LNG Fuelling

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IMO adopts 2020 carriage ban

The International Maritime Organization (IMO) has adopted an amendment to its forthcoming 0.5% limit on sulphur in ships fuel oil, designed to prohibit the carriage of non-compliant fuel oil.

The move is hoped to boost the outlook for LNG-fuelled ships when it enters into force on 1 March 2020 under IMO's 'tacit acceptance' procedure. The amendment will limit the carriage of fuel oil for propulsion or operation on board a ship unless the ship has an exhaust gas cleaning system.

While installation of a scrubber is accepted by flag States as an alternative means to meet the sulphur limit this approach can often be costlier than LNG in the long term, strengthening the economic argument for wider LNG use.



IMO sulphur limits will enter force next year

EBP phase resolution

The IMO's Marine Environment Protection Committee (MEPC) also sought to draw a line under discussions for a proposed experience-building phase (EBP) last month.

The EBP aims examine global compliance measures and availability of compliant fuel following implementation of the 0.5 sulphur cap and following the MEPC 73's plenary meeting at the end of October, MEPC committee chair Hideaki Saito invited submissions of further 'concrete' proposals ahead of the committee's next meeting in May 2019.

The EBP proposals will focus on how to 'enhance' the provisions of regulation 18 of MARPOL Annex VI, in particular on fuel oil quality and reporting of non-availability of compliant fuel oils

"The consensus agreement reached at IMO on Wednesday to ask for a concrete proposal to strengthen the implementation of MARPOL Annex VI, regulation 18, is very satisfactory to BIMCO... The MEPC has furthermore rejected attempts to defer adoption of the ban on carriage of non-compliant fuel, and adoption of this new regulation is expected to take place later this week. BIMCO has worked for a carriage ban, and is pleased that it is going to be adopted," a statement from the Baltic and International Maritime Council (BIMCO) states.



Delegates at MEPC 73

Necessary additions for IMO GISIS

BIMCO has been one of the main sponsors of EBP measures along with support from the U.S. The proposal will now seek to establish the necessary additions to the IMO GISIS modules for holding data from the experience ships gain with regard to fuel oil availability and fuel quality.

The issue has proven divisive with supporters citing 'misconceptions' regarding the proposal and clarifying solutions in "instances where a ship is not able to achieve compliance due to fuel non-availability and fuel quality problems".

This aspect is expected to be of concern to LNG-fuelled vessel operators as LNG bunkering infrastructure as yet remains immature in many regions. ■

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Tallink orders LNG-fuelled shuttle ferry

Estonian shipping company Tallink Grupp has signed a Letter of Intent with Rauma Marine Constructions (RMC) for the construction of a new LNG-fuelled ferry for its Tallinn-Helsinki route.

The new vessel is expected to cost an estimated 250 million and will be dual fuel capable, operating on LNG as its main fuel. Construction will take place at Rauma's specialised ferry and cruise vessels shipyard in Finland.

"Tallink Grupp has put a great deal of resources and effort into developing the Tallinn-Helsinki route for decades. With the launch of the shuttle service over ten years ago, we have built a bridge between the two capitals, offering year-round frequent departures and thus bringing the two countries closer together," Paavo Nõgene, CEO of Tallink said.

Delivery 2021

The new vessel is expected to be delivered in 2021 and will employ the latest technologies to ensure the highest energy efficiency and emission standards to meet requirements on the Baltic Sea.

"This is an opportunity for us to utilize our longstanding experience and to help steer the ship traffic between Finland and Estonia in a more environmentally friendly direction... We are very pleased to announce that Rauma shipyard's shipbuilding tradition, together with Tallink, will continue with RMC's building of a new Shuttle ship,," Jyrki Heinimaa, CEO of Rauma Marine Constructions said.

Once operational the ferry will carry a total of 2,800 passengers at full capacity.



Rendition of Tallink Shuttle ferry

"Momentous achievement"

The new shuttle ferry follows the delivery of Tallink's first LNG-fuelled vessel *Megastar* last year also operating on the Tallinn-Helsinki route and with capacity for 2,800 passengers.

"The next step on our journey is the continuous development and improvement of that service. *Megastar* was the first giant leap forward for us and the new ship will be a similarly momentous achievement," Nõgene added.

Talks are ongoing between Tallink Grupp and RMC to finalize the shipbuilding contract and financing arrangements with completiong expected in the next few months. ■

Gasum acquires Lyse share in Skangas

Finnish energy group Gasum has acquired partner Lyse Group's share in LNG joint venture Skangas, increasing its shareholding to 100%.

The deal saw Gasum acquire the remaining 30% stake in Skangas in order to strengthen "a key element" of the firm's strategy and "further enhance" the development of the Nordic gas market and LNG distribution network.

"Completing the acquisition of Skangas gives us even better opportunities to build and develop the Nordic gas ecosystem and to respond to growing demand. We thank the Lyse Group for the good co-operation in developing the LNG market," Johanna Lamminen, CEO of Gasum.

The acquisition is part of growth trajectory for Gasum which first became a majority shareholder in Skangas in 2014 before increasing its stake to 70 % in 2017.

Maritime, road transport and industrial processes

Skangas has been instrumental in driving infrastructure to support LNG refuelling in the Nordic region and has announced a focus on LNG use in both maritime and heavy-duty road transport, as well as industrial processes.

"The need for cleaner fuel solutions in industry and transport is increasing significantly, and LNG is the most competitive option for low-emission fuels. We want to be the frontrunner in taking the Nordic countries to a cleaner tomorrow," Lamminen commented



Gasum LNG tank

Profits support significant investment

The group reported strengthening profits for its LNG business in the third quarter of 2018 with sales hitting €176.8 million, up from €140.5 million in the same period the previous year.

"In the years ahead, we will be investing significantly in the development of the Nordic gas market and infrastructure. We are continuously strengthening our capacity to offer diverse, competitive and easy-to-access gas solutions to our customers in Finland, Sweden and Norway," Lamminen added.

Overall operating profit for the group sat at €93.0 million in the third quarter, up 20% on the comparative period in 2017. ■

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Scania launches world's first LNG-fuelled coach

Swedish vehicle manufacturer Scania has introduced the world's first LNG-fuelled long-distance coach.

The Scania Interlink Medium Decker coach features operational range of up to 1,000 kilometres and is claimed to reduce CO2 emissions by up to 20 percent while also substantially reducing nitrogen oxide and particulate matter emissions.

"Whereas there are several options for carbon-conscious city and suburban bus operators, there has been a void in long-distance travel market that we have now addressed," Karin Rådström, Head of Buses and Coaches at Scania, said.

The introduction signals the maturation of LNG refuelling infrastructure, particularly in Scania's home market in Scandinavia and northern Europe.



Scania coach refuels with LNG

Scania targets alternative fuel fleet

The firm states an intention to transition its entire bus and coach line-up to low-emission fuel capabiliteis ¬and has to date introduced a number of alternatives such as the Scania Citywide LE Suburban hybrid to the Scania Interlink High Decker for Hydrotreated Vegetable Oil (HVO).

"As LNG is becoming increasingly available throughout Europe, as well as in many other parts of the world, this is a timely and viable alternative." Rådström added.

"Fundamental shift" in transport solutions

While LNG use for passenger vessels has been established in Europe for many years, the uptake of LNG for land-based coach travel is predicted to be at the vanguard of wider urban transportation utilisation.

To tackle urban emissions, Scania also recently announced its Scania Zone solution to assist transport companies and their drivers in adhering to local regulations by linking policies such as speed limits, emission restrictions and noise limitations to geo-fencing zones in Scania Fleet Management.

"We are in the midst of a fundamental shift in heavy transport and Scania aims to lead the way with all the low-carbon and zero tailpipe emission vehicles that hauliers require for their operations. Cities are now in the forefront but all forms of transport will need to adjust to meet the carbon reduction target as set forth in the Paris Agreement," Alexander Vlaskamp, Senior Vice President at Scania, said.

As part of this shift, Scania also recently showcased its battery electric Citywide Low Floor bus, which is already operational in regular traffic in the northern Swedish city of Östersund. ■



Scania long distance coach

NEWS NUDGES

Suardiaz receives multi-fuel *Bunker Breeze*

Shipping line Suardiaz Energy Shipping has taken delivery of its new multi-fuel bunker vessel, *Bunker Breeze*, from Zamakona shipyard in Bilbao.

The 5,250-deadweight-tonne vessel features capacity for LNG bunker fuel via four cylindrical, deck-mounted, pressure vessel tanks, each of 300 cubic metres capcity. The vessel can also store up to 4,000 cubic metres of fuel oil and 1,000 cubic meters of marine diesel oil via 10 under-deck tanks.

Development of the *Bunker Breeze* was supported financially by the European Union-backed Core LNGas hive initiative, which encourages distribution infrastructure development to allow the use of LNG as a transport fuel, especially for ships, on the Iberian Peninsula.

Singapore to strengthen role as LNG hub

Russian energy firm Novatek Authorities in Singapore have outlined plans to ensure it retains its regional crown as LNG bunkering hub moving forward.

The Maritime and Port Authority of Singapore (MPA) is currently co-funding the construction of eight LNG-fuelled vessels that will serve in local waters and 15 truck-to-ship (TTS) LNG bunkering operations have so far been carried out.

A working group, comprising the MPA and the Ports and Harbours Bureau of Japan's Ministry of Land, Infrastructure, Transport, and Tourism, is currently assessing the feasibility of LNG bunkering for car carriers plying between Japan and Singapore. ■

Gibdock to retrofit Baleària *Napoles* for LNG

Gibraltese shipyard Gibdock is to retrofit the vessel *Napoles* to run on LNG fuel on behalf of ferry line Baleària.

The contract is part of a €60-million investment undertaken by Baleària to re-engine four of its current ferry fleet and part of a "strategic commitment" by the firm to use LNG as its main marine fuel.

"It's an LNG product geared towards the environment and we take that seriously – it is a good fit with us… It is nice to be involved in the early stages of what we see as pioneering ship repair work," Richard Beards, CEO of Gibdock, said.

Record lift for Gibdock

Installation of the 200-tonne LNG tank aboard the *Napoles* is expected to be a "key milestone" in the project, marking the heaviest lift Gibdock has ever completed.

"It is nice to be involved in the early stages of what we see as pioneering ship repair work," Beards commented.

A specialized crawler crane will be bought in to the shipyard to carry out the lift.

MAN PrimeServ to convert engines

The *Napoles* will be the first of the four vessels to be retrofit, with work starting on 15 November and scheduled to completed on 15 February. German engineering specialist MAN PrimeServ will convert the engines to LNG dual fuel.

Alongside retrofitting of existing vessels, Baleària has also ordered two newbuild ferries, investing €200 million in the construction of the *Hypatia de Alejandria* and *Marie Curie*, with the first of these scheduled for delivery in February 2019.



Balearia *Napoles*

"We are currently building the first two ships powered by this clean energy to operate in the Mediterranean," Adolfo Utor, president of Baleària, said, adding that "the digitalization of onboard services will be an added value, which will make the trip a unique experience"

Both vessels will measure 186.5 metres in length and include capacity for 810 passengers, 2,180 linear meters of cargo and 150 vehicles. ■

Rolls-Royce to supply LNG system to Havila Kystruten

Norwegian shipowner Havila Kystruten has contracted engineering group Rolls-Royce to supply power and propulsion systems for four newbuild LNG-fuelled Ro-Pax vessels currently under construction.

The Havyard 923 design vessels will be supplied by subsidiary Rolls-Royce Commercial Marine and are scheduled for delivery in 2021.

"Havila Kystruten has chosen a LNG fuel system that builds on our long experience with these type of systems, designed to be robust and reliable in rough weather conditions. No less important is the fact that the system and its engines will provide a significant reduction in emissions compared to conventional diesel engines," Steinar Oppedal, Technical Product Manager for LNG Fuel Systems, Rolls-Royce, said.

Two of the cruise ferries will be built by Spanish firm Astillero Hijos de J. Barreras shipyard while the remaining two will be built by Turkey's Tersan yard.


Rendition of Havila Kystruten vessels

Azipull-type propulsion thrusters

Rolls-Royce will supply each vessel a fully integrated LNG power and propulsion solution which will include two LNG fuel tanks with process system, and control and safety systems, four Bergen gas engines, main propulsion thrusters of type Azipull with Permanent Magnet (PM) drive motor, PM tunnel thrusters, and stabilisers of type Neptune 200.

"Each vessel will have two engines with nine in-line cylinders, and two with six cylinders. The engines can operate on variable speed to reduce both fuel consumption and emissions. The Bergen engines series is in operation across a range of vessel types today, including cargo vessels, PSVs and tugs as well as passenger vessels," a spokesperson for Rolls-Royce said.

The unique design of the main propulsion thrusters has been developed in close cooperation with ship designers, to ensure optimal integration and the energy efficient tunnel thrusters allow for a slimmer hull shape due to their narrow design.

Havila scoops new licenses

Once delivered, Havila Kystruten will operate the four ships on the coastal route between Kirkenes in northern Norway and Bergen in the south west.

In May this year, the Norwegian government awarded 11 new licenses for the route from Bergen and for the first time, the licenses have been split between two operators, and new entrant, Havila won four of the 11 licenses.

The route has been in continuous operation since 1884 and connects 34 ports with daily port calls along coastal Norway. ■

DNV GL, DSIC to develop LNG-fuelled ULCV

Standards agency DNV GL and Dalian Shipbuilding Industry Company (DSIC) have signed a joint development project agreement to develop a new LNG-fuelled ultra large container vessel (ULCV).

"In developing this new 23,000 TEU LNG fuelled ULCV design, we will show that DSIC can deliver vessels at the cutting edge of the market after two 20,000 TEU container vessels were successfully delivered to COSCO SHIPPING Group this year," Yang Zhi Zhong, President of DSIC, said.

CMA CGM competition

The project will seek to create one of the largest vessels ever powered by LNG with 23,000-TEU-capacity, surpassing Shipping line CMA CGM's order of nine 22,000-TEU-capacity ULCVs

CMA CGMs order for the new-build container ships last year is expected to drive wider acceptance of the fuel across the industry and led to an agreement covering the supply of around 300,000 tons of liquefied natural gas (LNG) a year for 10 years starting in 2020.

The JDP between DNV GL and DSIC will involve a number of feasibility studies and will continue in parallel to efforts by Bureau Veritas to provide classification for CMA CGM.



DNV GL and DSIC representatives at SMM trade fair

"We would like to thank DSIC for selecting DNV GL to take part in this project and trusting our expertise in LNG-fuelled and container shipping. The new JDP will build on the long and productive cooperation between DSIC and DNV GL, and we look forward to working with DSIC to ensure that the design meets the relevant class and international standards and regulations," Knut Ørbeck-Nilssen, CEO at DNV GL, said.

UCLV market to sustain growth

The rapid growth in the LNG-fuelled ULCV sector over the last year is expected to create significant demand for bunker solutions along with important challenges.

"We see a continuing strong market for ULCV vessels, with lower slot costs especially valued on the main trading routes. At the same time the expansion in bunkering infrastructure in both China and Europe means that LNG is becoming a viable solution for container vessels, lowering costs and ensuring compliance with incoming regulations," Zhong added. ■

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Green Corridor partners conclude JIP

LNG development consortium the Green Corridor Joint Industry Project (JIP) has concluded work to design an LNG-fuelled Newcastlemax for transport of iron ore and coal from Australia to China.

The ambitious cross-industry collaboration has brought together key stakeholders from the mining, shipping and classification standards sectors. Partners have included Australian miners BHP, Fortescue Metals Group and Rio Tinto, shipping lines MOL, U-Ming and China Merchant Energy Shipping, LNG supplier Woodside and Shell Eastern Petroleum, ship designer SDARI, and classification society DNV.

"The partners have made great progress in developing greener, more efficient, and future-proof designs. Innovations delivered will benefit not only ore and coal carriers, but the entire bulk segment," Morten Løvstad, DNV GL's Business Director for bulk carriers.

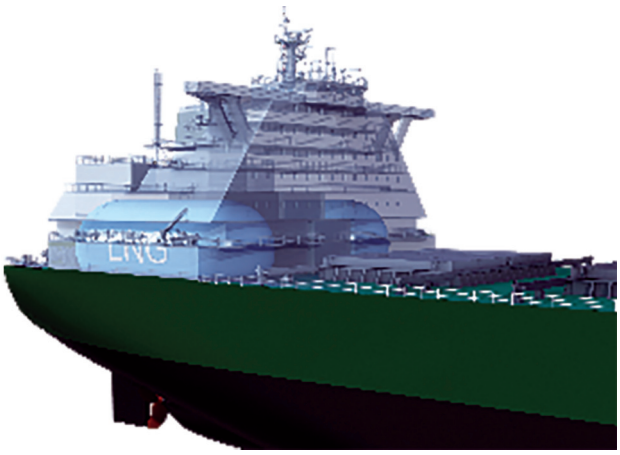
The various stakeholders from the Australia-China iron ore and coal trade route formed JIP in 2016 following confirmation in 2016 by the International Maritime Organization (IMO) of its planned 0.5 per cent global sulphur cap.

"This collaborative project has demonstrated that there is a cleaner way to ship Australia's largest export commodities to market using LNG as a marine fuel. Woodside will continue to work with industry partners to develop this opportunity," Meg O'Neill, Woodside Chief Operations Officer, said.

Australia–China Green Corridor sustainability

Since the project launch, the partners have contributed to detailed work on the commercially viable and safe design of a 210,000 deadweight-tonne LNG-fuelled bulk carrier. Concluding Pahse 1a this received Approval in Principle (AiP) from DNV GL in 2017.

"We look forward to the project results being put into action to ensure sustainability in the Australia-China Green Corridor for the coming decades... we will continue to invest to stay ahead of the technological developments," U C. K. Ong, president of U-Ming, comments.



GreenCorridor bulker design

Invaluable cooperation

Throughout the course of the two-year project, the JIP partners have investigated a range of bunkering issues including compatibility and safety studies for ship-to-ship bunkering as well as developing economic calculations to demonstrate a more robust business case for LNG as fuel.

"The cooperation between partners has in itself been invaluable, and the results will help to secure the sustainability of the route for the future... DNV GL is very pleased to have been the project manager and collaborating classification society in such a productive and beneficial project," Løvstad concludes. ■



Closing ceremony of the Green Corridor project in Singapore

NEWS NUDGES

Gazpromneft Marine Bunker registers ISO 20519

New specifications for bunkering of LNG-fuelled vessels have been registered by Gazpromneft Marine Bunker in Russia.

"Gazpromneft Marine Bunker has translated and adapted international standard ISO 20519, Ships and marine technology - Specification for bunkering of liquefied natural gas fuelled vessels, adopted in 2017. This document has been listed on the Federal Register of Standards Applicable in the Russian Federation, Registration No 1175/ISO dated 29.08.2018" Elena Kapysh of Gazpromneft stated.

The new document covers support for the IMO International Code of Safety for Ships using Gases or other Low-flashpoint Fuels (IGF Code) and sets requirements which are not covered by IGF and IGC Codes.

"In particular it contains requirements to fuel transfer systems, operational procedures, training of personnel as well as reporting and documentation. The new standard specifies basic requirements to ships supplying/accepting bunker, to LNG bunkering procedure to be approved by port authorities basing on HAZID and HAZOP analysis of the LNG bunkering operation," Kapysh added. ■

ENN orders seagoing LNG bunker vessel

Chinese gas distributor ENN Energy has ordered China's first seagoing LNG bunker vessel.

The vessel will be built by Dalian Shipbuilding Industry Company (DSIC) and will feature capacity for 8,500 cubic metres of LNG. ENN expects to operate the tanker from its newly opened Zhoushan LNG import and distribution terminal in China's eastern Zhejiang province.

DSIC is scheduled to deliver the bunker vessel in 2020, and it will be utilised forthe refuelling of LNG-powered ships as well as provision of LNG carrier precooling and gas-testing services.

The 119-metre-long bunker vessel will have two IMO Type C cargo tanks and a dual-fuel propulsion system.



ENN-owned LNG tanker *Stena Blue Sky* in Zhoushan

MoT announces national LNG strategy

The order is in line with recent policy announcements from China's Ministry of Transport concerning a national strategy for LNG as marine fuel, with the intention of having a full-scale LNG bunkering infrastructure in place by 2025.

The programme calls for 15% of government-owned vessels and 10% of shipping on the country's busiest inland waterways to be LNG-fuelled by that date.

China overtook South Korea as the world's second-largest LNG importer in 2017 with imports of 38 million tonnes, 46 percent higher than the year before.

Zhoushan receives first cargo

Earlier this year, ENN received the first cargo at its terminal, the country's first major privately-owned LNG import terminal.

The LNG tanker *Stena Blue Sky* docked at Zhoushan port after loading the fuel at Qatar's Ras Laffan LNG terminal. Zhoushan is part of an island archipelago in south Hangzhou Bay, located close to Ningbo.

ENN is spearheading uptake of LNG in China and has already signed long-term deals with Chevron Corp and Australia's Origin Energy amongst others, in deals totalling around 1.5 million tonnes per year of LNG. ■

Sovcomflot LNG tanker completes maiden voyage

Russian state-run shipping company Sovcomflot has completed the maiden voyage of its LNG-fuelled crude oil tanker *Gagarin Prospect.*

The Aframax tanker sailed across the Baltic and North Seas from Rotterdam in the Netherlands to Primorsk, Russia, delivering a cargo of 104,815 tonnes of crude oil.

World's first LNG Aframax crude oil tanker

The *Gagarin Prospect* is the world's first Aframax crude oil tanker designed to operate on LNG as its primary fuel.

"Switching to cleaner-burning LNG fuel allows Sovcomflot to significantly reduce its impact on the natural environment. This is particularly important for ships in high-traffic areas such as the Baltic and North Seas where these 'Green Funnel' tankers will primarily operate," a spokesperson for Sovcomflot said.

Two new orders with Zvezda

Headquartered in Saint Petersburg, Russia, Sovcomflot operates a chartered fleet of 148 vessels with a total deadweight of 12.8 million tonnes and specialises in the transportation of crude oil, petroleum products, and liquefied gas, as well as the servicing of offshore oil and gas exploration and production.

The shipping line is gradually switching its conventional tanker fleet from traditional heavy fuel oil to LNG and in September 2018, placed an order with Zvezda Shipbuilding Complex orders for a series of two similar LNG-fuelled Aframax tankers, both of which will then be time-chartered to Rosneft for 20 years each.

Sovcomflot received its second LNG-fuelled tanker, *Lomonosov Prospect*, in October 2018 and expects to have six such LNG-fuelled Aframax tankers in operation by the beginning of Q2 2019.

"*Gagarin Prospect* is the world's first Aframax crude oil tanker designed to operate on LNG as the primary fuel [and] is the lead ship of the next generation of tankers, which will set a new standard of navigation safety and quality," a spokesperson for Sovcomflot said. ■



The *Gagarin Prospect* at Primorsk

EU backs €2.9m Finnish LNG filling station roll-out

The European Union has announced it will invest €2.9 million in the expansion of the LNG filling station network in Finland by national energy firm Gasum.

Delivered under the EU's Connecting Europe Facility (CEF), the support proposal covers the construction of up to 14 gas filling stations in the Trans-European Transport Network (TEN-T) area in Finland.

"The stations to be built include both new LNG and biogas filling stations for heavy-duty vehicles and compressed natural gas and biogas filling stations for cars, delivery vehicles and waste management vehicles," a spokesperson for Gasum commented.

50 stations across Finland

The ambitious roll-out is only part of a wider investment planned by Gasum to construct a total of around 50 stations in Finland, Sweden and Norway in the next few years.

"The new filling stations will be located at key transport nodes as regards logistics operations, and they will enable significant increases in the use of liquefied natural gas and biogas in heavy-duty transport,"

The news follows the successful launch of Gasum's first LNG filling stations located in Helsinki, Jyväskylä, Turku and Vantaa last year and the group notes that the number of gas-fuelled vehicles registered in Finland has more than doubled in the past couple of years, rising from just under 2,000 in 2017, to the current figure already exceeding 5,500.

LBG refuelling first

In tandem with development of LNG infrastructure, Gasum has also been exploring the use of biogas for transport and in October announced the first refuelling of the Nornickel Harjavalta and Suomen Teollisuuden Energiapalvelut (STEP) bio steam boiler plant using liquefied biogas (LBG) from Skangas.

"Using liquefied biogas is a natural development towards an even cleaner operation and environment," says Marko Mikkola, Director Operations support & EHSQ, Nornickel Harjavalta.



Filling station Vantaa

LBG "hand in hand" with LNG development

The STEP steam boiler plant produces around 220,000 MWh of steam fuelled by wood pellets and is supported by back-up LNG fuel from Skangas. Gasum note that because the LNG and LBG mainly consist of methane "the existing LNG supply infrastructure can be used" and as a result the two fuels will "continue to walk hand in hand as the availability of LBG on the market is on the rise."

"Having replaced oil products with LNG in hydrogen production and bioenergy we are already significantly reducing our fossil CO2 emissions. As renewable LBG becomes increasingly available we will continue to improve our environmental footprint," Mikkola concludes. ■



Nornickel Harjavalta and Suomen Teollisuuden Energiapalvelut

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AET adds two LNG-fuelled Aframax tankers

Tanker operator AET has received two LNG dual-fuelled Aframax tankers from shipbuilder Samsung Heavy Industries in South Korea.

The vessels *Eagle Brasilia* and *Eagle Bintulu* were built at SHI's Geoje complex in South Korea and each weigh 113,400 deadweight-tonnes. Both ships are to operate on long-term charters to Shell, primarily for operations in the Atlantic Basin.

"To my mind, *Eagle Brasilia* and *Eagle Bintulu* are proof that, as an industry, we needn't see increasing environmental requirements as a threat to how we operate, but rather as an incentive to develop new, more innovative and sustainable shipping solutions," Yee Yang Chien, CEO of MISC Berhard, said.

Expanding LNG fleet

AET is a wholly owned subsidiary of Malaysian energy shipping corporation MISC Berhad and the parent company now predicts "significant growth" in its global fleet of LNG-fuelled vessels.

"We welcome these vessels as the first in what will be an expanding fleet of LNG dual fuelled vessels in the years to come, as part of our Group's Green Sustainability Agenda. This seeks to deliver environmental efficiency alongside operational excellence," Captain Rajalingam Subramaniam, President & CEO, AET, said

Single two-stroke propulsion engines

Key to this growth will be a forecast rise in LNG bunkering infrastructure which MISC feasibility studies have focused on mapping globally and analysing fuel handling and supply chain logistics

The vessels were hailed as "one of the first endorsements" of the dual-fuel concept by the crude oil carrier sector. Both ships will feature 6X62DF low-speed, dual-fuel engines, designed and licensed by Winterthur Gas & Diesel (WinGD).



AET representatives at signing ceremony

"This is a point of critical importance, as ensuring that these LNG dual-fuelled aframaxes are designed to operate with optimum efficiency, the highest standards of safety and compliance has been and remains top priority for us. Under the careful management of our shipmanagement division, Eaglestar, we look forward to ensuring our effort benefits the industry. I would also like to thank the Shell Group, for working with us in this pioneering effort," Subramaniam added.

The single two-stroke propulsion engines will be supported by three auxiliaries and two auxiliary boilers with LNG dual-fuel capability. Their design follows extensive study by AET into LNG fuelling and global fuel availability before deciding on dual-fuel propulsion units. ■

ESL Receives LNG-fuelled *Viikki*

Bulk cargo carrier ESL Shipping has received the LNG-fuelled vessel *Viikki* from the Jinling shipyard in Nanjing, China.

Measuring 160 metres in length, the vessel weighs 25,600 deadweight-tonnes and reduces carbon dioxide emission by more than 50 percent compared to previous generation of vessels.

"We are proud that this innovative and energy-efficient vessel sails under the Finnish flag," Mikki Koskinen, Managing Director of ESL Shipping, commented.

Headquartered in Helsinki, Finland, ESL Shipping provides dry bulk cargo carriage in the Baltic region and is a subsidiary of Finnish conglomerate Aspo.

Delivery via Northern Route

The vessel is sister ship to the *Haaga* which was delivered in August and both vessels will travel to the Baltic Sea via the Northern Sea Route.

"*Viikki* and *Haaga* significantly reduce emissions from our customers' transportation chains, and this new vessel category increases the flexibility of deliveries," Koskinen explained.

Reduction in travel time by nearly three weeks compared to the Panama Canal route is expected to reduce emissions from the trip by more than 40 percent.

"These new, next-generation vessels are a good example of how Aspo as a responsible owner is aiming to help mitigate climate change. Their passage via the Northern Sea Route is a concrete indication of the impact of climate change - but also of new business opportunities," Aki Ojanen, CEO of Aspo, said.



LNG-fuelled bulk carrier *Viikki*

Early adoption of 2025 requirements

Both vessels will operate all engines and boiler burner on LNG. The vessels also score approximately 50% below the current requirements on the Energy Efficiency Design Index (EEDI) and therefore already fulfil the 2025 requirements.

The addition of the *Viikki* and *Haaga* has been supported by the Bothnia Bulk project, partly funded by the EU, which aims to modernize the sea route between Luleå, Oxelösund and Raahe to be more environmentally-friendly.

Both vessels were designed by Deltamarin in Finland, and European equipment suppliers have provided roughly 60 percent of all vessel systems. ■

Crowley christens LNG-Fuelled *El Coquí*

LNG specialist Crowley Maritime has christened its new Commitment Class vessel *El Coquí,* marking the first combination container/roll-on, roll-off ship to be powered by the fuel.

NEWS NUDGES

DNV GL launches Alternative Fuels Insight platform

Standards agency DNV GL is launching a new Alternative Fuels Insight (AFI) platform offering a comprehensive and continually updated overview of LNG and alternative fuel projects, bunkering infrastructure, suppliers, and technologies.

"Initial focus is on LNG bunkering infrastructure and uptake of LNG, scrubbers and batteries on ships, but other fuels are also covered to some extent. The platform consolidates a wealth of detailed technical information on these fuels and technologies, and both content and features will be further improved and expanded over time," Martin Christian Wold, Senior Consultant at DNV GL, commented.

Most of the information in the AFI platform will be free to access.

Yanmar supplies LNG tug engines

Japanese engine manufacturer Yanmar has delivered two engines to Kanagawa Dockyard for installation on the first LNG-fuelled tug constructed in Japan based on the IGF Code.

The 6EY26DF dual-fuel commercial marine engines will be installed on a tug, under construction for Mitsui O.S.K Lines (MOL), which will be operated by Nihon Tug-Boat.

The tug is scheduled scheduled for completion in February 2019 and to begin operation commercially in April 2019. ■

Measuring 720-foot in length, the *El Coquí* was launched at the JAXPORT Cruise Terminal in Jacksonville, Florida and was hailed as the "culmination of many, many years of hard work, many, many years of transition" for this company by CEO Tom Crowley.

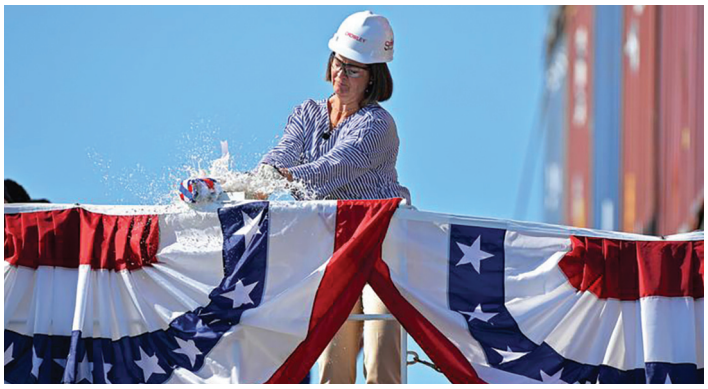
"It's remarkable to see the transition," Crowley said. "Whether it's going from Ro/Ro to Lo/Lo, the LNG fuel, putting a car house on the back of a container ship, you name it, you go through the transition of what we did to build a ship and create a supply chain that nobody else can match. And it's here today."

Sister vessel *Taíno*

Capable of carrying to 2,400 twenty-foot-equivalent container units, the 26,500 deadweight-tonne *El Coquí,* arrived in San Juan on her maiden voyage earlier this year and is the first of two vessels built as part of Crowley's Commitment Class project.

A sister vessel, the *Taíno,* is in the final phases of construction and testing at VT Halter Marine's shipyard in Pascagoula, Mississippi and is expected to be delivered later this year.

Both ships can accommodate containers in a wide range of sizes up to 53-foot by 102-inch-wide, and feature enclosed, ventilated and weather-tight Ro/Ro decks that can protectively carry cars and larger vehicles.



El Coqui Christening ceremony

US$3bn LNG-fuelling investment

Crowley has invested heavily in LNG fuelling infrastructure in recent years with US550 million invested in its Commitment Class project, and further modernization underway in its supply chain solutions, including three new gantry cranes; a new 900-foot pier; and an enhanced terminal operating system at the Isla Grande Terminal in Puerto Rico.

"*El Coqui* represents not just the $3 billion investment that Crowley has made in this industry in recent years, it really is the future of the maritime industry itself," Alexander B. Gray, Special Assistant to the President for the Defense Industrial Base, said. "It will serve as a shining example of the technological innovation that's going to allow this industry to remain a global leader for decades to come."

In Jacksonville, Crowley has also partnered with Eagle LNG to construct a new first-of-its-kind LNG bunker fuel station to fuel the new ships. Headquartered in Florida, Crowley Maritime is a family and employee-owned marine solutions, energy and logistics company and one of the leading developers of LNG fuelling infrastructure in the area. ■



El Coqui



"Energy is a major cost driver in running an LNG plant. But with efficient Atlas Copco mixed-refrigerant compressors, we're using less energy and saving more money."

Zhang Jia-Hua
Operations Team Leader
Baotou Lu Ding Natural Gas Co. Ltd.
Inner Mongolia, China

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Although balancing the mechanics of your LNG plant can put a lot of stress on your budget, Atlas Copco can help you handle the pressure with highly efficient, integrally geared centrifugal compressor solutions that help keep costs under control.

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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 Innvovation	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 = 22nd October 2018

Small-LNG.com

Built	Name	CBM	Cargo Type	Trading area	Trading in LNG?	Ship Owner / Operator
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)
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

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 = 22nd October 2018

Small-LNG.com

WORLD LNG-FUELLED CONFIRMED NEWBUILDS

Year	Project type	Ship name	Ship type	Shipowner	Area of Operation	Class
2019	Newbuild		Tugs	PSA Marine	Asia	--
2019	Newbuild	AIDA	Cruise ships	Aida Cruises	Global	RINA
2019	Newbuild	Costa Smeralda	Cruise ships	Costa Crociere	Global	RINA
2019	Newbuild	Ferus smit 444	Oil/Chemical tankers	Thun Tankers	Europe	BV
2019	Newbuild	Ferus smit 451	Oil/Chemical tankers	Thun Tankers	Europe	BV
2019	Newbuild	Ferus smit 452	Oil/Chemical tankers	Thun Tankers	Europe	BV
2019	Newbuild	Ferus Smit 453	Bulk carriers	Erik Thun	Europe	LR
2019	Newbuild	Honfleur	RoPax	Brittany Ferries	Europe	BV
2019	Newbuild	Hypatia de Alejandria	RoPax	Baleària	Europe	Unknown
2019	Newbuild	Ishin	Tugs	Mitsui O.S.K. Lines	Asia	Unknown
2019	Newbuild	L'Ostrea	Other activities	Dragages-Ports	Europe	Unknown
2019	Newbuild	Libas	Fishing vessels	Liegruppen	Norway	Unknown
2019	Newbuild	Marie Curie	RoPax	Baleària	Europe	Unknown
2019	Newbuild	Orion	Other activities	DEME	Europe	DNV GL
2019	Newbuild	Samsung 2236	Crude oil tankers	AET	Global	DNV GL
2019	Newbuild	Samsung 2237	Crude oil tankers	AET	Global	DNV GL
2019	Newbuild	Samsung 2241	Crude oil tankers	Teekay	Global	DNV GL
2019	Newbuild	Spartacus	Other activities	DEME	Europe	BV
2019	Newbuild	TBN	Oil/Chemical tankers	Sinanju Tankers	Asia	Unknown
2019	Newbuild	TBN	RoPax	Baleària	Europe	BV
2019	Newbuild	TBN 1	Car carriers	Siem Car Carriers	Global	ABS
2019	Newbuild	TBN 1	Crude oil tankers	AET	Global	ABS
2019	Newbuild	TBN 1	Oil/Chemical tankers	Älvtank	Europe	BV
2019	Newbuild	TBN 1	Other activities	German Transport Ministry	Europe	Unknown
2019	Newbuild	TBN 1	RoPax	Polish Baltic Shipping Co.	Europe	Unknown
2019	Newbuild	TBN 1	Tugs	Ningbo Zhoushan Port Co.	Asia	CSS
2019	Newbuild	TBN 2	Car carriers	Siem Car Carriers	Global	ABS
2019	Newbuild	TBN 2	Crude oil tankers	AET	Global	ABS
2019	Newbuild	TBN 2	Oil/Chemical tankers	Älvtank	Europe	BV
2019	Newbuild	TBN 2	Other activities	German Transport Ministry	Europe	Unknown
2019	Newbuild	TBN 2	RoPax	Polish Baltic Shipping Co.	Europe	Unknown
2019	Newbuild	TBN 3	Crude oil tankers	SCF	Europe	DNV GL
2019	Newbuild	TBN 4	Container ships	CMA CGM	Global	BV
2019	Newbuild	TBN 4	Crude oil tankers	SCF	Europe	DNV GL
2019	Newbuild	TBN 5	Car/Passenger ferries	Torghatten	Norway	DNV GL
2019	Newbuild	TBN 5	Crude oil tankers	SCF	Europe	DNV GL
2019	Newbuild	TBN 6	Crude oil tankers	SCF	Europe	DNV GL
2019	Newbuild	Thun Venern	Oil/Chemical tankers	Thun Tankers	Europe	BV
2019	Retrofit	Napoles	RoPax	Baleària	Europe	RINA
2019	Retrofit	Sicilia	RoPax	Baleària	Europe	RINA
2019	Retrofit	Spirit of Vancouver Island	Car/Passenger ferries	BC Ferries	America	ABS
2020	Newbuild		Other activities	Nordlaks	Norway	Unknown
2020	Newbuild	Atair	Other activities	German Transport Ministry	Europe	DNV GL
2020	Newbuild	Samsung 2242	Crude oil tankers	Teekay	Global	DNV GL
2020	Newbuild	Samsung 2256	Crude oil tankers	Teekay	Global	DNV GL
2020	Newbuild	Samsung 2257	Crude oil tankers	Teekay	Global	DNV GL
2020	Newbuild	Samsung 2286	Crude oil tankers	Teekay	Global	DNV GL
2020	Newbuild	TBN 1	Container ships	CMA CGM	Global	BV
2020	Newbuild	TBN 1	Container ships	Pasha Hawaii	America	Unknown
2020	Newbuild	TBN 1	Cruise ships	Carnival Corporation	Global	RINA

Excluding LNG carriers and inland waterway vessels. For more information please visit www.dnvgl.com
Data last updated : 31 October 2018

DNV·GL

Year	Project type	Ship name	Ship type	Shipowner	Area of Operation	Class
2020	Newbuild	TBN 1	Cruise ships	P&O Cruises	Global	RINA
2020	Newbuild	TBN 2	Container ships	CMA CGM	Global	BV
2020	Newbuild	TBN 2	Container ships	Pasha Hawaii	America	Unknown
2020	Newbuild	TBN 3	Container ships	CMA CGM	Global	BV
2020	Newbuild	TBN 6	Container ships	CMA CGM	Global	BV
2020	Newbuild	TBN 7	Container ships	CMA CGM	Global	BV
2020	Newbuild	TBN 8	Container ships	CMA CGM	Global	BV
2020	Newbuild	TBN 9	Container ships	CMA CGM	Global	BV
2020	Newbuild	Xiamen	RoPax	Viking Line	Europe	DNV GL
2021	Newbuild	Avic Weihai W268	RoPax	Stena	Europe	DNV GL
2021	Newbuild	Costa	Cruise ships	Costa Crociere	Global	RINA
2021	Newbuild	Ponant Icebreaker	Cruise ships	Ponant	Global	BV
2021	Newbuild	Samsung 2287	Crude oil tankers	Teekay	Global	DNV GL
2021	Newbuild	TBN 1	Bulk carriers	H-Line	Global	--
2021	Newbuild	TBN 1	Crude oil tankers	Rosneft	Europe	RR
2021	Newbuild	TBN 1	Cruise ships	Disney Cruise Lines	Global	LR
2021	Newbuild	TBN 1	Cruise ships	Havila Kystruten	Norway	DNV GL
2021	Newbuild	TBN 1	Other activities	Van Oord	Global	BV
2021	Newbuild	TBN 2	Bulk carriers	H-Line	Global	--
2021	Newbuild	TBN 2	Crude oil tankers	Rosneft	Europe	RR
2021	Newbuild	TBN 2	Cruise ships	Havila Kystruten	Norway	DNV GL
2021	Newbuild	TBN 2	Other activities	Van Oord	Global	BV
2021	Newbuild	TBN 3	Crude oil tankers	Rosneft	Europe	RR
2021	Newbuild	TBN 3	Cruise ships	Havila Kystruten	Norway	--
2021	Newbuild	TBN 4	Crude oil tankers	Rosneft	Europe	RR
2021	Newbuild	TBN 4	Cruise ships	Havila Kystruten	Norway	--
2021	Newbuild	TBN 5	Container ships	CMA CGM	Global	BV
2021	Newbuild	TBN 5	Crude oil tankers	Rosneft	Europe	RR
2021	Retrofit	Midnight Sun	Ro-Ro cargo ships	TOTE Shipholdings	America	ABS
2021	Retrofit	North Star	Ro-Ro cargo ships	TOTE Shipholdings	America	ABS
2021	Retrofit	TBN 1	Cruise ships	Hurtigruten	Norway	DNV GL
2021	Retrofit	TBN 2	Cruise ships	Hurtigruten	Norway	DNV GL
2021	Retrofit	TBN 3	Cruise ships	Hurtigruten	Norway	DNV GL
2021	Retrofit	TBN 4	Cruise ships	Hurtigruten	Norway	DNV GL
2021	Retrofit	TBN 5	Cruise ships	Hurtigruten	Norway	DNV GL
2021	Retrofit	TBN 6	Cruise ships	Hurtigruten	Norway	DNV GL
2022	Newbuild	Icon of the Seas	Cruise ships	RCCL	Global	DNV GL
2022	Newbuild	TBN 1	Cruise ships	MSC Cruises	Global	BV
2022	Newbuild	TBN 2	Cruise ships	Carnival Corporation	Global	RINA
2022	Newbuild	TBN 2	Cruise ships	Disney Cruise Lines	Global	LR
2022	Newbuild	TBN 2	Cruise ships	P&O Cruises	Global	RINA
2023	Newbuild		Cruise ships	Aida Cruises	Global	RINA
2023	Newbuild	TBN 1	Cruise ships	Princess Cruises	Global	Unknown
2023	Newbuild	TBN 3	Cruise ships	Disney Cruise Lines	Global	LR
2023	Newbuild	TBN 3	Cruise ships	MSC Cruises	Global	--
2024	Newbuild	TBN	Cruise ships	RCCL	Global	DNV GL
2024	Newbuild	TBN 1	Cruise ships	TUI Cruises	Global	Unknown
2024	Newbuild	TBN 2	Cruise ships	MSC Cruises	Global	BV
2025	Newbuild	TBN 2	Cruise ships	Princess Cruises	Global	Unknown
2026	Newbuild	TBN 2	Cruise ships	TUI Cruises	Global	Unknown

Excluding LNG carriers and inland waterway vessels. For more information please visit www.dnvgl.com
Data last updated : 31 October 2018

DNV·GL

LNG–FUELLED SHIPS IN OPERATION WORLDWIDE

Year	Type of Vessel	Owner	Class
2000	Car/Passenger ferries	Fjord1	DNV GL
2003	Offshore supply ships	Simon Møkster	DNV GL
2003	Offshore supply ships	Eidesvik Shipping	DNV GL
2006	Car/Passenger ferries	Fjord1	DNV GL
2007	Car/Passenger ferries	Fjord1	DNV GL
2007	Car/Passenger ferries	Fjord1	DNV GL
2007	Car/Passenger ferries	Fjord1	DNV GL
2007	Car/Passenger ferries	Fjord1	DNV GL
2008	Offshore supply ships	Eidesvik Shipping	DNV GL
2009	Other activities	Remøy Management	DNV GL
2009	Car/Passenger ferries	Norled	DNV GL
2009	Car/Passenger ferries	Norled	DNV GL
2009	Car/Passenger ferries	Fjord1	DNV GL
2009	Car/Passenger ferries	Norled	DNV GL
2009	Offshore supply ships	Eidesvik Shipping	DNV GL
2010	Other activities	Remøy Management	DNV GL
2010	Car/Passenger ferries	Fjord1	DNV GL
2010	Car/Passenger ferries	Fjord1	DNV GL
2010	Car/Passenger ferries	Fjord1	DNV GL
2010	Car/Passenger ferries	Fosen Namsos Sjø	DNV GL
2010	Other activities	Remøy Management	DNV GL
2011	Car/Passenger ferries	Fjord1	DNV GL
2011	Offshore supply ships	Solstad Rederi	DNV GL
2011	Offshore supply ships	DOF	DNV GL
2011 *	Oil/Chemical tankers	Tarbit Shipping	DNV GL
2012	Car/Passenger ferries	Torghatten Nord	DNV GL
2012	General cargo ships	Nordnorsk Shipping	DNV GL
2012	Offshore supply ships	Island Offshore	DNV GL
2012	Offshore supply ships	Island Offshore	DNV GL
2012	Car/Passenger ferries	Torghatten Nord	DNV GL
2012	Offshore supply ships	Olympic Shipping	DNV GL
2012	Car/Passenger ferries	Torghatten Nord	DNV GL
2012	Offshore supply ships	Eidesvik Shipping	DNV GL
2012	Offshore supply ships	Eidesvik Shipping	DNV GL
2012 *	Car/Passenger ferries	Fjord1	DNV GL
2013	Other activities	Incheon Port Authority	KR
2013	General cargo ships	Eidsvaag	DNV GL
2013	Car/Passenger ferries	Buquebus	DNV GL
2013	Tugs	CNOOC	CCS
2013	Tugs	CNOOC	CCS
2013	Car/Passenger ferries	Norled	DNV GL
2013	Car/Passenger ferries	Torghatten Nord	DNV GL
2013	Offshore supply ships	REM	DNV GL
2013	Car/Passenger ferries	Norled	DNV GL
2013	RoPax	Fjordline	DNV GL
2013	RoPax	Viking Line	LR
2014	RoPax	Fjordline	DNV GL
2014	Tugs	Buksér & Berging	DNV GL
2014	Tugs	Buksér & Berging	DNV GL
2014	Gas tankers	Anthony Veder	BV
2014	Gas tankers	Anthony Veder	BV
2014	Offshore supply ships	Remøy Shipping	DNV GL
2014	Offshore supply ships	Siem Offshore	DNV GL
2014	Other activities	Finnish Border Guard	DNV GL
2014	General cargo ships	Egil Ulvan Rederi	DNV GL
2014	General cargo ships	Egil Ulvan Rederi	DNV GL
2015	Car/Passenger ferries	Society of Quebec ferries	LR
2015	Bulk carriers	Erik Thun	LR
2015	Tugs	CNOOC	CCS
2015	Offshore supply ships	Harvey Gulf International Marine	ABS
2015	Offshore supply ships	Harvey Gulf International Marine	ABS
2015	Car/Passenger ferries	AG EMS	DNV GL
2015	Gas tankers	Evergas	BV
2015	Gas tankers	Evergas	BV

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* = conversion projects

DNV·GL

Year	Type of Vessel	Owner	Class
2015	Gas tankers	Evergas	BV
2015	Ro-Ro cargo ships	Nor Lines	DNV GL
2015	Ro-Ro cargo ships	Nor Lines	DNV GL
2015	Container ships	TOTE Shipholdings	ABS
2015	Car/Passenger ferries	Samsoe municipality	DNV GL
2015	Tugs	NYK	NK
2015	Gas tankers	Chemgas Shipping	BV
2015	Offshore supply ships	Siem Offshore	DNV GL
2015	Offshore supply ships	Simon Møkster Shipping	DNV GL
2015 *	Oil/Chemical tankers	Bergen Tankers	LR
2015 *	Oil/Chemical tankers	Furetank Rederi	BV
2015 *	Car/Passenger ferries	AG EMS	DNV GL
2016	Car carriers	UECC	DNV GL
2016	Car carriers	UECC	DNV GL
2016	Car/Passenger ferries	Boreal Transport Nord	DNV GL
2016	Tugs	CNOOC	CCS
2016	Offshore supply ships	Harvey Gulf International Marine	ABS
2016	Car/Passenger ferries	Boreal Transport Nord	DNV GL
2016	Bulk carriers	Erik Thun	LR
2016	Container ships	TOTE Shipholdings	ABS
2016	Gas tankers	Evergas	BV
2016	Gas tankers	Evergas	BV
2016	Gas tankers	Navigator Gas	ABS
2016	Other activities	Arctia Shipping	LR
2016	Car/Passenger ferries	BC Ferries	LR
2016	Ro-Ro cargo ships	Searoad Holdings	DNV GL
2016	Car/Passenger ferries	Seaspan Ferries Corporation	BV
2016	Offshore supply ships	Siem Offshore	DNV GL
2016	Gas tankers	Chemgas Shipping	BV
2016	Oil/Chemical tankers	Terntank	BV
2016	Oil/Chemical tankers	Terntank	BV
2016	Oil/Chemical tankers	Terntank	BV
2017	Tugs	Østensjø Rederi	BV
2017	Oil/Chemical tankers	Groupe Desgagnés	BV
2017	Tugs	Østensjø Rederi	BV
2017	Gas tankers	Ocean Yield	DNV GL
2017	Gas tankers	Ocean Yield	DNV GL
2017	Offshore supply ships	Harvey Gulf International Marine	ABS
2017	Gas tankers	Evergas	BV
2017	Gas tankers	Evergas	BV
2017	Gas tankers	Evergas	BV
2017	RoPax	Tallink	BV
2017	Oil/Chemical tankers	Groupe Desgagnés	BV
2017	Other activities	DEME	BV
2017	Gas tankers	Navigator Gas	ABS
2017	Gas tankers	Navigator Gas	ABS
2017	Tugs	Østensjø Rederi	BV
2017	Car/Passenger ferries	BC Ferries	LR
2017	Car/Passenger ferries	BC Ferries	LR
2017	Other activities	DEME	BV
2017	Car/Passenger ferries	Seaspan Ferries Corporation	BV
2017	Oil/Chemical tankers	Terntank	BV
2017 *	RoPax	Baleària	BV
2017 *	Container ships	Wessels Reederei	BV
2018	Cruise ships	Aida Cruises	RINA
2018	Car/Passenger ferries	Society of Quebec ferries	LR
2018	Other activities	DEME	BV
2018	Container ships	Brodosplit Shipping Company	DNV GL
2018	Other activities	van der Kamp	DNV GL
2018	Container ships	Crowley Maritime Corporation	DNV GL
2018	Tugs	Drydocks World	Tasneef
2018	Car/Passenger ferries	Caronte & Tourist	RINA
2018	Oil/Chemical tankers	Thun Tankers	BV
2018	Oil/Chemical tankers	Furetank Rederi	BV

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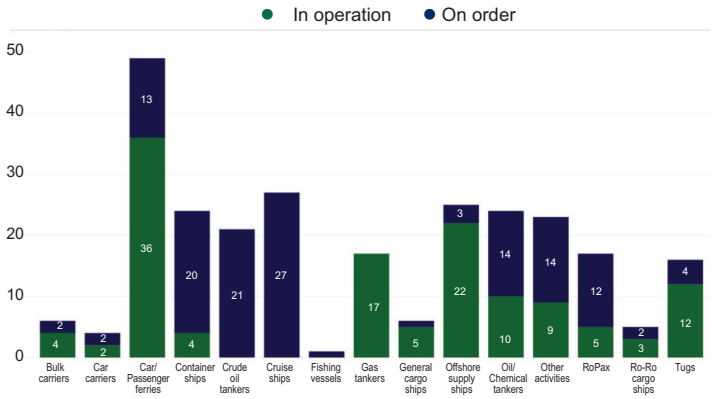
DNV·GL

Year	Type of Vessel	Owner	Class
2018	Crude oil tankers	SCF	DNV GL
2018	Other activities	Bremenports	DNV GL
2018	Bulk carriers	ESL Shipping	DNV GL
2018	Offshore supply ships	Harvey Gulf International Marine	ABS
2018	Offshore supply ships	Harvey Gulf International Marine	ABS
2018	Bulk carriers	Ilshin	LR
2018	Car/Passenger ferries	Society of Quebec ferries	LR
2018	Tugs	Keppel Smit Towage (Boskalis)	ABS
2018	Other activities	DEME Tideway	DNV GL
2018	Crude oil tankers	SCF	DNV GL
2018	Tugs	Maju Maritime (Boskalis)	ABS
2018	General cargo ships	Nordnorsk Shipping	DNV GL
2018	Oil/Chemical tankers	Groupe Desgagnés	BV
2018	Oil/Chemical tankers	Groupe Desgagnés	BV
2018	Offshore supply ships	Siem Offshore	DNV GL
2018	Offshore supply ships	Siem Offshore	DNV GL
2018	Other activities	Heerema Offshore Services	LR
2018	Container ships	Crowley Maritime Corporation	DNV GL
2018	Container ships	Brodosplit Shipping Company	DNV GL
2018	General cargo ships	SeOil Agency/Gas Entec	Unknown
2018	RoPax	Rederi AB Gotland	DNV GL
2018	Car/Passenger ferries	Clyde and Hebrides Ferry Service (CHFS)	LR
2018	Car/Passenger ferries	Royal Doeksen	LR
2018	Car/Passenger ferries	Torghatten	DNV GL
2018	Container ships	Brodosplit Shipping Company	DNV GL
2018	Container ships	GNS Shipping	ABS
2018	Oil/Chemical tankers	Furetank Rederi	BV
2018	Oil/Chemical tankers	Harley Marine Services Singapore	Unknown
2018	Car/Passenger ferries	Clyde and Hebrides Ferry Service (CHFS)	LR
2018	Car/Passenger ferries	Royal Doeksen	LR
2018	Car/Passenger ferries	Torghatten	DNV GL
2018	Container ships	Brodosplit Shipping Company	DNV GL
2018	Container ships	GNS Shipping	ABS
2018	Oil/Chemical tankers	Furetank Rederi	BV
2018	Oil/Chemical tankers	Harley Marine Services Singapore	Unknown
2018	Car/Passenger ferries	Torghatten	DNV GL
2018	Container ships	GNS Shipping	ABS
2018	Car/Passenger ferries	Torghatten	DNV GL
2018	Container ships	GNS Shipping	ABS
2018	Bulk carriers	ESL Shipping	DNV GL
2018	RoPax	Rederi AB Gotland	DNV GL
2018 *	Car/Passenger ferries	Fred. Olsen	DNV GL
2018 *	Other activities	Dragages-Ports	BV
2018 *	Car/Passenger ferries	BC Ferries	ABS

AREAS WITH OPERATING LNG-FUELLED VESSELS



LNG FUELLED FLEET BY VESSEL TYPE



Charts updated 1 October 2018

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