

LNG Fuelling

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Global LNG fleet and supply chain set to double

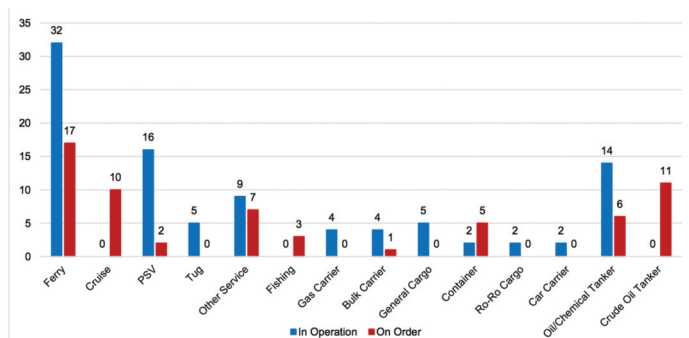
The global LNG-fuelled fleet is set to double by 2022, as demand for bunker fuel grows 'significantly', according to research by The Oxford Institute for Energy Studies (OIES).

The findings, published in a recent working paper from OIES, are based on the growth of existing LNG supply chains in Northern Europe and suggests the global LNG-fuelled fleet is "set to double in size", with all but nine of the current orderbook due for delivery by the end of 2022.

"The future growth of the LNG-fuelled fleet may be estimated by the order book for newbuild vessels and for retrofit projects to convert existing vessels to LNG propulsion... Looking forward, ferries and service vessels remain important, but it is the continued growth in the number of oil/chemical tankers and new growth in crude oil tankers, cruise ships, and container ships that stands out," Jack Sharples, Research Fellow at The Oxford Institute for Energy Studies and author of the report, commented.

IMO limits drive steady growth

Sharples' research suggests that new global sulphur limits, set to be introduced by the International Maritime Organization in 2020, will drive a new wave of invest-



Source: Graph created by author. Data from DNV GL.

Vessels in operation and on order by type in the North Sea - Baltic Sea region

ment in LNG as ship owners are faced with an improving cost benefit for using the fuel.

"Given the importance of the changes that could take place after 2020... the introduction of more stringent environmental regulations can solve the 'chicken and egg' dilemma of energy companies not wishing to invest in LNG bunkering infrastructure until there is substantial demand for LNG as a marine fuel," Sharples adds.

Despite the promise of substantial growth driven by the IMO rules, the report suggests growth will be gradual and long-term rather than occurring abruptly after the implementation date in 2020.

"Demand for LNG as a shipping fuel is likely to rise at a steady pace, rather than in a sudden 'big bang'. This should allow time for the development of the necessary additional infrastructure, and prevent marine fuel demand from acting as a source of volatility on the global LNG market,"

Fuel demand to double by 2022

Linked to this growth in fleet size, global demand for LNG bunker fuel is also expected to increase significantly, more than doubling by the end of 2022, according to OIES as total demand reaches 3 to 3.5 tonnes of LNG.

"With LNG propulsion being 'phased in' through newbuilds rather than retrofits, that rate of growth could continue through the 2020s, as the global fleet ages and is replaced, vessel-by-vessel," the OIES report notes.

The Oxford Institute for Energy Studies is a Recognized Independent Centre of the University of Oxford, focussed on research into the economics and politics of international energy.



LNG vessel refuelling

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Gazprom backs LNG bunker prospects

The board of directors of Russian national energy firm Gazprom has backed plans to support new LNG bunkering investment in line with expected growth in LNG consumption.

The board announced plans to build on its existing expertise in LNG as a bunker fuel via a range of investments, firstly across Russia and then globally.

"In 2020, MARPOL will implement a global 0.5 per cent sulphur cap for marine fuel. This measure is expected to significantly decrease the use of fuel oil and increase the consumption of LNG as a fuel meeting all of the environmental requirements set by MARPOL," a spokesperson for Gazprom said.

Portovaya development continues

Development will include continued development at Gazprom's LNG production, storage and shipment complex near the Portovaya

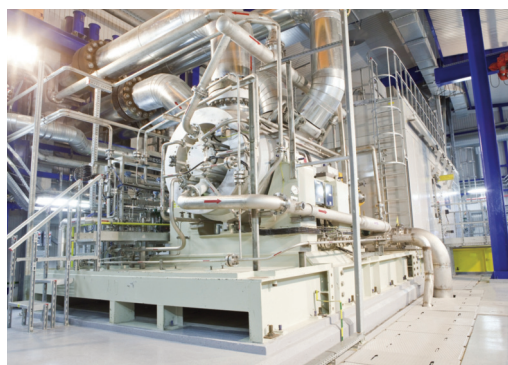
compressor station on the Russian coast of the Baltic Sea.

Core process equipment at the complex is under construction at present alongside an onshore LNG storage tank and berthing facilities. The group plans to use the plant's output to, inter alia, bunker marine vessels in Russia when the complex comes onstream in 2019.

The board of directors has also instructed Gazprom's Management Committee to continue creating infrastructure for producing and marketing LNG as a bunker fuel.

LNG bunker vessel designs

In the longer term, Gazprom plans to explore the possibility of build-



Gazprom Portovaya Compressor Station

ing plants in new areas, such as the Black Sea and in Russia's Far East as well as overseas territories used by Russian vessels.

Alongside onshore construction, the group also plans to consider designs for an LNG bunkering vessel to add flexible refuelling

options at sea or within designated Emission Control Areas, such as the Baltic and North Seas.

"Gazpromneft Marine Bunker, the Gazprom Group's single operator for selling LNG to end consumers in the bunkering mar-

ket, is currently working on a project for an LNG bunkering vessel. Today, only four vessels of this kind exist worldwide, along with eleven small-scale gas carriers some of which are fitted out for LNG bunkering," Gazprom said in a statement. ■

Coral Methane completes first ship-to-ship operation

LNG bunker vessel *Coral Methane* has completed its first ship-to-ship refuelling operation, in Tenerife in the Canary Islands.

The vessel successfully docked with the *AIDAnova*, the world's first LNG-powered cruise ship, and completed bunkering operations at Santa Cruz de Tenerife on the 16th January.

"The success of this project is due to an excellent cooperation with all parties involved, from the engineering phase up to and including our first LNG bunkering operation," Klaas Kerssemakers, COO of Anthony Veder, commented.

'Most sustainable' marine fuel

The *Coral Methane* is part of the fleet of tanker operator Anthony Veder and was originally developed as a multi-purpose bunker

and feeder vessel transporting ethylene as well as LNG for Norway's Gasnor, a subsidiary of Shell, however growing demand for LNG has seen the vessel retrofitted as a pure LNG vessel.

"We believe LNG is today's most sustainable marine fuel. The delivery of *Coral Methane* as an LNG bunker vessel, in partnership with Shell, underlines our dedication to LNG and marks the next step in our contribution to a sustainable supply chain," Kerssemakers added.

7,500 m3 capacity

Featuring capacity for 7,500 cubic meters of fuel, the vessel incorporates a modern gas plant, two



Coral Methane bunkering Aidanova

cylindrical cargo tanks, a dual fuel diesel-electric propulsion system and associated cargo-handling equipment.

With an overall length of 117.8 meters the *Coral Methane* is equipped with both high and low manifolds as well as flexible hoses to allow for various types of LNG

transfers including ship to shore and vice versa.

"The vessel forms a unique example and benchmark for various small scale LNG opportunities that exist around the globe and are moving towards feasible business cases with our help," a spokesperson for Anthony Veder said. ■

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Coalition forecasts accelerating LNG fuel use in 2019

Following a tipping point for LNG as a marine fuel last year, industry demand is expected to increase sharply in 2019, according to multi-sector coalition SEA\LNG.

In an outlook statement SEA\LNG Chairman, Peter Keller, highlighted growing demand for the fuel from shipping lines and an increase in LNG-powered vessels last year as setting the conditions for an uptick in 2019.

"If 2018 was the tipping point for LNG as a marine fuel, 2019 will be the year of acceleration... As the months progress, we expect to see an acceleration in decision making in favour of LNG due to three key factors: economic, environmental, and evolutionary," Keller said.

Legislation to bolster to economic case

Tightening of legislation over the coming year is expected to be a key reason for fleet additions and a more rapid move towards LNG as the marine fuel of choice for many shippers, according to SEA\LNG, as the IMO started measuring Greenhouse Gas emissions from ocean vessels from 1 January this year.

"The economic case for LNG as the marine fuel of choice for newbuilds is growing stronger each month... In 2019 we expect to see an increasing percentage of newbuildings within the global fleet move over to LNG for



SEA\LNG predicts growth in LNG refuelling this year

economic reasons to gain commercial trading advantages," Keller said.

Bunkering infrastructure expansion

Keller went on to note that the global LNG-powered fleet rose from 118 in operation in 2017 to 143 LNG-powered vessels in operation in 2018 with a further 135 currently on order and 135 "LNG-ready" ships are either in operation or on order.

"Driven by a requirement to supply these LNG-powered trailblazers, LNG bunkering infrastructure is expanding and there are increasing numbers of LNG-bunker vessels which are encouraging other operators to adopt LNG," Keller commented.

30 bunker vessels within five years

SEA\LNG counts 24 out of the world's top 25 ports and all but one of the top ten bunker ports globally as providing LNG bunker facilities today as well as a further eight LNG bunker vessels.

"We estimate 30 [LNG bunker vessels] likely to be in operation within the next four to five years at key bunkering nodes in Asia, Europe, the Middle East, and North America," the coalition states.

Regional initiatives of note, highlighted by Keller, included the Poseiden Med II project, the Blue-HUBS programme and LNGHIVE2 project in Europe as well as South Korea's plans to invest US\$2.48 billion in LNG bunkering facilities in the country.



LNG ship refuelling

NEWS NUDGES

Woodside plans LNG truck loading facility expansion

Australian oil and gas company Woodside Energy is reportedly planning to quadruple the size of its Pluto LNG truck loading facility, following the signing of its first customer this week.

Sheffield Resources signed an agreement for the equivalent of five terajoules of LNG per day for 15 years as part of the Thunderbird mineral sands project.

Woodside plans to expand its LNG truck-loading operations at Pluto to extend its virtual pipeline concept serving mines in the region.

India makes headway on LNG infrastructure

Authorities in India are to introduce close to 20 LNG fuelling stations on some of the country's main heavy transportation routes next year, according to energy major Petronet LNG.

Tenders are currently under consideration with the aim to establish a pilot project base of some 5,000 LNG-fuelled trucks travelling five leading national highways.

"Following its successful experiment, this exercise would have a repeat in subsequent year of 2020 for another estimated 5,000 trucks that can run on national highways on LNG with a fuel cost saving of nearly 25 percent as well effectively addressing the issue of fuel pollution," V. K. Mishra, director at Petronet, said.

Indian manufacturers including Tata and Mahindra are also expected to produce LNG-fuelled vehicles and buses helping to drive demand growth.

HAM expands Spanish LNG network

Spanish fuel specialist HAM Group has opened the first LNG fuelling station in Extremadura, in western Spain.

The new station, can supply LNG as well as compressed natural gas (CNG) and is located on the Extremadura highway, or A-5, at exit 341 near Merida.

“The strategically significant location provides access to CNG and LNG fuel for vehicles travelling between Madrid and Lisbon, the capital of Portugal. In addition, the route of the A-5 unites the autonomous communities of Madrid, Castilla-La Mancha and Extremadura,” a spokesperson for HAM said.

HAM commits to LNG-fuelled transport

Registered in Barcelona, HAM Group currently operates 30 LNG refuelling stations across Europe and is also one of the first companies to provide LNG for industrial

use in Extremadura.

“HAM considers the vehicular gas sector in this autonomous community as a future commitment... This confirms the commitment to compressed natural gas (CNG) and liquefied natural gas (LNG) as an alternative, efficient, clean and sustainable fuel that minimizes the negative impact on the environment,” the group said in a statement.

As part of this commitment to LNG as a transport fuel, the group is a member of NGVA Europe, and is currently studying opportunities for new LNG refueling to support the European road system.

Zaragoza station opens

The opening of the Extremadura station follows the commissioning of an LNG station in Zaragoza, in



HAM LNG station in Spain

the north of Spain at the end of last year. Located in the El Saco Industrial Park, it occupies a strategic point between Madrid and France, serving traffic passing through Guadalajara, Zaragoza, Lleida, Barcelona and Girona.

“This service station has a dou-

ble LNG pump for trucks and a double CNG pump for trucks and light vehicles. The innovative dual-fuel system of LNG and CNG, designed and manufactured by HAM, allows refuelling of two LNG vehicles from a single pump,” a HAM Group representative commented. ■

LIQAL to develop Heverlee LNG station

LNG equipment developer LIQAL has secured a contract for turnkey realization of an LNG refuelling station in Heverlee, Belgium.

The station will be deployed by Belgian fuel station operator Drive Systems, in cooperation with Texaco subsidiary EG Group, and will be located at the Texaco service station adjacent to the E40 highway in Heverlee.

“We are delighted that yet another station operator acknowledges the benefits of our technology and integrated approach. It is great to be given the opportunity to build this new highway location. With the addition of this site in Heverlee, being LIQAL’s fifth Belgian fuelling facility, we further strengthen our leading position in North West Europe,” Joost

Jansen, Business Development Manager at LIQAL, said.

Headquartered in Breda in the Netherlands, LIQAL acts as a Design, Build, Maintain and Operate (DBMO) company for turnkey small- and mid-scale LNG systems that serve the European market. The firm also develops a wide range of alternative fuel technologies alongside LNG dispensers including liquefaction systems, satellite plants and H2 fuelling and is a member of NGVA Europe.

First highway site in North-West Europe

Belgian transport firm Ninatrans

will be among the first customers of the station when it is inaugurated in the first quarter of 2019. Once complete, the station will supply CNG and LNG and will be the first highway site for LNG in North-West Europe.

“Alternative fuels as LNG are the future for road transport, but they must be easily accessible. The LNG station at the Texaco site on the E40 highway, close to our HQ, perfectly fits in our strategy to decarbonise activities. We decided to order 10 additional LNG trucks, and more units will be added as we replace the older diesel trucks,” Benny Smets, CEO of Ninatrans, said.

Construction of the new infrastructure has been supported by funds from the EU through its Connecting Europe Facility (CEF) program.

“This support was very welcome, as the number of vehicles on LNG or CNG is still low, for now. This initiative shows the commitment of the European Commission

to roll out alternative fuel infrastructure along the main corridors” Philippe Desrumaux, Director of Drive Systems, commented.

Belgium LNG road transport strengthens

The new station will continue to cement Belgium’s position as a leading site for LNG uptake. Last year, logistics specialist Jost Group ordered 500 IVECO LNG-fuelled Stralis NP trucks with the full fleet set to be in service by 2020.

“This marks a key turning point for our business as we begin a strategic move away from our dependence on diesel and towards green logistics, as requested by our customers, which are demanding a more sustainable transport. Our excellent experience operating Stralis Euro 5 EEV diesel vehicles has seen us establish a solid relationship with IVECO, supported by a very strong service network across Belgium,” Roland Jost, Owner of Jost Group, said. ■



Liqual refuelling station

Galileo introduces first LNG truck fleet in Argentina

Fuel specialist Galileo has introduced the first fleet of LNG-powered heavy-duty trucks in Argentina.

The firm announced it will operate six new Scania G340 trucks fuelled by LNG at a launch event this month in the Anchoris Thermo-electric Power Plant, in the Mendoza province.

“When this truck fleet working for Galileo starts riding the Argentine roads, we will show that LNG is the most adequate fuel for cargo transportation because it is national, clean and inexpensive”, Osvaldo del Campo, President and CEO of Galileo Technologies said.

Fuel range of 1,100 kilometres

The new fleet will be owned by the Andreu carrier company from Men-

doza, and will carry Galileo's proprietary Virtual Gas Pipeline system to distribute gas as liquid fuel.

“Because we are obsessed by innovation and we want to be more efficient and sustainable, we decided to accompany Galileo in this challenge by investing in the acquisition of these trucks,” Eduardo Andreu, Director of Transportes Andreu, commented.

Each truck is fitted with two cryogenic fuel tanks that can load up to 265 kilograms of LNG. This enlarged capacity will give the trucks a fuel range of 1,100 kilometres making them capable of accessing the remote mountainous routes and gravel roads they will



Argentina's first LNG-propelled truck fleet

encounter in service around Mendoza and Neuquén.

The vehicles will run on LNG liquefied directly in wells out of the reach of pipelines and will tow trailers that Galileo uses to carry LNG from these wells.

Cost savings

The trucks' operation will be monitored with a view to expanding Argentina's LNG fleet as Galileo Technologies expects to deliver cost savings of as much as 50 per cent thanks to lower fuel costs.

“It is the first time that the country brings heavy-duty vehicles running completely on gas, and more specifically, on LNG. We are

proud not only for pioneering the incorporation of new technology into the country, but also because such technology contributes directly to reducing the environmental impact,” Andrés Leonard, Scania Argentina General Director, said.

Headquartered in the capital Buenos Aires, Galileo specialises in natural gas, biomethane and hydrogen production and commercial technology development in over 70 countries worldwide. Galileo now plans to develop a Corredor Azul (Blue Corridor) of LNG filling stations so that the new fuel becomes available in the Argentine roads.



LNG dispenser connected to the trucks cryogenic tank

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Rotterdam deploys LNG dredger *Ecodelta*

The port of Rotterdam has introduced the first LNG-fuelled trailing suction hopper dredger to the Netherlands.

The *Ecodelta* was inaugurated at the Holland Amerikakade in Rotterdam and replaces the 60-year-old Rhine Delta, the dredger that has maintained the harbour depth since the 1980s. The new dredger was delivered by Zwolle-based dredging company Van der Kamp, in partnership with Conoship International.

"This one of a kind dredger has two main objectives: recover valuable material from the seabed and create a greater depth of water... The ship has been designed by Conoship International and has been built by the Frisian shipyard Barkmeijer," a spokesperson for Conoship said.

Contracted to 2023

With an overall length of 134 meters and a dredging draught of

7,770 meters, the vessel can dredge a depth below baseline of 35 meters and a gross tonnage of 7,560 tonnes.

Under the terms of the contract between Port of Rotterdam Authority and Van der Kamp, the *Ecodelta* will perform maintenance of the port until 2023 with the goal "to become the most sustainable port" by replacing the fuel oil with LNG for shipping.

Thanks to improved storage technology at the port, LNG is also now expected to be more cost-efficient as the LNG tank can store approximately 300 cubic metres, enough for two weeks' operation.

"The *Ecodelta* is of pure Dutch manufacture. Under supervision of Van der Kamp, Frisian Barkmeijer built the hull in segments. This happened with installation parts



The christening

of, among others, IHC. In Delfzijl, the segments were welded together by Niestern. Then the *Ecodelta* was towed to Harlingen and further reduced," says Arie

Faasse, director of Van der Kamp.

Hein to support LNG transition

The port of Rotterdam has put LNG at the forefront of its future strategy and has seen exponential growth in recent years with demand for the fuel reaching 1,500 tonnes in 2017, up from just 100 tonnes in 2016.

"The Port Authority, with an incentive, consciously steered on a significant sustainability improvement aimed at air quality... the Port Authority is fully supporting the transition from fuel oil to LNG as fuel for shipping", Ronald Paul, operational director of the Rotterdam Port Authority, said.

In addition to the *Ecodelta*, Van der Kamp will also maintain water depth at the port using the vessel Hein, which has recently undergone a 'midlife conversion'.



Ecodelta

NEWS NUDGES

Study points to "strong investment case" for LNG

A study commissioned by industry coalition SEA\LNG has revealed a strong investment case for LNG as a marine fuel in the container shipping market.

The research analyses usage for a newbuild 14,000 TEU con-

tainer vessel operating on an Asia-US West Coast (USWC) liner routing and compares six fuel pricing scenarios.

"The study unequivocally shows that for this vessel type, on this trade route, LNG as a marine fuel delivers the best return on investment on a net present value (NPV) basis over a

conservative 10-year horizon, with fast payback periods ranging from one to two years," Peter Keller, Chairman of SEA\LNG, said.

The study was produced by independent simulation and analytics firm Opsiana and indicates that LNG provides a greater ROI than alternative

compliance solutions, including the installation of Exhaust Gas Cleaning Systems (EGCS), or scrubbers, across 5 out of 6 of the fuel scenarios explored. It also reveals a diminishing CAPEX hurdle, competitive energy costs, the stability of LNG pricing, and the realistic cost of scrubbers.

Sovcomflot orders LNG-fuelled tanker trio

Russian shipping line Sovcomflot (SCF Group) has placed an order for the construction of three new LNG-fuelled tankers by United Shipbuilding Corporation.

The MR-class vessels will each have a deadweight of 51,000 tonnes and will be used for the transport of petroleum products and gas condensate.

"The technical specification of the tankers reflects the international regulatory limits on sulphur, nitrogen and greenhouse gas emissions, which will come into effect in 2020," a spokesperson for SCF said, noting that "LNG-powered engines release 27 per cent less Carbon Dioxide and 85 per cent less Nitrogen Oxide" compared to engines burning standard marine fuels.

Construction at Zvezda

The latest orders from SCF Group follow the arrival of three LNG-fuelled Aframax crude oil tankers to its fleet last year and an order for

a further two 114,000 deadweight-tonne Aframax in September.

The new orders will all be built at Zvezda shipbuilding complex in Bolshoy Kamen in the Russian Far East and will be chartered on long-term basis to Russia's largest independent natural gas producer Novatek.

SCF Group specialises in the transportation of crude oil, petroleum products, and liquefied gas, with a fleet of 144 vessels, including 80 ice class vessels. The group also provides servicing of offshore oil and gas facilities linked to LNG production.

Total inaugurates Yamal ahead of schedule

One of the largest offshore projects SCF is currently involved



Zvezda shipbuilding complex

with is the giant Yamal LNG project which comprises three trains with a total capacity of 16.5 million tonnes of liquefied natural gas per year once complete.

In December last year, developer Total announced that it had inaugurated Train 3 of the Yamal project a year ahead of the initial schedule and within the original budget.

This constitutes an unprecedented achievement for the industry. The positive experience of Yamal LNG paves the way for further LNG developments alongside our strategic partner Novatek, including Arctic LNG 2, the next major development based on giant low costs resources in Russia's far north," Patrick Pouyanné, CEO of Total, commented. ■

Rederi Gotland receives LNG-fuelled ferry

Swedish shipping line Rederi Gotland has taken delivery of its new LNG-fuelled ferry – *Visborg* - in Sweden.

The roll-on/roll-off passenger (ROPAX) vessel was delivered to Sweden from Guangzhou International Shipyard in southern China and will operate between the Swedish mainland and Visby on the Baltic island of Gotland.

"It has been a long project and our organization has made a very good effort from start to finish. For our core business at home on Gotland, this means an environmental improvement and capacity enhancement," Håkan Johansson, CEO of Rederi Gotland, said.

The new vessel will be oper-

ated by Rederi subsidiary Destination Gotland.

Visborg to replace Gotland

Headquartered in Visby, Rederi Gotland is Sweden's oldest passenger shipping company and also operates ro-ro and product tanker shipping services. The firm's investment in LNG is part of a wider strategy to develop and commission a range of next generation vessels to upgrade its fleet.

"Visborg goes to the home port Visby, after which she starts traf-

fic for Destination Gotland around the end of February-March. When *Visborg* comes in traffic, *Gotland*, which is one of the current big ferries, will be laid out until Easter," Christer Bruzelius, CEO of Destination Gotland, said.

Second delivery mid-2019

The *Visborg* is the first of two sister vessels to be delivered by Guangzhou International Shipyard for the Swedish ferry operator with the second - *Thjelvar* - due to begin sea trials in imminently and scheduled for delivery in mid-2019.

Both vessels have capacity for 1,650 passengers and 1,750 trailer-lane-meters of cargo, with a top service speed of 28.5 knots and weight of 4,800 deadweight-tonnes.

"It is good for both the local environment in the Baltic Sea and for the climate... It is also positive for the environment that it is a ferry that has great potential to run on biogas (LBG) and which until this fuel is available as an alternative will be operated with LNG," Rikard Engström, CEO of the Swedish Maritime Association, said. ■



The Visborg

BioLNG EuroNet plans refuelling infrastructure

Research consortium BioLNG EuroNet has announced plans to expand LNG infrastructure across Europe with investment in LNG trucks, refuelling stations and a BioLNG production plant.

The consortium, which includes Shell, DISA, Scania, IVECO, CNH Industrial Capital Europe and Nordsol, has proposed a new “pan-European network”, spanning operations in Belgium, France, Germany, the Netherlands, Poland and Spain.

“LNG is an increasingly affordable fuel for heavy goods vehicles which will make it an important energy source as the transport sector evolves,” István Kapitány, Executive Vice President for Shell Retail, said.

“Shell is committed to offering our customers more lower carbon

energy and the new LNG Retail stations are a vital piece of the puzzle. I look forward to seeing this important network of stations welcome European customers in the years to come.”

39 new LNG stations

In total, the BioLNG EuroNet partners expect to deliver 39 LNG fuelling stations and an additional 2,000 LNG-powered trucks as well as constructing a production plant in the Netherlands.

“The project’s funding will enable us to help our customers convert their fleets to LNG through

SITES OPENING PER COUNTRY



competitive IVECO Capital finance & leasing plans, increasing the number of natural gas vehicles on European roads and making progress towards a sustainable transport industry,” Pierre Lahutte, president at truck manufacturer IVECO, commented.

The stations will be located approximately every 400 km along core road network corridors from Spain to eastern Poland.

3,000 MTPA capacity

A key focus of investment will be the development of a plant capable of producing 3,000 tonnes of liquefied biogas per year. Running on organic waste, the plant will then sell BioLNG back to end-users via the LNG network, creating

“This project opens the possi-

bility for a seamless transition to a circular economy approach based on generating energy from waste. This makes even negative GHG emissions and carbon sequestration possible,” Lahutte added.

Developer Nordsol will build and operate the BioLNG facility together with biogas production partners using patented technologies and supported by the financial backing of the consortium

Unlocking BioLNG will enable LNG as the future energy source for the large transport sector... Our BioLNG concept is built around this mission and we look forward to rollout this expansion with the consortium partners,” Jerom van Roosmalen, founding partner at Nordsol, said.



BioLNG representatives

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DHSC gains AiP for LNG Aframax design

Korean shipbuilder Daehan Shipbuilding (DHSC) has received accreditation for a new LNG-fuelled Aframax tanker design.

The 115,000 deadweight-tonne tanker design received Approval in Principle from standards agency DNV GL, paving the way for it to progress to fabrication. The joint development project undertaken by DHSC and DNV GL focussed on producing a design that is tailored to these emerging regulatory and market trends.

"We believe the completion of this joint development project will allow us to take a competitive position in a challenging market. Eco-friendly designs enabled DHSC to win newbuilding orders. The result of the JDP will be another enabler for us to strengthen our marketing strategy," Yong-Duk Park, CEO of DHSC, said.

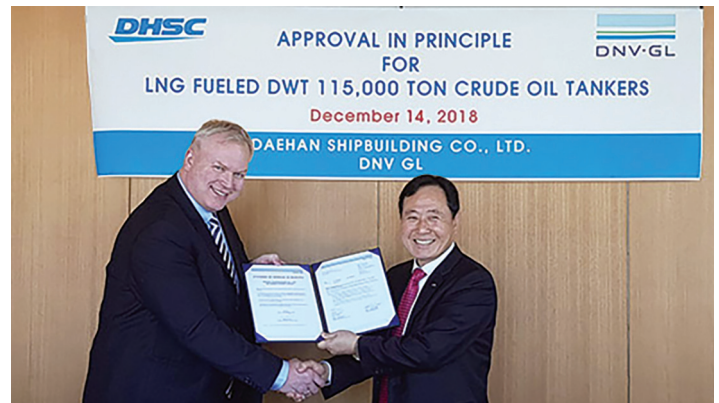
DHSC targets LNG growth

Located in Cheonnam Dom, South

Korea, DHSC features an industrial complex of over 2 million square meters and has backed a strategy to increase fabrication of LNG vessels following government plans to make the country a leader in LNG-related shipbuilding.

"Widening and deepening the technical expertise is essential to achieve DHSC's vision to be the best medium-sized shipyard in Korea. DNV GL is the right partner to accomplish this," Park commented.

Following a global downturn in new orders, South Korea's shipyards have struggled in recent years, losing their position as the world's largest shipbuilding sector was the largest in the world and the Ministry of Oceans and Fisheries has called for greater support for shipyards building LNG-fuelled vessels.



Vidar Dolonen and Yong-Duk Park

Shipping industry progress

As the world's largest classification society, responsible for 13,175 vessels and mobile offshore units, DNV GL has been a strong supporter of LNG as an alternative fuel for global shipping.

"This AiP is another concrete indication that the shipping industry is progressing in reducing its

environmental impact... We are pleased to deliver this AiP to DHSC after an intensive six-month project and successful completion," Vidar Dolonen, Regional Manager at DNV GL, said.

Headquartered in Bærum in Norway, DNV GL also provides a range of technical consultancy to the energy and transport sectors.

MPA introduces scrubber ban

The Maritime and Port Authority of Singapore (MPA) is to ban open-loop scrubbers, providing a boost for LNG-fuelled vessels in the country.

The new legislation will see the MPA ban discharge of wash water related to exhaust gas cleaning systems operating in wet, open-loop configuration. The ban is set to come into force at the same time as the IMO global cap on sulphur in fuel on 1 January 2020.

"To protect the marine environment and ensure the port waters are clean, the discharge of wash water from open-loop ex-

haust gas scrubbers in Singapore port waters will be prohibited," Mr Tan said in a speech to the Singapore Registry of Ships forum," Andrew Tan, chief executive of the MPA, said.

MPA to provide reception facilities

Scrubber systems have been touted as an alternative to LNG as they can be easily retrofitted onto

oil burning vessels however new regulation such as that from the MPA, means that operators will now be restricted in the fuels they can use.

"Singapore, as a party to Marpol Annex VI, will be providing reception facilities for the collection of residues generated from the operation of scrubbers," Tan commented.

Ships fitted with hybrid scrubbers will additionally be required to switch to closed-loop mode of operation while in Singaporean waters.

Scrubbers causing ocean acidification

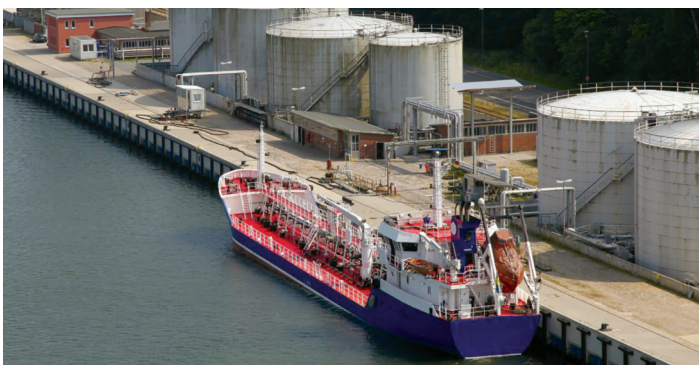
The ban on open-loop scrubbers follows research by the European Union's Joint Research Centre (JRC) which has found that residues in exhaust gas wash water lead to ocean acidification.

"Along major shipping lanes,

sulphur dioxide emissions from ships can further ocean acidification with a rate that is two-fold with respect to that caused by carbon dioxide [and cause] potential problems with water quality in critical areas such as ports, estuaries and coastal waters," the JRC states.

The MPA has is now working closely with bunker suppliers to produce a list of suppliers that are able to supply compliant fuel by the middle of next year and to ensure there will be adequate supply of compliant fuel oil in advance of 2020.

The MPA's support of LNG is part of a government drive to turn the island into a regional LNG hub, with sovereign wealth fund Temasek investing heavily in infrastructure under the Maritime Singapore Green Initiative (MSGI) to drive uptake of LNG as a fuel.



Singapore's MPA backs LNG uptake

Eagle LNG completes first bunkering of *Taino*

Fuel specialist Eagle LNG has completed first bunkering operations of the *Taino*, the world's first LNG-powered combination container/roll-on, roll-off (ConRo) vessel.

The refuelling operation was carried out at the firm's Talleyrand LNG bunker station at Jaxport in Florida and follows delivery of the *Taino* to shipping line Crowley Maritime in December.

"[The] launch represents another momentous achievement for the men and women at Crowley, VT Halter Marine and other partners, who have dedicated themselves to designing and building this pioneering ship as well as sister ship, *El Coquí*," Tom Crowley, CEO of Crowley Maritime, said.

Refuelling in less than eight hours

Fabricated by shipbuilder VT Halter Marine the *Taino* is the second Commitment Class LNG-fuelled vessel launched by Crowley and will operate between the port of Jacksonville, or Jaxport, and San Juan in Puerto Rico.

Eagle LNG is a wholly owned

subsidiary of Ferus Natural Gas Fuels and privately-held by The Energy & Minerals Group (EMG). The firm also owns LNG logistics assets that are currently supporting LNG piloting activities in other energy intensive industries throughout the country.

The groups newly designed Talleyrand bunkering facility includes 500,000 LNG-gallons of storage capacity and has a design capacity flow rate of 2,700 gallons per minute, allowing for refuelling of the *Taino* in less than eight hours.

2,400 TEU capacity

Both the *Taino* and *El Coquí* feature capacity for 2,400 twenty-

foot-equivalent container units (TEUs) and a mix of nearly 400 cars and larger vehicles in the enclosed, ventilated and weather-tight Ro/Ro decks. The vessels can also accommodate containers up to 53-foot in length as well as up to 300 refrigerated containers.

"Cargo for businesses and consumers will be able to dependably reach markets at peak time, whether it is dry, refrigerated, or breakbulk, such as vehicles and other rolling stock. The added speed and efficiency provided by these high-performing ships will benefit customers shipping goods between the mainland and the is-

land," John Hourihan, senior vice president at Crowley, said.

The launch follows commencement of operation of three new, ship-to-shore gantry cranes by Crowley at the Isla Grande Terminal in Puerto Rico. The cranes were manufactured by Liebherr Container Cranes, in Ireland and are the first new, specialized gantry cranes to be received for operation in San Juan Harbor in more than five decades.

Based in Jacksonville, Florida, Crowley Maritime is a family and employee-owned marine solutions provider with around 300 Puerto Rico employees. ■

“

The ... newly designed Talleyrand bunkering facility ...allows for refuelling of the *Taino* in less than eight hours.

”



The *Taino*



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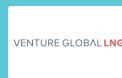
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WORLD SMALL SCALE LNG FLEET*

Built	Name	CBM	Cargo Type	Trading area	Trading in LNG?	Ship Owner / Operator
1974	Seagas	187	LNG	Sweden	Yes	AGA
1988	Kayoh Maru	1,517	LNG	Japan	Yes	Daiichi
1993	Aman Bintulu / Lucia Ambition	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	Aman Hakata	18,800	LNG	Malaysia - Japan	Yes	Perbadanan/NYK
2000	Triputra (ex Surya Satsuma)	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	Norgas Creation	10,000	LNG/LPG/Ethylene	Worldwide	No	Norgas Carriers
2010	Norgas Innovation	10,000	LNG/LPG/Ethylene	Worldwide	No	Norgas Carriers
2011	Akebono Maru	3,556	LNG	Japan	Yes	Chuo Kaiun
2011	Norgas Conception	10,000	LNG/LPG/Ethylene	Worldwide	No	Norgas Carriers
2011	Norgas Invention	10,000	LNG/LPG/Ethylene	Worldwide	No	Norgas Carriers
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
2014	LNG-Oil combi**	2,000	LNG	Germany	Yes	Veka
2014	Short Sea LNG Tanker **	4,000	LNG	Germany	Yes	Veka
2015	LNG Inland bunker**	800	LNG	Germany	Yes	Veka
2015	LNG bunker barge 1†	2,250	LNG	China	Yes	Anhui Huaqiang Natural Gas
2015	LNG bunker barge 2†	2,250	LNG	China	Yes	Anhui Huaqiang Natural Gas
2015	LNG bunker barge 3†	2,250	LNG	China	Yes	Anhui Huaqiang Natural Gas
2015	LNG Barge TBN	3,000	LNG	US Coast	Yes	LNG America
2015	10 small carriers TBN**	5,000	LNG			Bimantara Group
2015	Jahre TBN**	6,200	LNG	Norway	Yes	Donsotank/Jahre Marine
2015	Norgas TBN**	17,000	LNG/LPG/Ethylene	Worldwide		Norgas Carriers
2015	Norgas TBN**	17,000	LNG/LPG/Ethylene	Worldwide		Norgas Carriers
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	TBN 1	27,500	LNG	China?		Danyang?
2015	TBN 2	27,500	LNG	China?		Danyang?
2015	TBN 3	27,500	LNG	China?		Danyang?
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

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 = 10th January 2019

Built	Name	CBM	Cargo Type	Trading area	Trading in LNG?	Ship Owner / Operator
2016	Hai Yang Shi You 301	30,000	LNG	Bali FSU	Yes	CETS (CNOOC)
2016	Navigator Aurora	35,000	Ethane/Ethylene	Markus Hood - Stenungsund	Ethane, for Borealis	Navigator
2016	Gaschem Beluga	36,000	Ethane/Ethylene	US - Teeside	Ethane, for Sabic	Gaschem Services
2016	Gaschem Orca	36,000	Ethane/Ethylene	US - Teeside	Ethane, for Sabic	Gaschem Services
2016	Ocean Yield TBN**	36,000	Ethane/Ethylene	US - Teeside	Ethane, for Sabic	Gaschem Services
2017	Oizmendi	600	LNG	Bilbao	Yes	Itsas Gas
2017	CME TBN†	2,200	LNG	US Coast	Yes	CME
2017	CME TBN†	2,200	LNG	US Coast	Yes	CME
2017	ENGIE Zeebrugge	5,000	LNG	Northwest Europe	Yes	NYK
2017	Coralius	5,800	LNG	Northwest Europe/Baltics	Yes, for Skangas	Anthony Veder
2017	Cardissa	6,500	LNG	Northwest Europe	Yes	Shell
2017	LNG-Gorskaya TBN	7,300	LNG	Russia	Yes	LNG-Gorskaya
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	Yuan He 1	30,000	LNG	China	Yes	CSR
2017	Navigator Eclipse	35,000	Ethane/Ethylene	US	Ethane	Navigator
2017	Navigator Nova	35,000	Ethane/Ethylene	US	Ethane	Navigator
2017	Navigator Prominence	35,000	Ethane/Ethylene	US	Ethane	Navigator
2018	HUA XIANG 8	13,720	LNG	China	Yes	Zhejiang Huaxiang
2018	CME TBN†	2,200	LNG	US Coast	Yes	CME
2018	Shell Bunker Barge TBN 4	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	Qi Yuan	28,000	LNG	China	Yes	Dalian Inteh Group
2018	Evergas TBN	32,000	Ethane/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2018	Evergas TBN	32,000	Ethane/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2018	Evergas TBN	32,000	Ethane/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2018	Evergas TBN	32,000	Ethane/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
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
2020	Shell Bunker Barge	4,000	LNG	US Coast	Yes	Q-LNG Transport / Harvey Gulf
2020	Stolt TBN (option) **	7,500	LNG		Yes	Stolt-Nielsen Gas
2020	Stolt TBN (option)	7,500	LNG		Yes	Stolt-Nielsen Gas
2020	Total TBN	18,600	LNG	NWE	Yes	MOL
2020	FuelLNG TBN	7,500	LNG	Singapore	Yes	FuelLNG
2020	CLS TBN	3,500	LNG	Japan	Yes	CLS
2020	Eesti Gaas TBN	6,000	LNG	NWE	Yes	Eesti Gaas
2020	ENN TBN	8,500	LNG	China	Yes	ENN
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

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 = 10th January 2019

WORLD LNG-FUELLED CONFIRMED NEWBUILDS

Year of delivery	Ship name	Ship type	Shipowner	Area of operation	Class
2019	AIDA	Cruise ships	Aida Cruises	Global	RINA
2019	Bonny River	Other activities	DEME	Europe	BV
2019	Costa Smeralda	Cruise ships	Costa Crociere	Global	RINA
2019	Elemarateyah	Tugs	Drydocks World	Middle East	Tasneef
2019	Færøy	Car/Passenger ferries	Torghatten	Norway	DNV GL
2019	Ferus smit 444	Oil/Chemical tankers	Thun Tankers	Europe	BV
2019	Ferus smit 451	Oil/Chemical tankers	Thun Tankers	Europe	BV
2019	Ferus smit 452	Oil/Chemical tankers	Thun Tankers	Europe	BV
2019	Ferus Smit 453	Bulk carriers	Erik Thun	Europe	LR
2019	Flatøy	Car/Passenger ferries	Torghatten	Norway	DNV GL
2019	Greenports 1	Other activities	Bremenports	Europe	DNV GL
2019	Harvey Patriot	Offshore supply ships	Harvey Gulf International Marine	America	ABS
2019	Honfleur	RoPax	Brittany Ferries	Europe	BV
2019	Huftarøy	Car/Passenger ferries	Torghatten	Norway	DNV GL
2019	Hypatia de Alejandria	RoPax	Baleària	Europe	Unknown
2019	Jos-Deschenes II	Car/Passenger ferries	Society of Quebec ferries	America	LR
2019	Ishin	Tugs	Mitsui O.S.K. Lines	Asia	Unknown
2019	L'Ostrea	Other activities	Dragages-Ports	Europe	Unknown
2019	Libas	Fishing vessels	Liegruppen	Norway	Unknown
2019	Lysøy	Car/Passenger ferries	Torghatten	Norway	DNV GL
2019	Marie Curie	RoPax	Baleària	Europe	Unknown
2019	Orion	Other activities	DEME	Europe	DNV GL
2019	PX 1098	Tugs	PSA Marine	Asia	--
2019	Rossi A. Desgagnés	Oil/Chemical tankers	Groupe Desgagnés	America	BV
2019	Samnøy	Car/Passenger ferries	Torghatten	Norway	DNV GL
2019	Samsung 2236	Crude oil tankers	AET	Global	DNV GL
2019	Samsung 2237	Crude oil tankers	AET	Global	DNV GL
2019	Samsung 2241	Crude oil tankers	Teekay	Global	DNV GL
2019	Siem Confucius	Car carriers	Siem Car Carriers	Global	ABS
2019	Siem Melody	Offshore supply ships	Siem Offshore	Norway	DNV GL
2019	Siem Rhapsody	Offshore supply ships	Siem Offshore	Norway	DNV GL
2019	Sleipnir	General cargo ships	Heerema Offshore Services	Global	LR
2019	Spartacus	Other activities	DEME	Europe	BV
2019	TBN	General cargo ships	SeOil Agency/Gas Entec	Global	Unknown
2019	TBN	Oil/Chemical tankers	Sinanju Tankers	Asia	Unknown
2019	TBN	RoPax	Baleària	Europe	BV
2019	TBN	RoPax	Rederi AB Gotland	Europe	DNV GL
2019	TBN 1	Car carriers	Siem Car Carriers	Global	ABS
2019	TBN 1	Car/Passenger ferries	Clyde and Hebrides Ferry Service (CHFS)		EuropeLR
2019	TBN 1	Car/Passenger ferries	Royal Doeksen	Europe	LR
2019	TBN 1	Crude oil tankers	AET	Global	ABS
2019	TBN 1	Oil/Chemical tankers	Älvtank	Europe	BV
2019	TBN 1	Oil/Chemical tankers	Harley Marine Services Singapore	Asia	Unknown
2019	TBN 1	Other activities	German Transport Ministry	Europe	Unknown
2019	TBN 1	Tugs	Ningbo Zhoushan Port Co.	Asia	CSS
2019	TBN 2	Car/Passenger ferries	Clyde and Hebrides Ferry Service (CHFS)		EuropeLR
2019	TBN 2	Car/Passenger ferries	Royal Doeksen	Europe	LR
2019	TBN 2	Container ships	Containerships	Europe	ABS

Year of delivery	Ship name	Ship type	Shipowner	Area of operation	Class
2019	TBN 2	Crude oil tankers	AET	Global	ABS
2019	TBN 2	Oil/Chemical tankers	Älvtank	Europe	BV
2019	TBN 2	Oil/Chemical tankers	Furetank Rederi	Europe	BV
2019	TBN 2	Oil/Chemical tankers	Harley Marine Services Singapore	Asia	Unknown
2019	TBN 2	Other activities	German Transport Ministry	Europe	Unknown
2019	TBN 3	Container ships	Containerships	Europe	ABS
2019	TBN 4	Container ships	CMA CGM	Global	BV
2019	TBN 4	Container ships	Containerships	Europe	ABS
2019	TBN 4	Crude oil tankers	SCF	Europe	DNV GL
2019	TBN 5	Crude oil tankers	SCF	Europe	DNV GL
2019	TBN 6	Crude oil tankers	SCF	Europe	DNV GL
2019	Bencomo Express	Car/Passenger ferries	Fred. Olsen	Europe	DNV GL
2019	Napoles	RoPax	Baleària	Europe	RINA
2019	Samuel de Champlain	Other activities	Dragages-Ports	Europe	BV
2019	Sicilia	RoPax	Baleària	Europe	RINA
2019	Spirit of Vancouver Island	Car/Passenger ferries	BC Ferries	America	ABS
2020	Atair	Other activities	German Transport Ministry	Europe	DNV GL
2020	Brodosplit 476	Container ships	Brodosplit Shipping Company	Europe	DNV GL
2020	Samsung 2242	Crude oil tankers	Teekay	Global	DNV GL
2020	Samsung 2256	Crude oil tankers	Teekay	Global	DNV GL
2020	Samsung 2257	Crude oil tankers	Teekay	Global	DNV GL
2020	Samsung 2286	Crude oil tankers	Teekay	Global	DNV GL
2020	TBN	Container ships	Brodosplit Shipping Company	Europe	DNV GL
2020	TBN 1	Container ships	Brodosplit Shipping Company	Europe	DNV GL
2020	TBN 1	Container ships	CMA CGM	Global	BV
2020	TBN 1	Container ships	Pasha Hawaii	America	Unknown
2020	TBN 1	Cruise ships	Carnival Corporation	Global	RINA
2020	TBN 1	Cruise ships	P&O Cruises	Global	RINA
2020	TBN 1	Fishing vessels	Nordlaks	Norway	DNV GL
2020	TBN 1	Oil/Chemical tankers	SCF	Global	RS
2020	TBN 2	Container ships	Brodosplit Shipping Company	Europe	DNV GL
2020	TBN 2	Container ships	CMA CGM	Global	BV
2020	TBN 2	Container ships	Pasha Hawaii	America	Unknown
2020	TBN 2	Oil/Chemical tankers	SCF	Global	RS
2020	TBN 3	Container ships	CMA CGM	Global	BV
2020	TBN 3	Oil/Chemical tankers	SCF	Global	RS
2020	TBN 5	Container ships	Containerships	Europe	ABS
2020	TBN 6	Container ships	CMA CGM	Global	BV
2020	TBN 6	Container ships	Containerships	Europe	ABS
2020	TBN 7	Container ships	CMA CGM	Global	BV
2020	TBN 8	Container ships	CMA CGM	Global	BV
2020	TBN 9	Container ships	CMA CGM	Global	BV
2020	TBN High Speed Catamaran	Car/Passenger ferries	Baleària	Europe	BV
2020	Xiamen	RoPax	Viking Line	Europe	DNV GL
2020	Kong Harald	Cruise ships	Hurtigruten	Norway	DNV GL
2020	Nordkapp	Cruise ships	Hurtigruten	Norway	DNV GL
2020	Nordnorge	Cruise ships	Hurtigruten	Norway	DNV GL

Year of delivery	Ship name	Ship type	Shipowner	Area of operation	Class
2021	Avic Weihai W268	RoPax	Stena	Europe	DNV GL
2021	Costa	Cruise ships	Costa Crociere	Global	RINA
2021	Havila Polaris	Cruise ships	Havila Kysttruten	Norway	--
2021	Havila Pollux	Cruise ships	Havila Kysttruten	Norway	--
2021	Ponant Icebreaker	Cruise ships	Ponant	Global	BV
2021	Samsung 2287	Crude oil tankers	Teekay	Global	DNV GL
2021	TBN 1	Bulk carriers	H-Line	Global	DNV GL/KR
2021	TBN 1	Crude oil tankers	Rosneft	Europe	RR
2021	TBN 1	Cruise ships	Disney Cruise Lines	Global	LR
2021	TBN 1	Cruise ships	Havila Kysttruten	Norway	DNV GL
2021	TBN 1	Oil/Chemical tankers	Donsötank	Global	--
2021	TBN 1	Other activities	Van Oord	Global	BV
2021	TBN 1	RoPax	TT Line Co Pty Ltd	Oceania	LR
2021	TBN 2	Bulk carriers	H-Line	Global	DNV GL/KR
2021	TBN 2	Crude oil tankers	Rosneft	Europe	RR
2021	TBN 2	Cruise ships	Havila Kysttruten	Norway	DNV GL
2021	TBN 2	Fishing vessels	Nordlaks	Norway	--
2021	TBN 2	Oil/Chemical tankers	Donsötank	Global	--
2021	TBN 2	Other activities	Van Oord	Global	BV
2021	TBN 2	RoPax	TT Line Co Pty Ltd	Oceania	LR
2021	TBN 3	Crude oil tankers	Rosneft	Europe	RR
2021	TBN 4	Crude oil tankers	Rosneft	Europe	RR
2021	TBN 5	Container ships	CMA CGM	Global	BV
2021	TBN 5	Crude oil tankers	Rosneft	Europe	RR
2021	Midnight Sun	Ro-Ro cargo ships	TOTE Shipholdings	America	ABS
2021	Nordlys	Cruise ships	Hurtigruten	Norway	DNV GL
2021	North Star	Ro-Ro cargo ships	TOTE Shipholdings	America	ABS
2021	Polarlys	Cruise ships	Hurtigruten	Norway	DNV GL
2021	Richard With	Cruise ships	Hurtigruten	Norway	DNV GL
2022	Icon of the Seas	Cruise ships	RCCL	Global	DNV GL
2022	TBN	RoPax	TT-Line GmbH	Europe	--
2022	TBN 1	Cruise ships	MSC Cruises	Global	BV
2022	TBN 1	RoPax	Polish Baltic Shipping Company	Europe	Unknown
2022	TBN 2	Cruise ships	Carnival Corporation	Global	RINA
2022	TBN 2	Cruise ships	Disney Cruise Lines	Global	LR
2022	TBN 2	Cruise ships	P&O Cruises	Global	RINA
2023		Cruise ships	Aida Cruises	Global	RINA
2023	TBN 1	Cruise ships	Princess Cruises	Global	Unknown
2023	TBN 3	Cruise ships	Disney Cruise Lines	Global	LR
2023	TBN 3	Cruise ships	MSC Cruises	Global	BV
2024	TBN	Cruise ships	RCCL	Global	DNV GL
2024	TBN 1	Cruise ships	TUI Cruises	Global	Unknown
2024	TBN 2	Cruise ships	MSC Cruises	Global	BV
2025	TBN 2	Cruise ships	Princess Cruises	Global	Unknown
2026	TBN 2	Cruise ships	TUI Cruises	Global	Unknown

LNG-FUELLED SHIPS IN OPERATION WORLDWIDE

Year of delivery	Ship name	Ship type	Shipowner	Area of operation	Class
2000	Glutra	Car/Passenger ferries	Fjord1	Norway	DNV GL
2003	Stril Pioner	Offshore supply ships	Simon Møkster	Norway	DNV GL
2003	Viking Energy	Offshore supply ships	Eidesvik Shipping	Norway	DNV GL
2006	Bergensfjord	Car/Passenger ferries	Fjord1	Norway	DNV GL
2007	Fana fjord	Car/Passenger ferries	Fjord1	Norway	DNV GL
2007	Mastra fjord	Car/Passenger ferries	Fjord1	Norway	DNV GL
2007	Raunefjord	Car/Passenger ferries	Fjord1	Norway	DNV GL
2007	Stavangerfjord	Car/Passenger ferries	Fjord1	Norway	DNV GL
2009	Barentshav	Other activities	Remøy Management	Norway	DNV GL
2008	Viking Queen	Offshore supply ships	Eidesvik Shipping	Norway	DNV GL
2009	Dronningen	Car/Passenger ferries	Norled	Norway	DNV GL
2009	Kongen	Car/Passenger ferries	Norled	Norway	DNV GL
2009	Moldefjord	Car/Passenger ferries	Fjord1	Norway	DNV GL
2009	Prinsen	Car/Passenger ferries	Norled	Norway	DNV GL
2009	Viking Lady	Offshore supply ships	Eidesvik Shipping	Norway	DNV GL
2010	Bergen	Other activities	Remøy Management	Norway	DNV GL
2010	Fannefjord	Car/Passenger ferries	Fjord1	Norway	DNV GL
2010	Korsfjord	Car/Passenger ferries	Fjord1	Norway	DNV GL
2010	Romsdalsfjord	Car/Passenger ferries	Fjord1	Norway	DNV GL
2010	Selbjørnsfjord	Car/Passenger ferries	Fosen Namsos Sjø	Norway	DNV GL
2010	Sortland	Other activities	Remøy Management	Norway	DNV GL
2011	Boknafjord	Car/Passenger ferries	Fjord1	Norway	DNV GL
2011	Normand Arctic	Offshore supply ships	Solstad Rederi	Norway	DNV GL
2011	Skandi Gamma	Offshore supply ships	DOF	Norway	DNV GL
2011	Bit Viking	Oil/Chemical tankers	Tarbit Shipping	Norway	DNV GL
2012	Barøy	Car/Passenger ferries	Torghatten Nord	Norway	DNV GL
2012	Høydal	General cargo ships	Nordnorsk Shipping	Norway	DNV GL
2012	Island Contender	Offshore supply ships	Island Offshore	Norway	DNV GL
2012	Landegode	Car/Passenger ferries	Torghatten Nord	Norway	DNV GL
2012	Island Crusader	Offshore supply ships	Island Offshore	Norway	DNV GL
2012	Olympic Energy	Offshore supply ships	Olympic Shipping	Norway	DNV GL
2012	Værøy	Car/Passenger ferries	Torghatten Nord	Norway	DNV GL
2012	Viking Prince	Offshore supply ships	Eidesvik Shipping	Norway	DNV GL
2012	Viking Princess	Offshore supply ships	Eidesvik Shipping	Norway	DNV GL
2012	Tresfjord	Car/Passenger ferries	Fjord1	Norway	DNV GL
2013	Econuri	Other activities	Incheon Port Authority	Asia	KR
2013	Eidsvaag Pioner	General cargo ships	Eidsvaag	Norway	DNV GL
2013	Francisco	Car/Passenger ferries	Buquebus	America	DNV GL
2013	Hai Yang Shi You 521	Tugs	CNOOC	Asia	CCS
2013	Hai Yang Shi You 522	Tugs	CNOOC	Asia	CCS
2013	Hardanger	Car/Passenger ferries	Norled	Norway	DNV GL
2013	Lødingen	Car/Passenger ferries	Torghatten Nord	Norway	DNV GL
2013	REM Leader	Offshore supply ships	REM	Norway	DNV GL
2013	Ryfylke	Car/Passenger ferries	Norled	Norway	DNV GL
2013	Stavangerfjord	RoPax	Fjordline	Norway	DNV GL
2013	Viking Grace	RoPax	Viking Line	Europe	LR
2014	Bergensfjord	RoPax	Fjordline	Norway	DNV GL
2014	Bokn	Tugs	Buksér & Berging	Norway	DNV GL
2014	Borgøy	Tugs	Buksér & Berging	Norway	DNV GL
2014	Coral Star	Gas tankers	Anthony Veder	Europe	BV
2014	Coral Sticho	Gas tankers	Anthony Veder	Europe	BV
2014	Rem Eir	Offshore supply ships	Remøy Shipping	Norway	DNV GL
2014	Siem Symphony	Offshore supply ships	Siem Offshore	Norway	DNV GL

For more information please visit www.dnvgl.com

Data last updated: 29th January 2019

* = conversion projects

Year of delivery	Ship name	Ship type	Shipowner	Area of operation	Class
2014	Turva	Other activities	Finnish Border Guard	Europe	DNV GL
2014	With Harvest	General cargo ships	Egil Ulvan Rederi	Norway	DNV GL
2014	With Marine	General cargo ships	Egil Ulvan Rederi	Norway	DNV GL
2015	F.A. Gauthier	Car/Passenger ferries	Society of Quebec ferries	America	LR
2015	Greenland	Bulk carriers	Erik Thun	Europe	LR
2015	Hai Yang Shi You 525	Tugs	CNOOC	Asia	CCS
2015	Harvey Energy	Offshore supply ships	Harvey Gulf International Marine	America	ABS
2015	Harvey Power	Offshore supply ships	Harvey Gulf International Marine	America	ABS
2015	Helgoland	Car/Passenger ferries	AG EMS	Europe	DNV GL
2015	JS Ineos Ingenuity	Gas tankers	Evergas	Global	BV
2015	JS Ineos Insight	Gas tankers	Evergas	Global	BV
2015	JS Ineos Intrepid	Gas tankers	Evergas	Global	BV
2015	Kvitbjørn	Ro-Ro cargo ships	Nor Lines	Norway	DNV GL
2015	Kvitnos	Ro-Ro cargo ships	Nor Lines	Norway	DNV GL
2015	Perla del Caribe	Container ships	TOTE Shipholdings	America	ABS
2015	Prinsesse Isabella	Car/Passenger ferries	Samsøe municipality	Europe	DNV GL
2015	Sakigake	Tugs	NYK	Asia	NK
2015	Sefarina	Gas tankers	Chemgas Shipping	Europe	BV
2015	Siem Pride	Offshore supply ships	Siem Offshore	Norway	DNV GL
2015	Stril Barents	Offshore supply ships	Simon Møkster Shipping	Norway	DNV GL
2015	Bergen Viking	Oil/Chemical tankers	Bergen Tankers	Norway	LR
2015	Fure West	Oil/Chemical tankers	Furetank Rederi	Europe	BV
2015	Ostfriesland	Car/Passenger ferries	AG EMS	Europe	DNV GL
2016	Auto Eco	Car carriers	UECC	Europe	DNV GL
2016	Auto Energy	Car carriers	UECC	Europe	DNV GL
2016	Bergsfjord	Car/Passenger ferries	Boreal Transport Nord	Norway	DNV GL
2016	Hai Yang Shi You 526	Tugs	CNOOC	Asia	CCS
2016	Harvey Liberty	Offshore supply ships	Harvey Gulf International Marine	America	ABS
2016	Hasvik	Car/Passenger ferries	Boreal Transport Nord	Norway	DNV GL
2016	Ireland	Bulk carriers	Erik Thun	Europe	LR
2016	Isla Bella	Container ships	TOTE Shipholdings	America	ABS
2016	Js Ineos Innovation	Gas tankers	Evergas	Global	BV
2016	JS Ineos Inspiration	Gas tankers	Evergas	Global	BV
2016	Navigator Eclipse	Gas tankers	Navigator Gas	Global	ABS
2016	Polaris	Other activities	Arctia Shipping	Europe	LR
2016	Salish Orca	Car/Passenger ferries	BC Ferries	America	LR
2016	Searoad Mersey II	Ro-Ro cargo ships	Searoad Holdings	Oceania	DNV GL
2016	Seaspan Swift	Car/Passenger ferries	Seaspan Ferries Corporation	America	BV
2016	Siem Thiima	Offshore supply ships	Siem Offshore	Oceania	DNV GL
2016	Sundowner	Gas tankers	Chemgas Shipping	Europe	BV
2016	Tern Sea	Oil/Chemical tankers	Termtank	Europe	BV
2016	Ternfjord	Oil/Chemical tankers	Termtank	Norway	BV
2016	Ternsund	Oil/Chemical tankers	Termtank	Norway	BV
2017	Audax	Tugs	Østensjø Rederi	Norway	BV
2017	Damia Desgagnés	Oil/Chemical tankers	Groupe Desgagnés	Global	BV
2017	Dux	Tugs	Østensjø Rederi	Norway	BV
2017	Gaschem Beluga	Gas tankers	Ocean Yield	Global	DNV GL
2017	Gaschem Orca	Gas tankers	Ocean Yield	Global	DNV GL
2017	Harvey Freedom	Offshore supply ships	Harvey Gulf International Marine	America	ABS
2017	Js Ineos Independence	Gas tankers	Evergas	Global	BV
2017	JS Ineos Intuition	Gas tankers	Evergas	Global	BV
2017	JS Ineos Invention	Gas tankers	Evergas	Global	BV
2017	Megastar	RoPax	Tallink	Europe	BV

Year of delivery	Ship name	Ship type	Shipowner	Area of operation	Class
2017	Mia Desgagnés	Oil/Chemical tankers	Groupe Desgagnés	America	BV
2017	Minerva	Other activities	DEME	Europe	BV
2017	Navigator Nova	Gas tankers	Navigator Gas	Global	ABS
2017	Navigator Prominence	Gas tankers	Navigator Gas	Global	ABS
2017	Pax	Tugs	Østensjø Rederi	Norway	BV
2017	Salish Raven	Car/Passenger ferries	BC Ferries	America	LR
2017	Salish Eagle	Car/Passenger ferries	BC Ferries	America	LR
2017	Scheldt River	Other activities	DEME	Europe	BV
2017	Seaspan Reliant	Car/Passenger ferries	Seaspan Ferries Corporation	America	BV
2017	Tern Ocean	Oil/Chemical tankers	Terntank	Europe	BV
2017	Abel Matutes	RoPax	Baleària	Europe	BV
2017	Wes Amelie	Container ships	Wessels Reederei	Europe	BV
2018	Aidanova	Cruise ships	Aida Cruises	Global	RINA
2018	Armand-Imbeau II	Car/Passenger ferries	Society of Quebec ferries	America	LR
2018	Containerships Nord	Container ships	Containerships	Europe	ABS
2018	Ecodelta	Other activities	van der Kamp	Europe	DNV GL
2018	El Coquí	Container ships	Crowley Maritime Corporation	America	DNV GL
2018	Elio	Car/Passenger ferries	Caronte & Tourist	Europe	RINA
2018	Fure Valö	Oil/Chemical tankers	Furetank Rederi	Europe	BV
2018	Fure Vinga	Oil/Chemical tankers	Furetank Rederi	Europe	BV
2018	Gagarin Prospect	Crude oil tankers	SCF	Europe	DNV GL
2018	Haaga	Bulk carriers	ESL Shipping	Europe	DNV GL
2018	Harvey America	Offshore supply ships	Harvey Gulf International Marine	America	ABS
2018	Ilshin Green Iris	Bulk carriers	Ilshin	Asia	LR
2018	KST Liberty	Tugs	Keppel Smit Towage (Boskalis)	Asia	ABS
2018	Living Stone	Other activities	DEME Tideway	Europe	DNV GL
2018	Lomonosov Prospect	Crude oil tankers	SCF	Europe	DNV GL
2018	Maju Loyalty	Tugs	Maju Maritime (Boskalis)	Asia	ABS
2018	Mendeleev Prospect	Crude oil tankers	SCF	Europe	DNV GL
2018	Nyksund	General cargo ships	Nordnorsk Shipping	Norway	DNV GL
2018	Paul A. Desgagnés	Oil/Chemical tankers	Groupe Desgagnés	America	BV
2018	Taíno	Container ships	Crowley Maritime Corporation	America	DNV GL
2018	Thun Eos	Oil/Chemical tankers	Thun Tankers	Europe	BV
2018	Thun Verner	Oil/Chemical tankers	Thun Tankers	Europe	BV
2018	Viikki	Bulk carriers	ESL Shipping	Europe	DNV GL
2018	Visborg	RoPax	Rederi AB Gotland	Europe	DNV GL
2018	Spirit of British Columbia	Car/Passenger ferries	BC Ferries	America	ABS

AREAS WITH OPERATING LNG-FUELLED VESSELS



LNG FUELLED FLEET BY VESSEL TYPE



Charts updated 29 January 2019