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Shipowners make the leap to LNG

Significant ship orders give an indication as to how the bunkers landscape will develop in the run-up to 2020

Ports and shipping are readying themselves for the 2020 sulphur cap of 0.5 %, as IMO continues to reinforce the imminent deadline. IMO is now concerning itself with implementation of the regulation, which it said in November it would be addressing at its February meeting this year. IMO has also reiterated that flag and port states will be responsible for ensuring consistent implementation, along with the bunkering industry, which needs to ensure the supply of high-sulphur fuel for those ships using scrubbers.

Last year, however, saw a significant rise in commitment by shipowners to LNG bunkers, which in turn spawned a new bunkering industry alongside the traditional offering.

Such interest is raising the profile of LNG bunkers as the industry standard and increasingly ports will be required to offer some type of LNG bunkering facilities. According to IHS Markit data, 85 ports are either offering, have made the commitment to offer, or have proposals in place to provide LNG bunkers (see map, page 25). Some of these plans are as basic as over-quay bunkering from road tankers.

CMA CGM's announcement of an order for nine 22,000teu vessels to be fuelled by LNG (see page 32) has set the trend of things to come. Such a significant order from a big name does offer some insight into how the LNG bunkers landscape may pan out over the next few years. The nine LNG fuelled vessels will be deployed on CMA CGM's French Asia Line (FAL 1) and current vessels on that route take on the majority of their bunkers at Singapore, Rotterdam, and Zeebrugge. The latter two are, at present, the most advanced in offering LNG bunkers with both carrying out conventional ship-to-ship operations. Other operations tend to be truck-to-ship from the quay.



Shell's *Cardissa*, usually in operation in Rotterdam, was sent to Singapore for a trial LNG bunker operation at Jurong Island

Krispen Atkinson, senior consultant with Maritime and Trade at IHS Markit, believes the new vessels will take on the majority of their bunkers at Singapore and top up in Europe, most likely in Rotterdam and Zeebrugge, where facilities are already established.

These three ports, along with Antwerp, were the founding signatories of a 2014 memorandum of understanding (MOU) to co-operate on LNG bunkering. Since then, the MOU has expanded to include the ports of Jacksonville in the United States and Ulsan, South Korea, along with the Norwegian Maritime Authority and Japan's Ministry of Land, Infrastructure, Transport and Tourism, but it is of note to Atkinson that this original group looks likely to form the nucleus of the vessels' bunkering plans.

Although Singapore, Rotterdam, and Zeebrugge are among the pioneers of LNG bunker operations, further investment and developments will be required if CMA CGM's planned vessels maintain the existing routes.

The vessels will have a fuel tank capacity of 18,000 m³. At present, Rotterdam's Gate terminal has a bunker vessel, *Cardissa*, that can carry 6,500 m³ of LNG. Shell, the vessel's owner, also signed a timecharter agreement in August for a second bunker vessel with 3,000 m³ LNG capacity. But these two vessels combined will not be enough to cater to for this new class of vessel.

In the Belgian port of Zeebrugge, bunkering vessel *ENGIE Zeebrugge* has an LNG-carrying capacity of 5,000 m³ and performed its first bunkering operation in June last year to two pure car and truck carriers. *ENGIE Zeebrugge*, jointly owned by ENGIE, Mitsubishi Corporation, NYK Line, and Fluxys, loads LNG at Fluxys' LNG terminal. It also has a jetty specifically designed to receive very small LNG carriers.

Meanwhile in Singapore, bunker offerings are still in the trial stage and so far have been focused on truck-to-ship operations, with plans to progress to ship-to-ship operations. The Maritime and Port Authority of Singapore (MPA) announced in December that it had set aside another SGD12 million (USD9 million) for initiatives aimed at boosting LNG bunkering in Singapore. Half of this will co-fund the construction of new LNG bunker vessels to facilitate development of ship-to-ship (STS) LNG bunkering in Singapore. Successful applicants will receive up to SGD3 million (USD2 million) per LNG bunker vessel.

There are two LNG bunker supplier licensees in Singapore: FuelNG is a Keppel-Shell joint venture, while Pavilion Gas is an LNG trading group backed by Singapore state investment firm Temasek Holdings.

Each was awarded a bunker supplier licence in January 2016 and both are participating in an LNG bunkering pilot programme, launched by MPA in the first quarter of 2017.

FuelNG completed the first commercial LNG bunkering in Singapore in September. This was carried out by truck-to-shore LNG bunkering for *Hilli Episeyo*, the world's first converted floating

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Krispen Atkinson, senior consultant, IHS Markit

liquefaction vessel. The transfer was conducted in accordance with the Singapore Chemical Industry Council Technical Reference for LNG Bunkering (TR 56). Launched in April 2017, the framework provides a safe, efficient, and sustainable technical framework for LNG bunkering operations.

The remaining funds will top up an existing co-funding programme by MPA to support the construction of LNG-fuelled vessels.

In June, FuelNG facilitated Singapore LNG Corporation's (SLNG's) gas-up/cool-down and reload operation at the Jurong Island terminal for Shell's *Cardissa*, which usually operates in Rotterdam.

In addition, FuelNG secured contracts from Keppel Smit Towage and Maju Maritime to provide LNG bunkering services for two dual-fuel LNG harbor tugs. The tugs are still under construction and the bunkering contracts will commence in this year when construction is completed.

Another container ship operator that is hedging its bets on LNG is United Arab Shipping Company (UASC), which merged with Hapag-Lloyd in May last year.

UASC ordered 17 LNG-ready container ships – 6 of 18,000 teu and 11 of 14,000 teu – the first of which was named in 2014.

In the United States, Crowley Maritime launched the first of two new container/ro-ro Commitment-Class ships powered by liquefied natural gas in early 2017 in Pascagoula, Mississippi. The second vessel should be delivered this year and both will be able to carry 2,400 teu and a mix of nearly 400 cars and larger vehicles.

A number of other types of vessel operator have shown an interest in the fuel, with the passenger ferry industry taking the lead as its fixed operating routes make bunker calls predictable.

LNG is particularly popular with ferries in Norway as the government supported the construction of LNG bunkering infrastructure, prompting Fjord Line and Viking Line to operate a number of passenger vessels that run on the low-sulphur gas. This number will grow next year when Hurtigruten adds two gas-powered polar exploration vessels to its fleet, with the possibility that it will order a further two vessels in the same class.



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Engie Zeebrugge performed its first LNG bunkering operation in June last year

In the cruise sector, Carnival Corporation awaits four LNG-powered cruise ships, to be delivered from 2019 onwards. In December, heavy-lift company Jumbo Shipping signed a letter of intent with China Merchants Industry Holdings for an LNG powered offshore construction vessel estimated to be delivered in the first quarter of 2020.

The port of Yokohama in Japan is now active in this area and wants to position itself as a regional bunker hub for LNG, hoping to capture business as the first or last bunkering hub on the trans-Pacific route. Also in 2015, it started operating an LNG-fuelled tug. The port is developing this infrastructure with the City of Yokohama in co-operation with national government and the private sector.

On 19 September, Skangas' *Corilius* bunkered LNG to a vessel in international waters between Denmark and Sweden. The receiving vessel was oil and chemical tanker *Fure West*, which in 2015 was retrofitted to run on LNG.

North Europe has been a pioneer of LNG as a fuel, with bunkers available in, for example, Belgium, Sweden, and Norway. Ports in the area have been early participants in the IAPH LNG bunkering project.

A European Union (EU)-funded Spanish/French project, Sustainable Atlantic Motorways of the Seas Using as Fuel for Engine LNG (S/F SamuelLNG), aims to accelerate the infrastructure that will enable the global implementation of LNG as a marine fuel and focuses on the Atlantic Corridor as one of the most

The case for Gijón

CEDA offers an overview of a smaller port working with industry to offer LNG bunkers in Europe as part of the S/F SamuelLNG Project

Each of the ports involved in the S/F SamuelLNG Project has different logistical requirements, dependent on likely demand, traffic, and operational and environmental conditions. They will use the results from the project studies to develop the best LNG facilities for their own particular set of conditions.

Smaller ports, and those anticipating lower LNG demands in the early stages, may be reluctant initially to invest in the LNG infrastructure. Adopting a strategy of waiting until the market is more mature and the returns on their investment can be assured is likely to leave them in a vulnerable position.

Port of Gijón, a 'core port' of the Ten-T network, has similar challenges and several years ago started a new action linked to the key European Union issue: the use of LNG as a maritime fuel. With that in mind, the key objective of the study, currently being conducted at Gijón, is to consider the feasibility of more affordable LNG bunkering services, specifically for ports used by smaller vessels or operating under lower LNG demand.

The Port of Gijón study is focused on evaluating the infrastructure and likely investment needed and will include designs for a flexible or mobile bunkering system

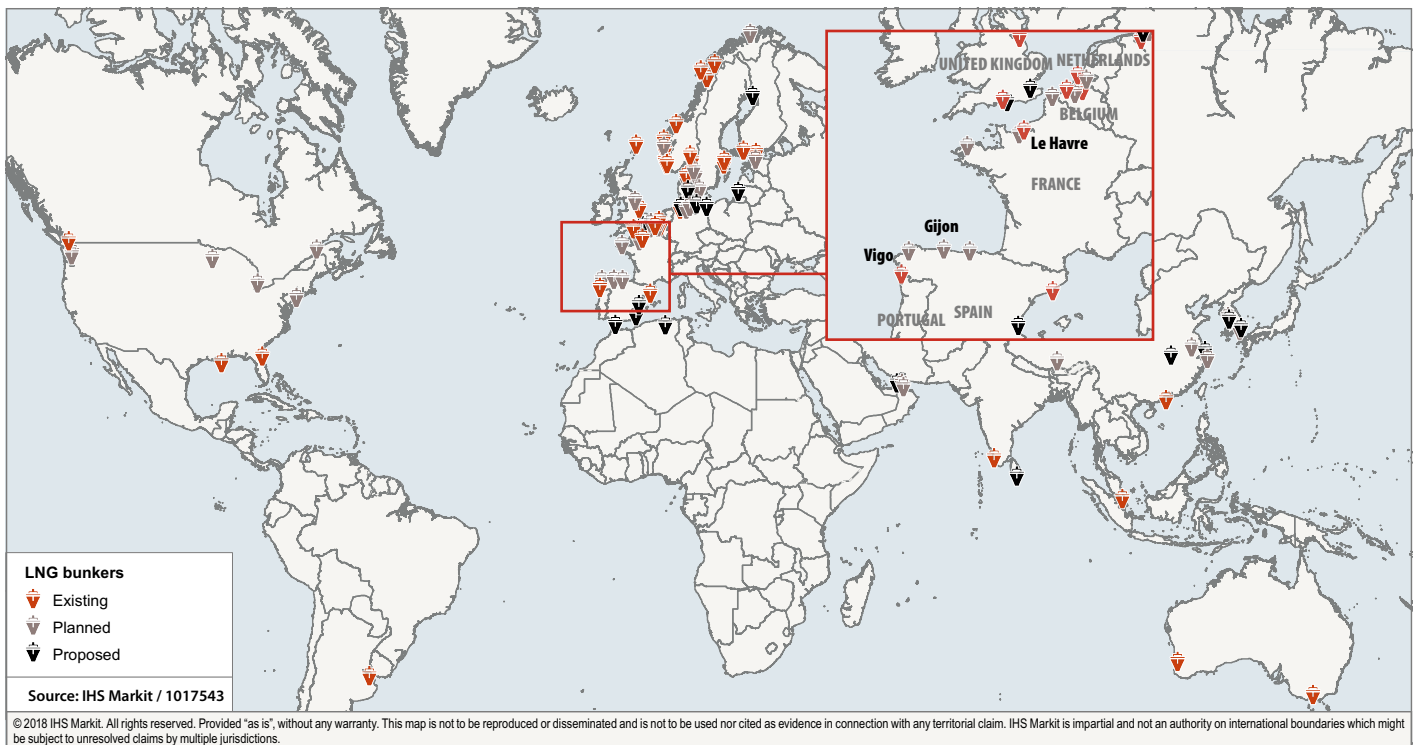
and recommend a corresponding business model for such ports.

In collaboration with EDP, Gas Natural, and Ghenova Ingeniería, Port Authority of Gijón is designing the most suitable system based on the current low-demand scenario. Initial demand studies will consider both the maritime and road transport sectors in order to determine requirements for a global LNG logistic service that can be tailored to their needs. It will cover the options for low LNG demand and analyse the synergy between existing bunkering in maritime transport and refuelling in road transport to help identify the most economical solutions and appropriate locations for integrated bunkering activities.

In evaluating the effects of switching to LNG, the study will identify the potential difficulties presented by an LNG bunkering and refuelling service and consider the different options for small and medium-sized vessels. As part of Port of Gijón sub-activity, the final study will also define key operational parameters for safety and administrative conditions, for LNG bunkering and refuelling services operating under a low LNG demand model.

The Port of Gijón study will conclude with the production of a business model for implementing the most suitable system for LNG bunkering, which can be adapted to accommodate ports with similar challenges.

The sub-activity is on schedule to be completed in March this year.



important shipping routes of the EU (see map above).

The project is being co-ordinated by Dragages Ports and is supported by a consortium of 12 partners from along the Atlantic Arch, representing France, Spain, and the Netherlands.

The partners working alongside Dragages are five public port authorities – Nantes Saint-Nazaire, Le Havre, Rouen, Gijón, and Vigo. Also involved are Inova Labs, GHENOVA, Energias de Portugal (EDP), Gas Natural Fenosa, Suardiaz, and the Central Dredging Association (CEDA). The project is co-financed by the EU Connecting Europe Facility.

The main objectives of the project include preliminary studies such as LNG bunkering at the the port of Nantes Saint-Nazaire and development of a mobile bunkering unit in Port of Gijón (see page 25) and a floating device in Port of Vigo.

Port of Vigo has worked with engineering design companies Inova Labs and GHENOVA to develop an innovative concept to provide LNG bunkering and on-shore power supply services from a barge. Another significant part of the project is the LNG retrofit of trailing suction hopper dredger (TSHD) *Samuel de Champlain*.

Port of Antwerp has been providing LNG bunkers via truck-to-ship (TTS) since 2012, but it understands that STS transfers are necessary to cater for larger vessels. The port authority's technical manager for the environment, Pieter Vandermeeren, told *P&H*, "We do not have LNG storage in the Port of Antwerp yet. The LNG is being collected by truck from the

Fluxys terminal in Zeebrugge or the GATE terminal in Rotterdam. We are, however, aware that truck-to-ship bunkering is a cost-effective solution for bunkering smaller volumes, which is the case for inland barges and shortsea vessels.

"We envision that larger seagoing vessels as well as shortsea vessels will be bunkered ship-to-ship. Such LNG bunkering vessels are very welcome in our port," Vandermeeren noted.

In addition, he explained that the port was keen to offer other alternative fuels, should its customers require them.

Indeed, LNG is not the only contender in the race. Owners can opt for low-sulphur distillate fuels, which would allow them to use their existing vessels without any technical modifications, or continue using heavy fuel oil (HFO) and filter the emissions through a scrubber. However, not all vessels are suitable to be retrofitted with scrubbers, and low-sulphur distillates are likely to be more difficult to source, and thus more expensive, than HFO and LNG.

The possible fly in the ointment would be if LNG costs increase, which seems unlikely in the short term. Atkinson said, "There won't be much kick-up on low-sulphur next year. I think the industry will stall until it really has to use it."

"What we may see is a gradual uplift in mid-2019 in places such as Singapore and Fujairah as owners start to look at switching ships, but the big push won't be until very late 2019, or even January 2020, as owners are forced to use it." **PH**