LNG Fuelling

AN LNG JOURNAL PUBLICATION 9 March 2017

GE, Woodside sign LNG fuelling partnership

Engineering conglomerate GE and Australian oil and gas company Woodside Energy have signed a partnership agreement to develop the use of LNG as a fuel in Western Australia.

The wide-ranging deal will see both parties invest in technology and infrastructure designed to provide customers with "the option of seamless access" to reliable LNG fuel for gas-fuelled transport and power generation solutions.

"The agreement between our companies will harness the combined experience and offerings of Woodside and GE, allowing customers to choose LNG as a fuel that will deliver significant cost and emissions reductions," Peter Coleman, CEO of Woodside, said.

As Australia's largest LNG operator, Woodside manages both the Pluto LNG export plant and the North West Shelf LNG plant in Karratha, northwest Australia, giving the partnership ready access to LNG fuel.

"Woodside is ideally placed to lead the transition to LNG fuelling, with world-class LNG facilities in the Pilbara in close proximity to heavy industries," Coleman added.

Woodside's Linda Albano and GE's Mary Hackett

Australian LNG-fuelled shipping set to grow

LNG produced in Australia has to date been destined for markets in Asia but LNG output is increasingly in demand as a transport fuel domestically with a recent study by Det Norske Veritas (DNV) concluding that environmental and commercial pressures were set to drive further uptake of gas-powered shipping industry in Australia.

The study built on previous work that examined the establishment of LNG bunkering stations at 10 Australian ports and predicted no significant restrictions for the adoption of LNG fuel.

"Developing new fuel technology to power industries such as marine, transportation and mining is key - and as a Digital Industrial Company that works across multiple industries and sectors, GE looks forward to working with Woodside to deliver gas technology solutions for customers," Mary Hackett, Regional Director for GE Oil & Gas ANZ/PNG, said.

Woodside has been a strong supporter of LNG-fuelled shipping and is also currently exploring the commercial feasibility of LNG-fuelled Capesize bulk carriers as part of consortium.

The mining sector is a major part of the Australian economy and a shift to LNG to power Capesize export vessels would signify a significant source of demand. ■

The North West Shelf LNG plant in Karratha

FUELLING NEWS AGENDA

DEME orders world's first LNG-fuelled CSD

Belgian marine engineering group DEME has placed an order with Dutch shipyard Royal IHC for the world's first LNG-fuelled Cutter Suction Dredger – *Spartacus*.

Royal IHC design for LNG-fuelld vessel *Spartacus*

The new vessel will be built at Royal IHC's facilities in the Netherlands and is set to join DEME's fleet in mid-2019. Once complete, *Spartacus* will be the most powerful Cutter Suction Dredger ever built with total installed capacity of 44.180 kilowatts.

"DEME believes this exceptional vessel will create its own market, by achieving what has been impossible until now," a spokesperson for DEME said.

The new CSD will also include advanced features such as a waste heat recovery system to convert heat from the exhaust gasses to electrical energy.

Most powerful CSD ever built

At 164 metres in length, the vessel will be capable of dredging in waters of up to 45 metres as compared to the 35 metres depth which is presently the upper limit in the market. The *Spartacus* will also be capable of operating in remote locations with limited infrastructure, thanks to improved fuel autonomy and accommodation capacity.

"We can state that this CSD is the largest and most complex that IHC has ever built. The combination of power, size and innovations makes it a true challenge to build. We are proud and honored that DEME has again placed their trust in us," Dave Vander Heyde, CEO of IHC, said.

The ability to deliver increased power from LNG systems is set to open new opportunities as larger classes of vessels are increasingly developed to run on the fuel.

The construction of *Spartacus* follows similar recent orders by DEME for the first LNG-powered Trailing Suction Hopper Dredgers *Minerva* and *Scheldt River*. All the vessels will have a Green Passport and Clean Design notation.

"We are pleased to note that IHC's strategy, which focuses on developing and producing high added value equipment, and integrated vessels is starting to pay off. Being able to manage all the gigantic forces of this CSD with our high tech equipment and systems perfectly supports this," Vander Heyde added. ■

Croatia receives EU funding for Krk LNG facility

The Croatian government has received €102 million in funding from the European union to build an LNG terminal on the Adriatic island of Krk.

The proposed facility will include a floating terminal off the island of Krk and will be designed to support the growth of regional LNG-fuelled transport. The government is currently in the final phase of selecting a strategic investor and ground-breaking for the project is scheduled to begin in 2019.

CEF to support €363m costs

Total investment required to build the LNG terminal is estimated at €363 million. Just under 28% of construction costs will be covered by finance from the EU's Connecting Europe Facility (CEF) and 50 % of the costs for the pre-construction study.

Authorities plan to build an LNG terminal on the island of Krk

"This project will definitely give a boost to the Croatian economy and industry, which will have the opportunity to develop new services, new skills and new technologies in the field of LNG", Slaven Dobrovic, Croatian energy minister said.

Krk facility to boost Eastern Mediterranean resources

It is hoped that the development will feed into other European Union schemes in the Eastern Mediterranean such as the cross-border Poseidon Med II LNG project. Poseidon Med II is the largest feasibility of LNG bunkering installation sites in the Eastern Mediterranean and to date has already identified a number of key areas for investment.

Poseidon Med II is the second phase of an EU-funded project that involves the five member states of Cyprus, Greece, Italy, Croatia and Slovenia.

"This is one of the most important energy projects not only at the national, but also at the regional and European levels, as proven by today's decision on co-financing," Dobrovic said.

The Poseidon Med II project aims to develop LNG bunkering infrastructure and introduce LNG as the main fuel for the shipping industry in the region in line with the Hellenic Transport Strategic Investment Plan (HTSIP) 2014-2025. ■

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Fosmax issues Marseille-Fos LNG fuelling tender

French energy firm Fosmax LNG has issued a call for expressions of interest to develop further LNG fuelling infrastructure around its existing Fos Cavaou terminal near Marseille.

"Fosmax LNG is considering making short/medium-term investments to modify its existing facilities and to be able to receive the majority of existing or planned small scale LNG vessels at the Fos Cavaou LNG terminal," a spokesperson for Fosmax said.

The Fos Cavaou terminal is currently limited to vessels with a minimum capacity of 15,000 cubic metres of LNG and operator Fosmax LNG now wants to expand compatibility with a wider range of vessels.

"Fosmax LNG is launching a call for expressions of interest to the market to discuss the technical side of the project with interested parties and to ascertain the needs and expectations relating to the small scale LNG vessel loading service proposed," the firm said in a statement.

Fosmax aims to initiate a binding reservation phase by mid-2017.

Chart Ferox To Commission Second LNG Station at Marseille-Fos

Cryogenic specialist Chart Ferox has signed a contract with French energy firm Proviridis to design and build a new LNG fueling station close to the container terminal at Marseille-Fos. The new facility will be commissioned during the first quarter 2017.

"Chart's scope includes complete turnkey installation plus servicing and maintenance and the package incorporates Chart Vacuum Technology and class leading equipment, such as the LNG Dynaflow 3000 dispenser, for superior safety, efficiency and customer comfort," a spokesperson for Chart said.

The fully automated station will be operated 24/7 by V-gas and will provide fuel for heavy haulage vehicles and passenger cars.

Decinske Giants Travel To Klaipėda

Chart Ferox also announced that three of its Decinske Giants cryogenic storage tanks have been dispatched from its Czech facility for delivery to the Klaipėda LNG reloading station in Lithuania.

The tanks will forma a central part of the Lithuanian LNG facility, providing an initial storage capacity of 5 million litres of LNG. Chart has partnered with PPS Pipeline Systems to install the tanks and plans to expand the LNG station's capacities up to 10,000 cubic metres.

"When the LNG distribution station is put into operation, the port of Klaipėda will become the LNG hub for the Baltic countries and north-eastern Poland," Marius Pulkauninkas, CEO of AB Klaipėdos Nafta, said.

The Klaipėdos Nafta project involves construction of an LNG reloading station, LNG jetty and ancillary LNG refuelling equipment for the Klaipėda LNG Terminal. The LNG station will be equipped with truck filling stations and first commercial operation is expected in third quarter of 2017.

"Collaboration between our respective technical experts has facilitated first class performance in delivering this Lithuanian LNG terminal," Hans Lonsain, President of Chart Europe, said. "Chart's primary role is preparation and delivery of the cryogenic part of the terminal project, comprising five HT1000 LNG cryogenic storage tanks, two truck loading bays, one LNG bunkering jetty and the regasification plant." ■

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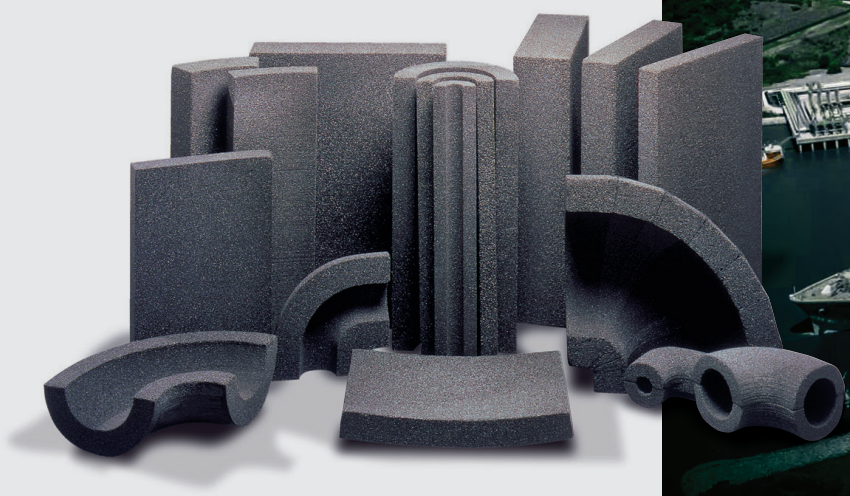
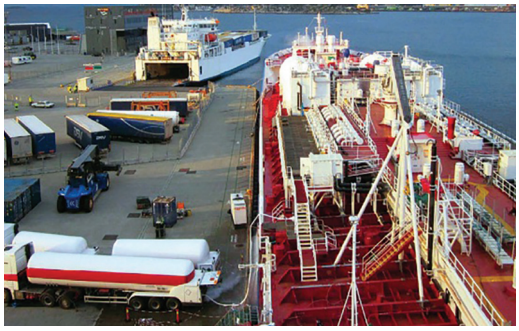


Bunker fuel cost rises may favour alternative fuels

Global bunker fuel costs may rise by as much as US$60 billion per year from 2020, according to research by consultancy Wood Mackenzie.



Established bunker hubs, such as Singapore may face pressure from China

The increase in costs may help to drive increased uptake of LNG as Wood Mackenzie notes that a combination of higher crude prices and tight availability of marine gas oil (MGO) could take the price of MGO up to almost four times that of fuel oil in 2016.

The implementation of the International Maritime Organization sulphur cap in 2020 is predicted to be a key driver for change, forcing the shipping industry to consider a switch to alternative fuels or install systems that removes sulphur from exhaust gas.

The firm notes that the shipping industry will have to consider a switch to alternative fuels or else install scrubber systems to remove sulphur from exhaust gases.

"Installing scrubbers may be an economically attractive option," Sushant Gupta, research director at Wood Mackenzie noted , while cautioning that, "despite attractive returns, penetration rate for scrubbers could be limited by access to finance, scrubber manufacturing capacity, dry-dock space and technological uncertainties."

Geo-pressure on bunker hubs

The firm also expects a shift in bunkering locations based on compliant fuels availability with established bunker hubs such as Singapore potentially losing market share to China as shippers look for alternative locations with a surplus of compliant fuels.

Singapore will also need to repurpose some storage tanks and other infrastructure to prepare for a shift from fuel oil to gasoil bunkering.

"The shipping industry is traditionally slow to move, but in this case, early adopters may hugely benefit.. At the end of the day, the shipping industry and refineries need to communicate and find middle ground, and time, unfortunately, is running out," Gupta added.

Headquartered in Edinburgh, UK, Wood Mackenzie provides commercial analysis and data tools for the global upstream/downstream oil and gas, energy, metals and mining sectors. ■

Alfa Laval expands Aalborg test centre, predicts LNG growth

Swedish equipment manufacturer Alfa Laval has expanded its test and training centre in Aalborg, Denmark as part of an effort to research new gas combustion and LNG fuelling technology.

The new facilty now covers five times the area of the earlier centre and includes greatly improved testing capabilities focused on exhaust gas cleaning, ballast water treatment, steam production, fuel cleaning and other key areas.

The new centre includes Alfa Laval's new Gas Combustion Unit (GCU), as well as new burner systems and inert gas systems. The GCU is designed to deal with LNG boil-off gas in a safe manner and can burn up to 4.5 tonnes of LNG per hour.

"Our investment in the Alfa Laval Test & Training Centre reflects the extraordinary changes we see in the marine industry," Peter Leifland, President of Alfa Laval's Marine Division, said.

With an additional 1,100 cubic metres of space the centre will not only provide general research into LNG operation but will allow the firm to tweak existing designs for dual-fuel boiler and power systems.

"Tightening emissions legislation is driving many customers from residual fuels towards LNG and other alternatives. As a comprehensive marine supplier, we must be at the cutting edge in supporting our customers, no matter what fuel they choose."

LNG-fuelled vessel fleet to increase ten-fold

The investment in the new test centre has been driven by Alfa Laval's optimistic outlook for the LNG transport sector, which the firm believes is poised for imminent growth.

"Within 15 years, it is expected that thousands of vessels will be sailing with LNG as fuel, compared to the hundreds using gas today," Lars Skytte Jorgensen, Vice President, Alfa Laval Product Centre Boilers, said.

One of the first pieces of research at the centre will be the testing of a new dual-fuel burner for gas-diesel applications for smaller boilers. This is part of a partnership with the Danish Technical University in Copenhagen, focused on multi-fuel solutions.

"After just three years of operation, we can point to many areas where the Alfa Laval Test & Training Centre has accelerated our R&D and improved its quality. The rate of change in marine legislation is increasing, and ship owners and operators are forced to keep in step. With the expanded capabilities of the Alfa Laval Test & Training Centre, we will ensure that onboard technologies are ready to meet their technical challenges," Leifland added. ■

Alfa Laval's new testing centre in Aalborg, Denmark

NEWS NUDGE

Fred Olsen converts Caterpillar 3618 to LNG operation

LNG fuelling specialist Atlantic, Gulf and Pacific (AG&P) has signed a Memorandum of Understanding with Air Liquide Global E&C Solutions to develop small-scale LNG infrastructure for LNG distribution across Asia.

Under the agreement, AG&P will integrate Air Liquide technologies with its expertise in planning, designing engineering, financing and operating LNG infrastructure modules to build technologically-advanced blocks that can plug into any part of the LNG supply chain.

"This milestone agreement with Air Liquide will enable the integration of downstream LNG infrastructure, including small scale regasification terminals, distribution hubs, truck loading stations and boil-off gas handling systems into AG&P's LNG supply network for rapid delivery of tolled gas to last-mile customers," Jose P Leviste (Jr.), AG&P's Chairman, said.

GustoMSC studies LNG fuelling for mobile offshore units

Mobile units for use in offshore wind construction projects may represent a new area of growth in the development of LNG-fuelled transport solutions, according to research by Dutch engineering firm GustoMSC.

A study by the company examines design considerations for a wide range of vehicles such as construction vessels, drillships, jack-ups and semisubmersibles and identifies several use cases within the offshore wind sector.

The white paper, titled LNG Fueled Mobile Offshore Units, discusses some of the key challenges for vessel designers in this space and potential routes to optimize costs.

"Feasible LNG applications are possible when all technical, operational and economic aspects are considered at an early stage. Different possibilities exist to optimize designs, business cases and supply chains. All of these require careful alignment with the unit's design and operations, making an independent designer uniquely positioned to support early stage LNG concept development," a spokesperson for GustoMSC said.

Offshore wind 'promising'

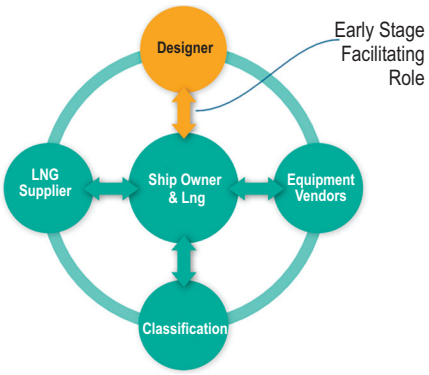
Vessels serving the offshore wind sector are expected to benefit in the shorter term thanks to closer alignment with operator demands for innovative solutions and environmental processes.

"Offshore wind is considered a promising short term field of application due to the alignment of a geographical hotspot for this market (NW-Europe), a developed LNG infrastructure, and the predictable operational profile which will make the supply chain more efficient," the report's authors state.

A predictable operational profile, with typically single voyages to a dedicated shore base, also weighed in favour of offshore wind market implementation with wind turbine foundation installer vessels demonstrating the most promising economics within this category.

While the study highlights a number of heavy-lift vessels such as wind turbine installation jack-up ships or wind turbine foundation installation vessels, the reports authors also note the inherent difficulties associated with using LNG to power such vehicles.

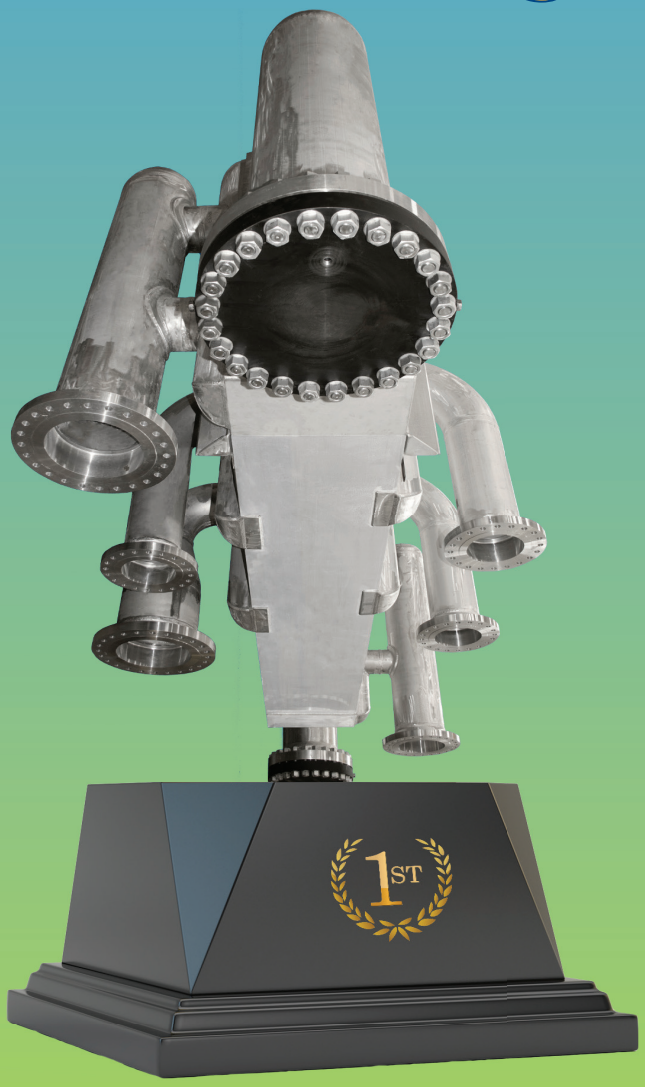
"Offshore construction, maintenance and exploration units have power requirements that vary widely over relatively short time spans and occasionally need to make long transits from project to project. Achieving this required flexibility on LNG would result in very large tanks, which has a detrimental effect on design due to the associated increase in main dimensions and CAPEX," GustoMSC states.



GustoMSC highlights a number of cost savings that early design involvement can deliver

Headquartered in Schiedam in the Netherlands. GustoMSC provides a multi-faceted product and services portfolio and develops engineering solutions for mobile offshore units for offshore exploration, construction and production. ■

Chart Brazed Aluminum Heat Exchangers



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LNG–FUELLED SHIPS IN OPERATION WORLDWIDE

Year	Type of Vessel	Owner	Class
2000	Car/passenger ferry	Fjord1	DNV GL
2003	PSV	Simon Møkster	DNV GL
2003	PSV	Eidesvik	DNV GL
2006	Car/passenger ferry	Fjord1	DNV GL
2007	Car/passenger ferry	Fjord1	DNV GL
2007	Car/passenger ferry	Fjord1	DNV GL
2007	Car/passenger ferry	Fjord1	DNV GL
2007	Car/passenger ferry	Fjord1	DNV GL
2008	PSV	Eidesvik Shipping	DNV GL
2009	PSV	Eidesvik Shipping	DNV GL
2009	Car/passenger ferry	Tide Sjø	DNV GL
2009	Car/passenger ferry	Tide Sjø	DNV GL
2009	Car/passenger ferry	Tide Sjø	DNV GL
2009	Patrol vessel	Remøy Management	DNV GL
2009	Car/passenger ferry	Fjord1	DNV GL
2010	Patrol vessel	Remøy Management	DNV GL
2010	Car/passenger ferry	Fjord1	DNV GL
2010	Patrol vessel	Remøy Management	DNV GL
2010	Car/passenger ferry	Fjord1	DNV GL
2010	Car/passenger ferry	Fjord1	DNV GL
2010	Car/passenger ferry	Fosen Namsos Sjø	DNV GL
2011	PSV	DOF	DNV GL
2011*	Oil/chemical tanker	Tarbit Shipping	DNV GL
2011	Car/passenger ferry	Fjord1	DNV GL
2011	PSV	Solstad Rederi	DNV GL
2012*	Car/passenger ferry	Fjord1	DNV GL
2012	PSV	Eidesvik	DNV GL
2012	PSV	Olympic Shipping	DNV GL
2012	PSV	Island Offshore	DNV GL
2012	General Cargo	Nordnorsk Shipping	DNV GL
2012	PSV	Eidesvik Shipping	DNV GL
2012	PSV	Island Offshore	DNV GL
2012	Car/passenger ferry	Torghatten Nord	DNV GL
2012	Car/passenger ferry	Torghatten Nord	DNV GL
2012	Car/passenger ferry	Torghatten Nord	DNV GL
2013	PSV	REM	DNV GL
2013	RoPax	Viking Line	LR
2013	Car/passenger ferry	Torghatten Nord	DNV GL
2013	Tug	Incheon Port Authority	KR
2013	General Cargo	Eidsvaag	DNV GL
2013	RoPax	Fjordline	DNV GL
2013	High speed RoPax	Buquebus	DNV GL
2013	Tug	CNOOC	CCS
2013	Tug	CNOOC	CCS
2013	Car/passenger ferry	Norled	DNV GL
2014	Car/passenger ferry	Norled	DNV GL
2014	Tug	Buksér & Berging	DNV GL
2014	RoPax	Fjordline	DNV GL
2014	Patrol vessel	Finish Border Guard	DNV GL
2014	Tug	Buksér & Berging	DNV GL
2014	Gas carrier	Anthony Veder	BV
2014	Gas carrier	Anthony Veder	BV
2014	PSV	Remøy Shipping	DNV GL
2014	General Cargo	Egil Ulvan Rederi	DNV GL
2014	General Cargo	Egil Ulvan Rederi	DNV GL
2014	PSV	Siem Offshore	DNV GL
2015	PSV	Harvey Gulf Int.	ABS
2015	Ro-Ro	Norlines	DNV GL
2015	Car/passenger ferry	Samsoe municipality	DNV GL
2015	PSV	Simon Møkster Shipping	DNV GL
2015	PSV	Siem Offshore	DNV GL
2015	Ro-Ro	Norlines	DNV GL
2015*	Oil/chemical tanker	Bergen Tankers	LR
2015	Car/passenger ferry	Society of Quebec ferries	LR

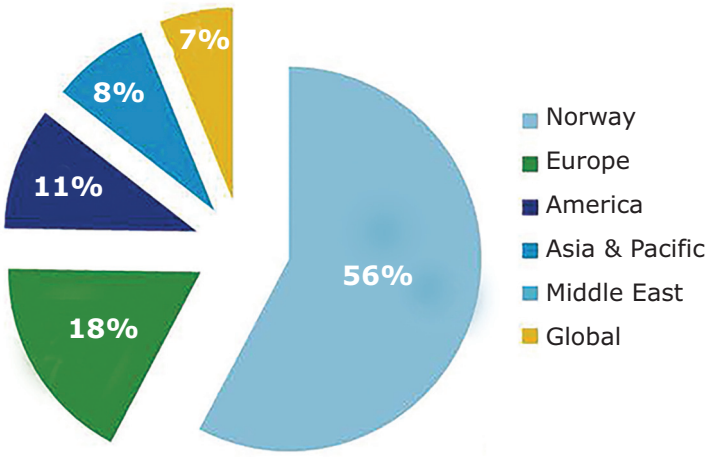
For more information please visit www.dnvgl.com
Data last updated: 15 February 2017
* = conversion projects

DNV·GL

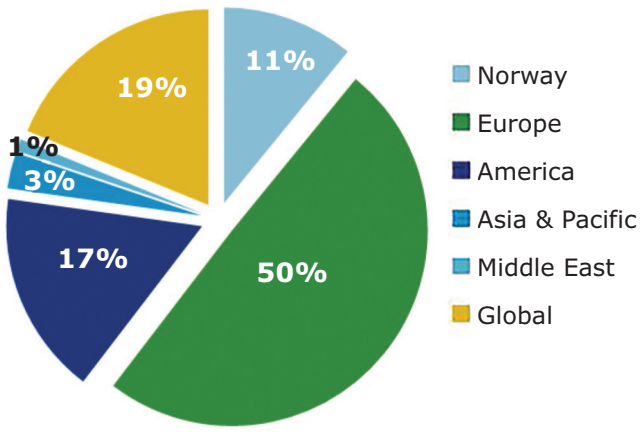
Year	Type of Vessel	Owner	Class
2015	Gas carrier	Evergas	BV
2015	Gas carrier	Evergas	BV
2015	Tug	CNOOC	CCS
2015*	Car/passenger ferry	AG Ems	DNV GL
2015	Tug	NYK	NK
2015	Gas carrier	Chemgas Shipping	BV
2015	Gas carrier	Evergas	BV
2015	PSV	Harvey Gulf Int.	ABS
2015	Container ship	TOTE Shipholdings	ABS
2015	Car/passenger ferry	AG EMS	DNV GL
2015	Bulk ship	Erik Thun	LR
2016	Container ship	TOTE Shipholdings	ABS
2016	Gas carrier	Evergas	BV
2016	PSV	Harvey Gulf Int.	ABS
2016	Bulk ship	Erik Thun	LR
2016	Oil/chemical tanker	Terntank	BV
2016	Gas carrier	Navigator Gas	ABS
2016*	Oil/chemical tanker	Furetank Rederi	BV
2016	Icebreaker	Arctica Shipping	LR
2016	Car/passenger ferry	Boreal Transport Nord	DNV GL
2016	Car/passenger ferry	Boreal Transport Nord	DNV GL
2016	Tug	CNOOC	CCS
2016	Gas carrier	Chemgas Shipping	BV
2016	Car carrier	UECC	LR
2016	Oil/chemical tanker	Terntank	BV
2016	Oil/chemical tanker	Terntank	BV
2016	Car/passenger ferry	BC Ferries	LR
2016	Gas carrier	Evergas	BV
2016	PSV	Siem Offshore	DNV GL
2016	Car/passenger ferry	Seaspan Ferries Corp.	BV
2016	Gas carrier	Navigator Gas	ABS
2016	Ro-Ro	Searoad Holdings	DNV GL
2016	Car carrier	UECC	LR
2017	Gas carrier	Navigator Gas	ABS
2017	Car/passenger ferry	Seaspan Ferries Corp.	BV
2017*	RoPax	Baleària	BV

AREA OF OPERATION OF LNG–FUELLED SHIPS

Operating area
ships in operation



Operating area
confirmed orderbook



Updated 15 February 2017
Excluding LNG carriers and inland waterway vessels

For more information please visit www.dnvgl.com
Data last updated: 15 February 2017
* = conversion projects

DNV·GL

WORLD LNG-FUELLED CONFIRMED NEWBUILDS

Year	Type of Vessel	Owner	Class
2017	Car/passenger ferry	Society of Quebec ferries	LR
2017	Car/passenger ferry	Society of Quebec ferries	LR
2017	Tug	Drydocks World	
2017	PSV	Siem Offshore	DNV GL
2017	Gas carrier	Evergas	BV
2017	PSV	Siem Offshore	DNV GL
2017*	Ro-Ro	TOTE Shipholdings	ABS
2017	Car/passenger ferry	BC Ferries	LR
2017	Gas carrier	Ocean Yield	DNV GL
2017	Gas carrier	Ocean Yield	DNV GL
2017	Gas carrier	Ocean Yield	DNV GL
2017	Gas carrier	Navigator Gas	ABS
2017	Dredger	DEME	BV
2017	Dredger	DEME	BV
2017*	Container ship	Wessels Reederei	BV
2017	Hopper Barge	Bremenports	DNV GL
2017	HSLC	Fred. Olsen	DNV GL
2017	PSV	Harvey Gulf Int.	ABS
2017	PSV	Harvey Gulf Int.	ABS
2017	Cable layer	DEME Tideway	DNV GL
2017	Gas carrier	Evergas	BV
2017	Gas carrier	Evergas	BV
2017	Tug	Østensjø Rederi	
2017	Tug	Østensjø Rederi	
2017	Tug	Østensjø Rederi	
2017*	Car/passenger ferry	BC ferries	ABS
2017	RoPax	Rederi AB Gotland	DNV GL
2017	Car/passenger ferry	Caronte & Tourist	RINA
2017	Oil/chemical tanker	Groupe Desgagnés	BV
2017	Oil/chemical tanker	Groupe Desgagnés	BV
2017	Oil/chemical tanker	Groupe Desgagnés	BV
2017	Oil/chemical tanker	Groupe Desgagnés	BV
2017	Car/passenger ferry	BC Ferries	LR
2017	Oil/chemical tanker	Terntank	BV
2017	Container ship	Crowley Maritime Corp.	DNV GL
2017	Container ship	Crowley Maritime Corp.	DNV GL
2017	RoPax	Tallink	BV
2017	Container ship	Brodosplit	DNV GL
2018	Container ship	Brodosplit	DNV GL
2018	Bulk ship	ESL Shipping	DNV GL
2018	Bulk ship	ESL Shipping	DNV GL
2018	Tug	Keppel Smit Towage	ABS
2018	Tug	Maju Maritime	ABS
2018*	Car/passenger ferry	BC ferries	ABS
2018	PSV	Harvey Gulf Int.	ABS
2018	Container ship	Brodosplit	DNV GL
2018	Container ship	Brodosplit	DNV GL
2018	Car/passenger ferry	Royal Doeksen	LR
2018	Car/passenger ferry	Royal Doeksen	LR
2018	Car/passenger ferry	CHFS	LR
2018	Car/passenger ferry	CHFS	LR
2018*	Ro-Ro	TOTE Shipholdings	ABS
2018	RoPax	Rederi AB Gotland	DNV GL
2018	General cargo ship	Nordnorsk Shipping	DNV GL
2018	Container ship	Containerships	ABS

Year	Type of Vessel	Owner	Class
2018	Container ship	Containerships	ABS
2018	Container ship	GNS Shipping	ABS
2018	Container ship	GNS Shipping	ABS
2018	Container ship	GNS Shipping	ABS
2018	Container ship	GNS Shipping	ABS
2018	Heavy lift vessel	Heerema Offshore	LR
2018	Oil/chemical tanker	Furetank Rederi	BV
2018	Oil/chemical tanker	Furetank Rederi	BV
2018	Oil/chemical tanker	Furetank Rederi	BV
2018	Dredger	DEME	BV
2018	Bulk ship	POSCO	KR
2018	Dredger	van der Kamp	DNV GL
2018	Car/passenger ferry	Torghatten	
2018	Car/passenger ferry	Torghatten	
2018	Car/passenger ferry	Torghatten	
2018	Car/passenger ferry	Torghatten	
2019	Car/passenger ferry	Torghatten	
2019	Cruise ship	Carnival Corporation	RINA
2019	Cruise ship	Carnival Corporation	RINA
2019	Oil/chemical tanker	Älvtank	BV
2019	Oil/chemical tanker	Älvtank	BV
2019	Oil/chemical tanker	Thun Tankers	BV
2019	RoPax	Baleària	BV
2019	Car carrier	Siem Car Carriers	
2019	Car carrier	Siem Car Carriers	
2019	Emergency response ship	German Transport Ministry	
2019	Emergency response ship	German Transport Ministry	
2019	RoPax	Brittany Ferries	
2019	RoPax	Baleària	
2019	RoPax	Baleària	
2019	Oil/chemical tanker	Rosneft	
2020	Oil/chemical tanker	Rosneft	
2020	Oil/chemical tanker	Rosneft	
2020	Oil/chemical tanker	Rosneft	
2020	Oil/chemical tanker	Rosneft	
2020	Research ship	German Transport Ministry	
2020	RoPax	Viking Line	
2020	Cruise ship	Carnival Corporation	RINA
2020	Cruise ship	Carnival Corporation	
2021	Cruise ship	Carnival Corporation	
2021	Cruise ship	Carnival Corporation	
2022	Cruise ship	Carnival Corporation	RINA
2022	Cruise ship	MSC Cruises	
2022	Cruise ship	RCCL	
2024	Cruise ship	MSC Cruises	
2024	Cruise ship	RCCL	

Excluding LNG carriers and inland waterway vessels. For more information please visit www.dnvgl.com
Data last updated : 15 February 2017
* = conversion projects

DNV·GL

WORLD SMALL SCALE LNG FLEET*

Built	Name	CBM	Cargo Type	Trading area	Trading in LNG?	Ship Owner / Operator
1974	Seagas	187	LNG	Sweden	Yes	AGA
1988	Kayoh Maru	1,517	LNG	Japan	Yes	Daiichi
1993	Aman Bintulu	18,928	LNG	Malaysia - Japan	Yes	Perbadanan/NYK
1996	Surya Aki	19,475	LNG	Indonesia - Japan	Yes	MCGC
1997	Aman Sendai	18,928	LNG	Malaysia - Japan	Yes	Perbadanan/NYK
1998	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 Bahrain Vision	12,000	LNG/LPG/Ethylene	Worldwide	No	Norgas Carriers
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	Norgas Unikum	12,000	LNG/LPG/Ethylene	Worldwide	No	Norgas Carriers
2012	Coral Energy	15,600	LNG	Northwest Europe/Baltics	Yes	Anthony Veder
2013	Coral Anthelia	6,500	LNG/Ethylene			Anthony Veder
2013	JX Energy TBN	2,500	LNG	Japan	Yes	JX Energy
2013	Kakuyu Maru	2,500	LNG	Japan	Yes	Tsurumi Sunmarine
2014	LNG-Oil combi**	2,000	LNG	Germany	Yes	Veka
2014	Short Sea LNG Tanker **	4,000	LNG	Germany	Yes	Veka
2015	10 small carriers TBN**	5,000	LNG			Bimantara Group
2015	Jahre TBN**	6,200	LNG	Norway	Yes	Donsotank/Jahre Marine
2015	JS Ineos Ingenuity	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2015	JS Ineos Insight	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2015	JS Ineos Intrepid	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2015	LNG Barge TBN	3,000	LNG	US Coast	Yes	LNG America
2015	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 Inland bunker**	800	LNG	Germany	Yes	Veka
2015	Norgas TBN**	17,000	LNG/LPG/Ethylene	Worldwide		Norgas Carriers
2015	Norgas TBN**	17,000	LNG/LPG/Ethylene	Worldwide		Norgas Carriers
2015	PetroChina TBN	30,000	LNG	China		PetroChina
2015	TBN	14,000	LNG	China	Yes	Zhejiang Huaxiang
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	Yuan He 1	30,000	LNG	China	Yes	CSR
2016	Clean Jacksonville	2,200	LNG	US Coast	Yes	CME
2016	Dalian TBN	28,000	LNG	China	Yes	Dalian Inteh Group
2016	Hai Yang Shi You 301	30,000	LNG	Bali FSU	Yes	CETS (CNOOC)
2016	JS Ineos Indepence	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2016	JS Ineos Innvovation	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2016	JS Ineos Inspiration	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2016	LNG Prime	2,250	LNG	Northwest Europe	Yes	Veka Deen LNG
2016	Navigator Aurora	35,000	Ethane/Ethylene	Markus Hood - Stenungsund	Ethane, for Borealis	Navigator
2016	Ocean Yield TBN	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
2016	Ocean Yield TBN	36,000	Ethane/Ethylene	US - Teeside	Ethane, for Sabic	Gaschem Services
2016	Shell Bunker Barge TBN 1	6,500	LNG	Northwest Europe	Yes	Shell
2016	Shell Bunker Barge TBN 2	6,500	LNG	Northwest Europe	Yes	Shell
2016	Shell Bunker Barge TBN 3	6,500	LNG	Northwest Europe	Yes	Shell
2016	Shell Bunker Barge TBN 4	3,000	LNG	Northwest Europe	Yes	Shell
2017	ENGIE Zeebrugge	5,000	LNG	Northwest Europe	Yes	NYK
2017	CME TBN†	2,200	LNG	US Coast	Yes	CME
2017	CME TBN†	2,200	LNG	US Coast	Yes	CME
2017	Coral EnergICE	18,000	LNG	Northwest Europe/Baltics	Yes	Anthony Veder
2017	Coralius	5,800	LNG	Northwest Europe/Baltics	Yes, for Skangas	Anthony Veder
2017	Evergas TBN	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
2017	Evergas TBN	27,500	LNG/Ethylene	Markus Hook - Rafnes	Ethane, for Ineos	Evergas
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	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	Bernhard Schulte TBN	7,500	LNG	Baltic	Yes	Bernhard Schulte
2018	CME TBN†	2,200	LNG	US Coast	Yes	CME
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

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 = 22 February 2017

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