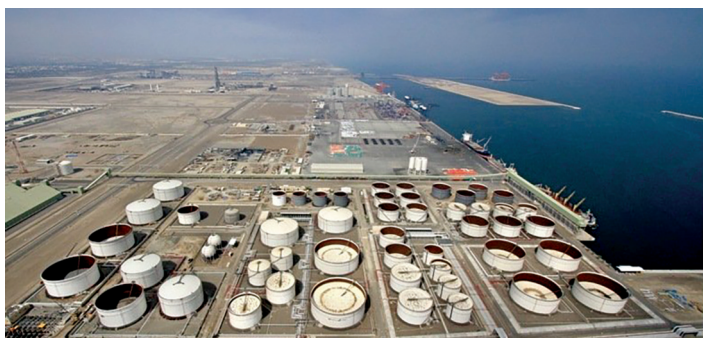
Located outside the Strait of Hormuz and mid-way between Europe and Asia, Sohar's LNG efforts will be supported by Oman's large domestic gas reserves. The port features deep-water drafts capable of handling the largest vessels in the world and access to a dedicated logistics chain.

Clear pathway

The new investment will allow all shipping lines calling at SOHAR Port to bunker with LNG, driving a switch from traditional marine fuel oils.

"As well as providing a means to comply with recently enforced sulphur limitations, LNG provides a clear pathway for the shipping industry to decarbonise through the introduction of biomethane and synthetic methane. Now is the time to move forward with LNG as an important maritime fuel. Inaction is not a plan and we cannot afford to wait decades for solutions that may never be realised. Investing in LNG capable vessels now provides the shipping industry with a pathway to a low carbon future as well as significant and immediate environmental and health benefits," Keller notes.

SEA-LNG's members include: ABS, Carnival Corporation, Chart Industries, Clean Marine Energy, DNV GL, Eagle LNG Partners, Fearnleys, FortisBC, Gasum, GE, GTT, JAX LNG, Keppel Gas Technology, "K" LINE Group, Lloyd's Register, MAN Energy Solutions, Maritime and Port Authority of Singapore, Marubeni Corporation, Mitsubishi Corporation, NYK Line, Port of Long Beach, Port of Rotterdam, Port of Virginia, Qatargas, Shell, Société Générale, Sohar Port & Freezone, Stabilis Energy, Sumitomo Corporation, Total, TOTE, Toyota Tsusho, Uyeno Group of Companies, Vancouver Fraser Port Authority, Wärtsilä, and Yokohama-Kawasaki International Port Corporation.



Sohar Port

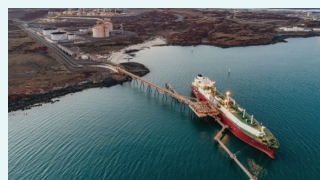
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Gasum, Samskip sign LNG bunkering agreement

Finnish gas specialist Gasum has partnered with Rotterdam-based shipping group Samskip to bunker LNG in Risavika, Norway.

The agreement covers Samskip's two single-fuel LNG vessels *Samskip Kvitbjorn* and *Samskip Kvitnos*.

"Bunkering LNG in Risavika is a great asset to us and vastly improves our bunker network. We are looking forward to developing our relationship to gain further

benefits from Gasum's products and services", Kari-Pekka Laaksonen, CEO of Samskip, said.

Rotterdam – Hammerfest

The vessel will be bunkered at Gasum's LNG-plant, located 200 meters from the quayside, sup-

porting Samskip's door-to-door logistics operations.

Both vessels provide liner shipping between Rotterdam and Norway, with extended transport as far as Hammerfest, Europe's northernmost town.

"Partnership with Samskip is great news for us! We are proud to be part of the bigger change in shipping industry and to have these performant vessels taking LNG just outside Gasum office windows. I'm also happy that loading in Norway confirms our competitiveness in the North European LNG environment," Jacob Granqvist, Sales Director for Maritime at Gasum said.

SSAB Raahe biogas trial

Headquartered in Espoo, Finland, Gasum provides integrated gas services across the Nordic region and northern Europe. The firm is also the transmission system operator of the natural gas grid of Finland, a natural gas importer and seller and biogas refiner in Finland and Sweden.

Gasum also recently announced a separate partnership with steel producer SSAB Raahe to test biogas as a maritime transport fuel.

The test will be carried out in collaboration with ESL Shipping and will compliment LNG use with liquefied biogas at the firm's facilities.



The *Samskip Kvitbjorn*

Nordic consortium launches liquefied biogas trial

A joint venture of transport and gas specialists has launched a two-month trial to use liquefied biogas (LBG) for truck transportation between Denmark and Sweden.

The consortium consists of Finnish gas network Gasum, global truck manufacturer Volvo Trucks and GDL a transport provider for Norwegian consumer goods conglomerate Orkla. The partners will trial the use of LBG for journeys between Orkla's warehouse facility in Helsingborg, Denmark, and Fågelmara, Blekinge, Sweden.

"The test period is both a way for us to increase our knowledge of gas as a vehicle fuel both internally and at our transporters and together create change to reduce emissions in the transport sector. "We want to influence our carriers to make more sustainable choices and we see that we must do this together. For this to work, it is necessary that the hauliers change car and we, as transport buyers, choose alternative fuels, and that there are gas stations available,"

Emelie Zakrisson, category manager of Energy at Orkla, said.

Environmental benefits

The trial began at the beginning of June and will be analysed for its environmental and economic impacts ahead of further planned roll-out of the fuel.

"For GDL, this test period is an exciting continuation of the transition to fossil-free alternatives. We are expanding our fleet of gas cars and gain even more miles of experience in the pros and cons of the various technology choices available today," Anders Wendelius, business area manager at GDL, commented.

Network expansion

Gasum also announced the expansion of its filling station network this summer with the opening of four



Volvo biogas truck

new stations across the Nordics.

"Despite the challenging conditions during the coronavirus pandemic, Gasum is still expanding the filling station network. The demand for alternative fuels has grown at an incredible rate as companies pursue more environment-friendly and cost-effective transport solutions," states Mikael Antonsson,

Director, Traffic, Gasum Sweden.

The company currently operates 22 filling stations in the Nordics, with 13 in Sweden, serving long-haul transport with low emission LNG and renewable LBG. Additional stations are now set to open in Ljungby, Helsingborg and Gothenburg in Sweden, and Lieto in Finland.

LNG Fuelling

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Western Australia plans Pilbara LNG hub

Authorities in Western Australia have launched an initiative to create an international LNG fuelling hub in the Pilbara region.

The Western Australia government is leading a push to establish the hub with a primary focus on refuelling infrastructure for bulk vessels in the Pilbara.

"The Pilbara is already globally renowned as an LNG production powerhouse, and my Government is taking steps to turn the Pilbara into an international LNG fuelling hub," Mark McGowan, Premier of Western Australia commented.

LNG Bunkering discount

The McGowan Government has called for the establishment of the Pilbara LNG Bunkering Hub to capitalise on growing shipping traffic around the Burrup Peninsula.

"Major resources companies have already tendered for LNG-fuelled bulk vessels to carry iron ore from the Pilbara, and are beginning negotiations about where to bunker those ships. We've moved quickly to capitalise

on this opportunity before our competitors in South East Asia claim the mantle," Ports Minister Alannah MacTiernan said.

To boost development, the government will offer a 50% discount on port dues to bulk vessels bunkering with LNG at Pilbara ports, effective July 1, 2020. The discount scheme is estimated to be worth as much as US\$5.3 million by 2025.

The initiative aims to reduce carbon emissions by up to six million tonnes per annum by displacing heavy fuel oil with LNG for export vessels carrying iron ore shipped from the Pilbara.

Hydrogen infrastructure

The proposed hub is also expected to spur development of renewable hydrogen infrastructure, with government plans to create a new hydrogen-based industry in the Pilbara.



LNG vessel

"The McGowan Government is ...driving opportunities in green hydrogen in the Pilbara through the WA Renewable Hydrogen Strategy, creating future opportunities for carbon-free fuel in the region," a government spokesperson said.

The new hub is expected to create up to 125 local jobs, including skilled mariners and support administration, supporting

global efforts to reduce carbon emissions.

"Importantly, a Pilbara LNG Bunkering Hub provides the platform for Western Australia to become the region's major renewable hydrogen producer and fuelling stop - driving down carbon emissions from shipping and creating a whole new industry for the Pilbara," the ministry states. ■



LNG vessel near Karratha, Western Australia

Samsung Heavy to build two LNG-fuelled VLCC

Shipbuilder Samsung Heavy Industries has secured a deal to fabricate two LNG-fuelled Very Large Crude Carriers (VLCC), valued at more than US\$209 million.

The giant tankers will both be equipped with the S-Fugas LNG fuelling system, independently developed by SHI.

"We see increasing demand for LNG-fuelled VLCCs on top of that for S-max and A-max tankers powered by LNG. SHI aims to take more opportunities to come as we have predominated the market with the advancement of technologies," a spokesperson for Samsung Heavy Industries said.

Delivery in 2022

The vessels are designed to comply with IMO 2020 regulations that impose sulphur limits on emissions and will reduce the emission of SOx by 99%, NOx by 85% and carbon dioxide by 25% compared to diesel fuel.

"To pre-emptively respond to rising demand for cleaner ships in the wake of IMO 2020, SHI has developed a competitive edge in



Geoje shipyard

LNG-fuelled vessels, adopting LNG fuel tanks and engines in different forms and materials as ME-GI and X-DF since 2012," Samsung Heavy Industries states.

Both ships are scheduled for delivery in April 2022 and will be constructed at Samsung Heavy Industries shipyard in South Korea.

SVESSEL smart ship

Alongside emissions reduction, the new vessel will also feature energy saving device technology to enhance fuel efficiency by improving rotational energy efficiency of propellers during operation as well as Samsung Heavy Industries' SVESSEL smart ship

solution.

Samsung Heavy Industries' shipyard in Geoje is one of the largest in the world, comprising three dry docks and five floating docks. The firm is ranked as one of South Korea's "Big Three" shipbuilders and one of the largest shipbuilders in the world. ■

Kawasaki launches Japan's first LNG bunker vessel

Engineering firm Kawasaki Heavy Industries has launched the first LNG bunkering vessel in Japan, signalling a push to switch marine transport to LNG in the country.

The vessel will be based at Kawagoe Thermal Power Station operated by JERA, the largest power generation company in Japan, and is expected to enter service in September. The vessel will be owned and managed by joint venture developer Central LNG Shipping Japan Corporation.

"Japan's first LNG bunker vessel was successfully launched at the Sakaide Works of Kawasaki Heavy Industries," a spokesperson for Central LNG Shipping said.

3,500m³ Capacity

The 4,100-gross-ton bunker vessel will feature LNG cargo capacity

of 3,500 cubic metres and measures over 81 metres in length and 18 metres in width. It will operate ship-to-ship bunkering for LNG-fuelled vessels in Mie Prefecture as authorities focus on developing the Chubu region into an LNG hub.

"Central LNG Shipping and the Central LNG Marine Fuel Corporation will continue our efforts to establish an LNG fuel supply network in the Chubu region and contribute to the environment by promoting the conversion of ship fuel to LNG," Central LNG Shipping stated.

Central LNG was established in 2018 to promote the LNG bunkering business and includes investment from Kawasaki Kisen Kaisha, JERA Corporation, Toyota Tsusho Corporation, and Nippon Yusen Kabushiki Kaisha.

Important alternative

The order for the new LNG bunker vessel is the first output from the Central LNG but competition in the sector is heating up as Japan's largest companies invest in commercialization of LNG as a transport fuel.

Fellow Japanese shipping firm Mitsui O.S.K. Lines (MOL) has been one such major pushing LNG fuel and announced a deal with Kanagawa Dockyard to construct the first LNG-fuelled tugboat to operate in Osaka Bay, Japan as part of ongoing research to establish LNG as a fuel of choice in the country.

"LNG is expected to become an important alternative to heavy fuel oil due to its low emission rate of air polluting substances and greenhouse gases," Central LNG said. ■



LNG vessel Sakaide

Guangdong signs inland shipping LNG initiative

Authorities in the Guangdong province of China have signed an agreement to develop new LNG infrastructure and lead major retrofitting of vessels across the region.

The local government agreed terms with China State Shipbuilding Corporation (CSSC) and China National Offshore Oil Co (CNOOC) for the project, designed to transform inland shipping in the province.

“The implementation of this project is of great significance to promote the prevention and control of air pollution, fully reflects the strength of China Shipbuilding Group in green power technology innovation,” a spokesperson for CSSC said.

The agreement was signed by Qin Weizhong vice governor of Guangdong Province, Sun Wei, deputy general manager of China Shipping Group, and Wen Dongfen, chief accountant of CNOOC.

19 LNG bunkering stations

Under the terms of the agreement, the partners aim to construct 19 LNG bunkering stations and retrofit around 1,500 ships to run on LNG by 2025.

“The cooperation mode will jointly promote the LNG power



Signing ceremony for Guangdong Inland Ship LNG Power Transformation Project

transformation of inland ships in Guangdong Province, create demonstrations of pollution control projects for inland ships, create a green Pearl River, and achieve a win-win ecological and economic situation,” CSSC said in a statement.

Emissions reduction

Once complete the new infrastructure is expected to meet annual demand for marine LNG of about 400,000 tonnes and replace and

exceed current oil demand of about 390,000 tonnes.

Guangdong Province estimates that emissions of nitrogen oxides and particulate matter from ships will be reduced by 12.6% and 19.5%, respectively.

Guangdong province is home to some of the world’s busiest shipping lanes, with the port of Shenzhen, in southern part of the Pearl River, ranked as one of the busiest and fastest growing ports in the world. ■

NEWS NUDGES

SEA / LNG calls for review of Green Bond certification

Industry consortium SEA / LNG has called on the Climate Bond Initiative to review criteria for its proposed Green Bond certification of Low Carbon Shipping to accommodate greater financing for LNG-fuelled vessels.

The consortium notes that proposals lean “towards being technology prescriptive” rather than goal oriented, noting that “immature and emerging technologies such as ammonia and hydrogen, that will require significant research and development investment over many years if they are to scale safely in the deep-sea maritime environment, appear to be favoured”.

A recent study commissioned by SEA-LNG from CE Delft concludes that LNG-fuelled ships, with little or no modifications, can realise significant GHG savings through the use of liquid biomethane (LBM) and liquid synthetic methane (LSM), with estimated sustainable global supplies potentially exceeding the demands of shipping in the future.

“LNG through the gradual introduction of LBM/LSM offers a realistic pathway for reducing shipping’s GHG emissions and we believe it should be recognized accordingly. Today, LNG is operationally effective, safe, scalable to meet shipping’s needs, and improves global air quality... Specifying green investment criteria that favour specific technology pathways risks forcing the shipping industry into non-optimal solutions from environmental, operational, and commercial perspectives and must be avoided,” SEA / LNG said in an open letter to the industry. ■



Representatives of Guangdong government



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FueLNG launches Singapore's first LNG bunkering vessel

Bunkering joint venture FueLNG has launched Singapore's first LNG bunkering vessel at Keppel Nantong Shipyard.

The new vessel features capacity of 7,500 cubic metres and will be the first vessel to provide regular ship-to-ship LNG bunkering services within Singapore port.

"There is a growing number of LNG-fuelled vessels in the world and FueLNG is well-positioned to seize LNG bunkering opportunities in Singapore," Saunak Rai, General Manager of FueLNG, said

MTD 7500U LNG design

The launch is one of several initiatives supported by the Maritime and Port Authority of Singapore (MPA) designed to transform the island state into a global LNG bunkering hub.

Capable of running on both LNG and marine diesel oil, the new bunker vessel is based on the proprietary MTD 7500U LNG design developed by Keppel O&M's technology arm, Keppel Marine and

Deepwater Technology (KMDTech).

The design allows bunkering without tug assistance, and additionally offers propulsion and power management systems that optimise fuel consumption while delivering compatibility with a wide range of vessels.

Following launch at Keppel Nantong Shipyard in China the vessel will be deployed in Singapore, offering a filling rate range of up to 1000 cubic metres of LNG per hour and ability to refuel vessels at heights up to 23 metres above water level.

200 successful operations

A joint venture between Keppel Offshore & Marine and Shell Eastern Petroleum, FueLNG recently announced that it had completed more than 200 truck-to-ship bunkering operations with



Port of Singapore

no incidents.

"Building Singapore's first LNG bunkering vessel demonstrates FueLNG's confidence in LNG as a marine fuel. The vessel will enhance our range of services and boost our efforts to further increase the availability of LNG

in the market," Rai commented.

The firm predicts that expansion of LNG bunkering infrastructure will extend opportunities in adjacent sectors, such as ship design, construction, operation and repair, as well as boosting demand for LNG trading in Singapore. ■



FueLNG bunker vessel

Pavilion, SLNG sign first mid-term LNG agreement

Singapore LNG Corporation (SLNG) has signed an agreement with Pavilion Energy to deliver LNG storage and reload services on Jurong Island, Singapore.

The five-year agreement provides Pavilion Energy access to tank capacity of 180,000 cubic metres and is the first such agreement signed for a term longer than two years.

“SLNG is happy to extend our cooperation with Pavilion Energy through this longer term Storage and Reload Services agreement. SLNG has taken bold steps to de-

velop infrastructure and create new service offerings to meet the needs of the industry, and we will continue to do so,” Tan Soo Koong, CEO of SLNG said.

to support enhanced LNG breakbulk and vessel cool-down services as well as driving a higher volume of LNG trading activities.

“The contract’s longer tenure allows Pavilion Energy greater flexibility in managing its LNG portfolio, market fluctuations and demand dynamics,” SLNG stated.

Enhanced LNG breakbulk

The Singapore Government has long backed a strategy to develop the island as a regional LNG bunkering and gas trading hub and has steadily invested in LNG infrastructure at Jurong Port over the last five years.

“We are primed to play our part in helping Singapore achieve its ambition of becoming an LNG hub, through catalysing LNG-related businesses such as LNG Trading, Small-Scale LNG Distribution, LNG Bunkering, and more,” Koong added.

The LNG capacity is expected

Key contributor

SLNG estimates that Singapore ranked second worldwide in terms of LNG re-export volumes, and notes that Pavilion Energy has been ‘one of the key contributors’ to the total volume re-exported out of Singapore.

Pavilion Energy is owned by Singapore sovereign wealth fund Temasek and manages a portfolio of energy assets with primary focus on LNG.



LNG storage will support increased bunkering in Singapore

BayWa, Volkswagen launch Wolfsburg LNG station

Renewable developer BayWa Energy has partnered with Volkswagen Group to launch a new LNG filling station for trucks in Wolfsburg, Germany.

The new station was developed in partnership Volkswagen’s logistic division and is located close to the group’s world headquarters in Lower Saxony.

“For Volkswagen Group’s logistics, the extensive availability of LNG stations is an essential prerequisite to further reduce CO2 emissions in road freight transport in the future. The opening of such a filling station at the headquarters of Volkswagen AG is a forward-looking sign and also sends out a signal for our transport service providers,” commented Thomas Zernechel, Head of Volkswagen Group Logistics.

The Wolfsburg station is situated on the Heinekamp industrial estate, serving traffic from the nearby A39, and connections to the A2 motorway.

Expanding portfolio

The facility will be operated by BayWa Mobility Solutions and is

the first of a series planned for launch in Germany this year, with similar LNG stations set to launch in Munich, Nuremberg and Nördlingen in mid-2020.

“We want to develop our service station business in a future-oriented way and expand our portfolio with low-emission fuel alternatives such as LNG. The new station in Wolfsburg marks the start of our LNG activities,” Matthias Taft, board member responsible for energy at BayWa AG, Munich.

The facility comprises two LNG dispensers and BayWa is now considering measures to introduce BioLNG and renewable hydrogen mixes.

Modernized fleet

Headquartered in Munich, BayWa operates in 14 countries and specialises in trading, logistics and services within the agriculture, energy and building materials

market.

Alongside its partnerships with logistics firms such as Volkswagen, BayWa is also realigning its own logistics operations and extensive fleet of vehicles, with the introduction of gas-powered vehicles supporting its roll-out of LNG stations.

“BayWa continues to modernise its fleet by introducing electric vehicles and using alternative fuels. ... To reduce environmental impacts from its own vehicles and logistics processes, BayWa is implementing a range of activities and measures,” the firm said in a statement.



BayWa LNG station

Stena Bulk announces LNG-ready IMOFlexMAX

Shipping line Stena Bulk has unveiled plans for a prototype product and chemical tanker, capable of running on LNG and reducing greenhouse gas emissions by more than 25%.

The IMOFlexMAX is equipped with dual-fuel engines, supporting LNG as well as conventional low-sulphur fuels and is also equipped with Flettner rotors and solar panels to harvest energy from wind and sunlight.

“The world’s need for reliable, innovative and sustainable transportation of liquid products is increasing and it will continue to do so as the world’s population grows and global living standards continue to improve,” Erik Hånell, CEO at Stena Bulk, commented.

Stena Teknik design

The next-generation vessel was designed by naval architects at sister company Stena Teknik and is based on 40 years of tanker ship-ping experience.

“The prototype is one step further in Stena Bulk’s vision of being our customers’ first choice for safety, innovation and performance in the transportation of oil, chemicals and gas,” Hånell said.

The IMOFlexMAX will be deployed alongside the firm’s current IMOIIIMAX design and is expected to reduce greenhouse



IMOFlexMAX

gases by up to 45% compared with modern product tankers run on low-sulfur fuel oil.

Medium Range segment

The vessel is the latest in an expanding portfolio of asset classes fuelled by LNG and is expected to increase usage of the fuel in the

“The IMOFlexMAX vessels will constitute an important asset for Stena Bulk, as well as for its part-

ners, in strengthening our position as the market-leading, cross-trading specialists in the Medium Range segment with increased efficiency and reduction of greenhouse gases,” Hånell added.

Stena Bulk is part of shipping group Stena, one of the largest family-owned companies in Sweden. The firm currently controls a combined fleet of around 115 tankers.



IMOFlexMAX

NEWS NUDGES

European LNG stations pumping biogas

More than 25% of CNG and LNG fuelling stations in Europe are now delivering biomethane, according to analysis of 4,120 stations by the Natural & Bio Gas Vehicle Association (NGVA).

“It is key to understand and acknowledge that a vehicle that is fuelled with renewable gas, is effectively climate neutral. Europe’s renewable gas production capacity is proven and sustainability criteria in place are fully respected. Today, it is the best solution to boost the decarbonization process of the transport sector leveraging on a real circular economy,” Andrea Gerini NGVA Europe Secretary General, said.

The figures show that an average of 17% all gas delivered is now biomethane with bioLNG becoming a “growing reality” as a cost-effective transition towards “carbon neutral mobility”.

“While continuously increasing the rate of renewable gas in our network, there is future potential also in improving the efficiency of natural gas engines. This will progress hand in hand,” Gerini stated.

Dunkerque LNG launches truck fuelling

Terminal operator Dunkerque LNG is introducing truck fuelling at its sites with a new service reportedly offering 3,000 slots per year.

The firm is majority-owned by a consortium of gas infrastructure group Fluxys, AXA Investment owns and operates Dunkirk LNG terminal in the north of France.

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PPA issues first LNG bunkering licences

The Pilbara Ports Authority (PPA) in Western Australia has signed the country's first ship-to-ship LNG bunkering services licenses with engineering firm Woodside Energy.

The PPA executed non-exclusive licences with Woodside Energy for the provision of ship-to-ship (STS) LNG bunkering services at the ports of Dampier and Port Hedland.

"In addition to Woodside's

ship-to-ship licences, a truck-to-ship LNG bunkering licence was issued to Evol LNG in early 2017. Western Australia is well-placed to become an LNG bunkering hub, with LNG production facilities close to large iron ore mining

operations and the many hundreds of ocean-going vessels that use ports in the Pilbara region," Lyle Banks, General Manager Development & Trade at PPA, said.

Key step

Reinhardt Matisons, Woodside Executive Vice President Marketing for Trading and Shipping, called the move "a key step in developing an LNG fuels industry" in Western Australia.

"Woodside is finalising plans for an LNG bunkering operation in the Pilbara to capture the significant environmental and economic benefits of using LNG, instead of fuel oil, for the busy iron ore shipping trade," Matisons commented.

Formed in 2014, the PPA operates as a Western Australian Government Trading Enterprise, and manages the former port authori-

ties of Dampier and Port Hedland.

LNG MFI support

The LNG Marine Fuel Institute praised the award of the licences, citing the "strong business case" for LNG in the region and stating that it sent "a clear signal" that Australia was acting to meet greenhouse gas emission targets set by the International Maritime Organisation.

"We've strongly advocated with our members, including the Pilbara Port Authority, for these changes which we believe are good for the state and the country... alternative fuels need to play a significant role in the shipping industry achieving the IMO 2050 50 per cent net emission target. LNG will be a large part of the marine fuel mix beyond 2050," Margot Matthews, CEO of LNG MFI, said. ■



Pilbara Ports Authority awarded licenses

MPA issues new bunker licenses

The Maritime & Port Authority of Singapore (MPA) has issued two new bunker supplier licenses, including provisions for dual-fuelled bunker barges

The authority granted Minerva Bunkering and TFG Marine the operating licences to meet rising demand for refuelling services, following a tender process launched in December last year.

"Minerva Bunkering and TFG Marine will also be required to each operate at least two clean energy dual-fuelled bunker barges. This will help drive more sustainable bunkering activities in the Port of Singapore," the MPA and Enterprise Singapore said in a joint statement.

LNG trading

The new bunker licenses are expected to support Singapore's ambition to become the *de facto* regional hub for LNG trading and bunkering, driving competition in the sector.

"It brings the total number of MPA-licensed bunker suppliers to

45 in the Port of Singapore... These two companies complement ESG's effort in the bunker fuel trading sector comprising more than 70 players," a spokesperson for Enterprise Singapore said.

Minerva Bunkering is owned by Mercuria Group while TFG Marine is owned by Trafigura, two of the world's largest independent energy trading companies.

Robust regulatory framework

Alongside the introduction of new licences, the MPA is also continuing work with industry stakeholders to establish a robust regulatory framework for bunkering operations on the island.

As part of this work it will carry out periodic

reviews to ensure the quality and availability of bunker in the Port of Singapore.

"Singapore continues to undergo a successful IMO 2020 transition to serve the needs of the industry during COVID-19 whilst maintaining its position as the global bunkering hub," a

spokesperson for Enterprise Singapore said.

The MPA is a statutory board under the Ministry of Transport of the Government of Singapore, responsible for regulating and managing port and marine services, facilities and activities within the Singapore waters. ■



LNG bunker vessel

First LNG bunkering for record semi-submersible

Nordic energy group Gasum has completed the first LNG bunkering operations for the vessel *Sleipnir*, the largest semi-submersible crane vessel in the world.

Refuelling operations were carried out in Åmøyfjorden in the south-west of Norway and will support ongoing operations by *Sleipnir* on the Norwegian Continental Shelf during the following months.

"The bunkering operation was swift and efficient, saving valuable time and allowing *Sleipnir* to start her work quickly. We are extremely proud of our well-equipped bunker fleet," Jacob Granqvist, Sales Director for Maritime at Gasum, commented.

Ekofisk platform

The giant lifting vessel, with lifting capacity of 20,000 tonnes, is owned and operated by Dutch maritime contractor Heerema and is part of a group-wide strategy to switch away from traditional fuel oil.

"Maritime traffic generates 3 percent of the world's total greenhouse gas emissions. To lower these emissions, we need to reduce the use of conventional fuels, such as heavy fuel oil, in



Sleipnir



Heerema's *Sleipnir*

maritime transport. LNG provides an excellent alternative, and we are happy to see that vessels such as *Sleipnir* use it as fuel," Granqvist adds.

The *Sleipnir* is currently employed in decommissioning work at the Ekofisk platform further boosting the environmental benefits as it removed the retired oil platform.

Flexible fleet

Future bunkering operations will be supported by Gasum's flexible fleet of five LNG supply vessels, all of which can be used for LNG bunker-

ing operations, and form part of Gasum's strategy "to build a low-carbon future" on land and at sea.

"It is now possible to offer a large degree of flexibility to our customers. The bunkering of Heerema's *Sleipnir* is a good example. Our bunker vessel Kairos was the only vessel able to bunker *Sleipnir* in her current state. To reach the fuel tank we needed to lift the bunker hose more than 28 meters above sea level," Granqvist added.

Gasum's fleet comprises the *Coralius*, *Kairos*, *Coral Energy*, *Coral EnergyICE* and *Seagas*.

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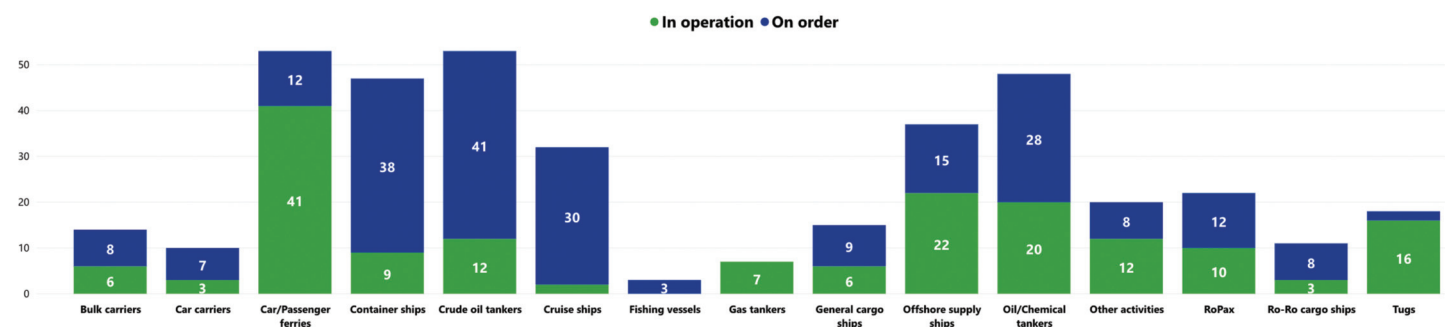
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LNG BUNKER VESSELS

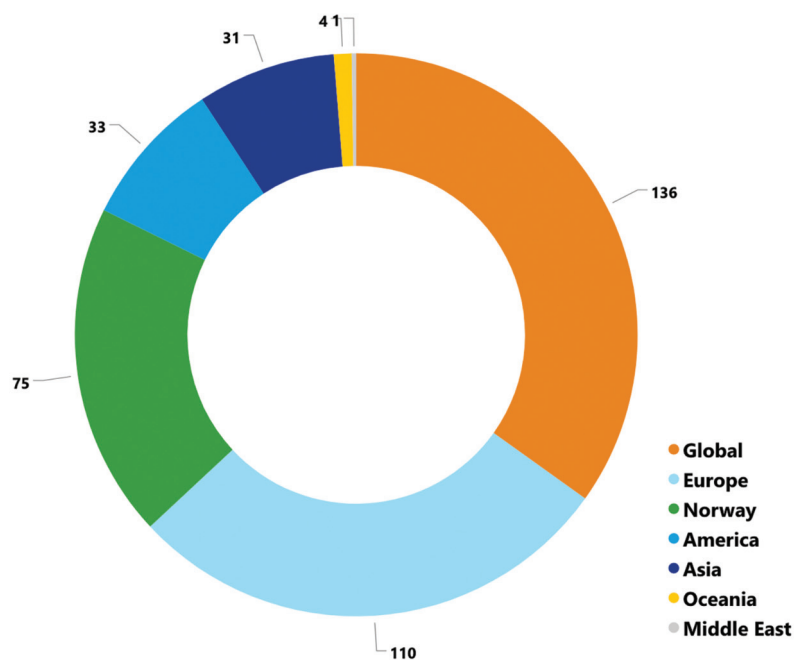
Vessel Name	Home Port	Delivery year	Country	LNG Tank Capacity	Owner	Operator
Yidu inland river LNG bunker barge	Yidu port	2014	China	500	Xilan Natural Gas Group	Xilan Natural Gas Group
Seagas	Stockholm (Loudden)	2013	Sweden	187	Gasum	AGA
Cardissa	Rotterdam	2017	The Netherlands	6500	Shell	Shell
Coralius	Risavika	2017	Norway	5600	Sirius Veder Gas	Sirius Rederi
ENGIE Zeebrugge	Zeebrugge	2017	Belgium	5100	Engie, NYK Line, Mitsubishi Corporation and Fluxys	NYK
Bunker Breeze	Algeciras	2018	Spain	1200	Suardiaz Energy Shipping	
Clean Jacksonville	Jacksonville Jax LNG	2018	United States	2200	TOTE	FOSS Maritime
Coral Methane	Rotterdam	2018	Netherlands	7551	Anthony Veder	Shell
Kairos	Lithuania	2018	Lithuania	7500	Babcock Schulte Energy	Nauticor
Oizmendi	Huelva	2018	Spain	600	Cepsa	Cepsa
Coral Fraseri	Unknown	2019	Global	10000	Anthony Veder	
FlexFueler 001	Amsterdam	2019	Netherlands	1480	Titan LNG	Titan LNG
LNG London	Rotterdam	2019	Netherlands	2998	LNG Shipping (Victrol & Sogestran)	
Avenir bunker vessel 1	Oristano, Sardinia	2020	Europe	7500	Avenir LNG	
Avenir bunker vessel 2/ Petronas		2020	Malaysia	7500	Avenir LNG	
CLS LNG bunker vessel	Chubu region (Central Japan)	2020	Japan	3500	CLS joint venture	CLMF, a jv established by Kawasaki Kise
ENN LNG bunker vessel	Zhoushan	2020	China	8500	ENN Energy	ENN Energy
Gas Agility	Northern Europe	2020	The Netherlands	18600		Mitsui O.S.K. Lines Ltd. (MOL)
KOGAS LNG bunker vessel	Busan	2020	South Korea	7500	Korea Line	Korea Line
LGC 6000		2020	Europe	6000	Eesti Gaas	Eesti Gaas
FlexFueler 002	Antwerp	2020	Belgium	1480	Titan LNG	Titan LNG
Naturgy LNG bunker vessel	Barcelona	2020	Spain	6000	Naturgy	Naturgy
NYK Western Japan LNG bunker vessel	Setouchi/ Kyushu, western Japan	2020	Japan		NYK, Kyushu Electric, Saibu Gas and Chugoku Electric	NYK, Kyushu Electric Power Co., Inc., Saibu Gas Co
Oslo Tank	Bergen	2020	Norway	850	Bergen Tankers	
Pinoeer Knutsen		2020	Norway	1100	Knutsen	Knutsen
Poseidon Med II bunkering barge	TBA, Adriatic Sea	2020	Europe	4000	Venture led by DEPA	
Q-LNG ATB Bunker 4000	Port Canaveral, FL	2020	United States	4000	Q-LNG	Harvey Gulf Barge International Marine
Singapore LNG bunker vessel	Singapore	2020	Singapore	7500	FueLNG	FueLNG
Shturman Koshelev LNG bunker vessel		2020	Europe	5800	Shturman Koshelev LLC	Gazpromneft Marine Bunker Ltd (Gazpromneft)
Domestic LNG Bunkering Vessel in China	To be decided (China)	2021	China	6000	CNOOC	
Domestic LNG Bunkering Vessel in China	To be decided (China)	2021	China	12000	CNOOC	
Ecobunker shipping LBV	Yokohama	2021	Japan	2500	Ecobunker shipping	Ecobunker shipping
LNG bunker vessel Total / MOL	Marseilles-Fos	2021	France	18600	Mitsui O.S.K. Lines Ltd. (MOL)	MOL and Gazocean
MOL LNG bunker vessel	Singapore	2021	Singapore	12000	MOL	

Vessel Name	Home Port	Delivery year	Country	LNG Tank Capacity	Owner	Operator
Small LNG bunkering vessel in South Korea		2021	South Korea	500	Ministry of Oceans and Fisheries	
Titan Hyperion	TBD	2021	Netherlands	8000	Titan LNG	Titan LNG
Woodside Western Australia LNG bunker vessel	Dampier	2021	Australia	12000		
Avenir bunker vessel 4 (Location unknown)	Undecided (China)	2021	China	7500	Avenir LNG	
Avenir bunker vessel 5 (Location unknown)	Undecided (China)	2021	China	20000	Avenir LNG	
Avenir bunker vessel 3 (Location unknown)	Undecided (China)	2021	China	7500	Avenir LNG	
DEPA Limassol	Limassol	2022	Greece	4000	DEPA	
DEPA Piraeus	Piraeus	2022	Greece	4000	DEPA	
LNG bunker barge GALP		2022	Portugal		GALP	
Shell LBV	Undecided	2022	--	18000	Not yet decided. Shell tender	
LNG Bunker & Feeder Reganosa Vessel	Mugardos	2023	Spain	10000	Reganosa	
LNG bunker vessel Swinoujscie	Swinoujscie	2023	Poland		Polskie LNG	

LNG-FUELLED FLEET BY VESSEL TYPE



LNG-FUELLED FLEET AREAS 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	Akebono Maru	3,556	LNG	Japan	Yes	Chuo Kaiun
2011	Coral Furcata	10,000	LNG/LPG/Ethylene	Worldwide	No	Anthony Veder
2011	Coral Fungia	10,000	LNG/LPG/Ethylene	Worldwide	No	Anthony Veder
2011	Vision Spirit	12,000	LNG/LPG/Ethylene	Worldwide	No	Teekay
2011	Unikum Spirit	12,000	LNG/LPG/Ethylene	Worldwide	No	Teekay
2012	Coral Energy	15,600	LNG	Northwest Europe/Baltics	Yes	Anthony Veder
2013	JX Energy TBN	2,500	LNG	Japan	Yes	JX Energy
2013	Kakuyu Maru	2,500	LNG	Japan	Yes	Tsurumi Sunmarine
2013	Coral Anthelia	6,500	LNG/Ethylene			Anthony Veder
2015	LNG Barge TBN	3,000	LNG	US Coast	Yes	LNG America
2015	JS Ineos Ingenuity	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2015	JS Ineos Insight	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2015	JS Ineos Intrepid	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2015	PetroChina TBN	30,000	LNG	China		PetroChina
2016	Clean Jacksonville	2,200	LNG	US Coast	Yes	CME
2016	LNG Prime	2,250	LNG	Northwest Europe	Yes	Veka Deen LNG
2016	JS Ineos Indepence	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2016	JS Ineos Innvation	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2016	JS Ineos Inspiration	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2016	Hai Yang Shi You 301	30,000	LNG	Bali FSU	Yes	CETS (CNOOC)
2017	Oizmendi	600	LNG	Bilbao	Yes	Itsas Gas
2017	ENGIE Zeebrugge	5,000	LNG	Northwest Europe	Yes	NYK
2017	Coralius	5,800	LNG	Northwest Europe/Baltics	Yes, for Skangas	Anthony Veder
2017	Cardissa	6,500	LNG	Northwest Europe	Yes	Shell

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 = 16th June 2020

Built	Name	CBM	Cargo Type	Trading area	Trading in LNG?	Ship Owner / Operator
2017	LNG-Gorskaya TBN	7,300	LNG	Russia	Yes	LNG-Gorskaya
2017	LNG-Gorskaya TBN	7,300	LNG	Russia	Yes	LNG-Gorskaya
2017	LNG-Gorskaya TBN	7,300	LNG	Russia	Yes	LNG-Gorskaya
2017	Coral EnergiCE	18,000	LNG	Northwest Europe/Baltics	Yes	Anthony Veder
2017	JS Ineos Invention	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2017	JS Ineos Intuition	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2017	Coral Encanto	30,000	LNG	China	Yes	Anthony Veder
2018	HUA XIANG 8	13,720	LNG	China	Yes	Zhejiang Huaxiang
2018	LNG London	3,000	LNG	Northwest Europe	Yes	Shell
2018	Shell Bunker Barge TBN 2	6,500	LNG	Northwest Europe	Yes	Shell
2018	Shell Bunker Barge TBN 3	6,500	LNG	Northwest Europe	Yes	Shell
2018	Kairos	7,500	LNG	Baltic	Yes	Bernhard Schulte
2018	Bunker Breeze	0	LNG	Barcelona	Yes	Suardiaz Energy Shipping
2019	KLine TBN	7,500	LNG	Korea	Yes	Korea Line
2019	KLine TBN	7,500	LNG	Korea	Yes	Korea Line
2019	Stolt TBN	7,500	LNG	Mediterranean	Yes	Stolt-Nielsen Gas
2019	Stolt TBN	7,500	LNG	Mediterranean	Yes	Stolt-Nielsen Gas
2019	Gas Agility	18,600	LNG	NWE	Yes	MOL
2019	Flexfueller 001	1,480	LNG	Amsterdam	Yes	Titan LNG
2020	CNTIC VPOWER Global	28,000	LNG	Myanmar	Yes	Dalian Inteh Group
2020	Q-LNG 4000	4,000	LNG	US Coast	Yes	Q-LNG Transport/Harvey Gulf
2020	Stolt TBN (option)	7,500	LNG		Yes	Stolt-Nielsen Gas
2020	FuelLNG TBN	7,500	LNG	Singapore	Yes	FuelLNG
2020	CLS TBN	3,500	LNG	Japan	Yes	CLS
2020	Elenger TBN	6,000	LNG	NWE	Yes	Elenger
2020	ENN TBN	8,500	LNG	China	Yes	ENN
2020	Flexfueller 002	1,480	LNG	Antwerp	Yes	Titan LNG
2021	Stolt TBN (option)	7,500	LNG		Yes	Stolt-Nielsen Gas
2021	Knutsen TBN	30,000	LNG	Mediterranean	Yes	Knutsen OAS
2021	Gazprom Neft TBN	5,800	LNG	Russia	Yes	Gazprom Neft
2021	PE TBN	12,000	LNG	Singapore	Yes	MOL
2021	JMU TBN	2,500	LNG	Japan	Yes	JMU
2021	TBN	18,600	LNG	Mediterranean	Yes	MOL
2021	TG TBN	500	LNG	Korea	Yes	Trans Gas
2022	Stolt TBN	20,000	LNG	Worldwide	Yes	Stolt-Nielsen Gas
2022	Stolt TBN	20,000	LNG	Worldwide	Yes	Stolt-Nielsen Gas
2022	PNE TBN	5,400	LNG	USG	Yes	PNE
2024	Stolt TBN (option)	20,000	LNG	Worldwide	Yes	Stolt-Nielsen Gas
2024	Stolt TBN (option)	20,000	LNG	Worldwide	Yes	Stolt-Nielsen Gas
2026	Stolt TBN (option)	20,000	LNG	Worldwide	Yes	Stolt-Nielsen Gas
2026	Stolt TBN (option)	20,000	LNG	Worldwide	Yes	Stolt-Nielsen Gas

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