LNG Fuelling

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Klaipedos Nafta starts Klaipeda LNG test operations

Terminal operator Klaipedos Nafta has commenced operations at its LNG distribution station at the port of Klaipėda in Lithuania.

The first test load was handled via the bunkering vessel *Cardissa*, which reloaded 1,000 cubic meters of LNG.

"The commissioning works enable us to test the entire infrastructure for the LNG logistics in the Klaipėda Seaport. First, the reloading of LNG from the large terminal to a small-scale LNG carrier, then from the carrier to the LNG reloading station, and finally to LNG tank trucks," Mindaugas Jusius, managing director of Klaipedos Nafta, commented.

The distribution facility was backed by a €20 million credit agreement from Nordic Investment Bank and is connected to the country's natural gas system operator, Amber Grid.

"Today's event marks a new and important phase of Klaipedos Nafta's history. Increasingly exploiting LNG infrastructure and expanding its activities, the company continues to create added value to our customers, gas consumers and the main shareholder - the State," Žygimantas Vaičiūnas, Minister of Energy, said.

Klaipeda port

Klaipėda eyes role as regional LNG hub

Klaipedos Nafta's new LNG distribution station is the first stage of planned expansion at Klaipėda, designed to turn the port into a regional energy hub. Under the Blue Baltics plan, port authorities also plan to operate a further bunker supply vessel at the site with capacity for an additional 7,500 cubic meters of LNG.

"Infrastructure commissioning works allows us to try out all the logistics of Klaipeda LNG port infrastructure... This process of testing for the first time is very important both for ourselves and our users, and will result in a successful signal to the market that the LNG division Klaipeda has started," Vaičiūnas commented.

LNG supply companies will now be able to reserve capacity overload and begin commercial operations from the site.

The *Cardissa* at Klaipeda terminal

Growing LNG fleet orderbook

Operated by Shell Western LNG, the *Cardissa* entered service for the first time in August this year at its home port of Rotterdam, docking for the first time at the Yukonhaven terminal.

"The fact that Shell gas chose our Lithuanian gas company once again confirms the LNG terminal in Klaipeda competitiveness and growth prospects," Vaičiūnas added.

The 6,500 cubic-metre-capacity *Cardissa* was co-financed by the European Union's Connecting Europe Facility and built at STX Offshore & Shipbuilding's yard in South Korea. It is one of relatively few LNG bunker vessels currently in operation in the region but is set to be joined by several planned newbuild bunker vessel over the coming three years as shipping firms switch to the fuel ahead of new IMO sulphur limits in 2020. ■

FUELLING NEWS AGENDA

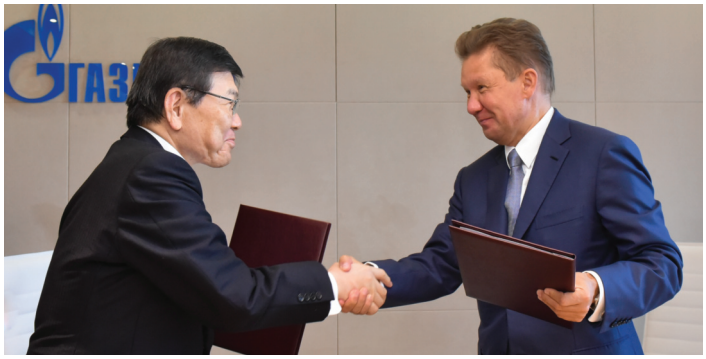
Gazprom, Mitsui partner on LNG bunkering

Russian energy major Gazprom has signed a framework agreement with Japanese multinational Mitsui & Co to collaborate on LNG bunkering in the Sea of Japan.

The two firms will invest in LNG bunkering for marine vessels and aim to build on ongoing LNG bunker activities formalized in a Memorandum of Understanding signed in September last year.

Alexey Miller, Chairman of the Gazprom Management Committee, and Masami Iijima, Chairman of the Board of Directors of Mitsui signed the framework document at the recent Eastern Economic Forum 2017 in Vladivostok.

"The document reflects the commitment of the parties to collaborate in producing, transporting and marketing small- and mid-scale LNG in Japan, as well as in LNG bunkering in the Sea of Japan," a spokesperson for Gazprom said.



Masami Iijima and Alexey Miller

Deepening Sakhalin II partnership

Alongside LNG bunkering in Japan the wide-ranging framework agreement will cement the firms' partnership in large-scale projects such as Sakhalin II, Russia's only active LNG plant.

Gazprom and Mitsui are partners in the Sakhalin II operator Sakhalin Energy Investment Company Ltd. In which Gazprom owns a 50% stake and Mitsui owns 12.5%.

Anglo-Dutch energy firm Shell owns a further 27.5% minus one share and Japanese firm Mitsubishi owns the remaining 10%.

Mitsui eyes Baltic LNG involvement

Further steps under the Agreement of Strategic Cooperation signed in December last year may include Mitsui adding its expertise to the Baltic LNG project which Gazprom is currelty leading.

"Baltic LNG is a natural gas liquefaction plant in the Leningrad Region. The potential target markets for the project include countries in the Atlantic region, Middle East, and South Asia, as well as small-scale LNG markets in the areas of the Baltic and North Seas," a spokesperson for Gazprom said.

The proposed plant will be built near the seaport of Ust-Luga and will have an initial annual capacity of 10 million tonnes. Gazprom states that there is a possibility of LNG swap deals also under consideration. ■

Skangas hails *Coralius* maiden voyage

LNG bunker vessel *Coralius* has completed its maiden voyage docking at a Skangas terminal in Øra, Fredrikstad in Norway.

The *Coralius* is owned by Dutch gas tanker line Anthony Veder and Sirius Shipping and was developed in partnership with Skangas. The three companies received the newbuild LNG vessel in June from shipyard Royal Bodewes in the Netherlands.

"We look forward to serving our existing and new customers wherever they need LNG by ship-to-ship. Today the technology and ship engines are sound for gas and we are more than ready to supply it by our supply chain," Kimmo Rahkamo, CEO of Skangas, said.

The vessel sailed from Skangas' production facility in Risavika, Stavanger where it originally loaded LNG.

Skangas enters time charter contract

The *Coralius* has capacity for 5,800 cubic meters of LNG and Skangas entered a time charter contract on 2 September with the owners Anthony Veder and Sirius Shipping.

It will be operated in partnership with Swedish fuel provider Sirius Rederi, and serve traffic from the Kiel Canal in the German state of Schleswig-Holstein up to mid Norway, via the North Sea.

"We are very content with further developing the marine LNG availability in Northern Europe by our new ship *Coralius*," Rahkamo said.

The *Coralius*

Ice Class 1A classification

The *Coralius* measures 100 meters in length and is equipped with the latest fast transfer technology to ensure larger volumes of LNG can be transferred at high rates. The vessel is also designed to carry out LNG refuelling operations either in port or at sea and holds a Finnish/Swedish Ice Class 1A classification making it equally capable of accessing the remote areas of Norway as the industrial heartlands of Northern Germany.

"By 2020 there will be nearly 200 vessels worldwide running on LNG. This number is expected to rise significantly, as LNG is recognized by the shipping industry as the most viable alternative fuel to reduced emissions… LNG marine fuel is available, and will remain economically efficient for the foreseeable future," a spokesperson for Skandgas commented. ■

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LIQAL develops relocatable LNG refuelling station

LNG equipment developer LIQAL has developed a skid-mounted LNG refuelling station that allows operators to create relocatable LNG resources.

The pre-fabricated and transportable LNG refuelling unit is dubbed the 'MRU' and is SIL-2 classified. The firm expects the new functionality will offer lower investment requirements for both fuelling equipment and onsite project preparations while offering 'best in class performance' and flexibility.

"Any tank type including mobile ISO storage can be connected to the MRU, which also holds space for LIQAL's proven micro liquefaction technology that ensures unlimited holding time of LNG in the storage tank and enables supply of both saturated- and cold LNG to effectively fill all available LNG truck types," a spokeperson for LIQAL commented.

The MRU complies with the latest international standards and regulations, including ISO 16924. The proprietary design also integrates 'intelligent features' like on-the-fly saturation, a vapour return economizer, MID certified LNG fuel dispenser with patented heated and purged nozzle docking bay and 24/7 iSCADA remote monitoring system.

"The MRU offers the opportunity to position the dispenser at a distance from the skid for 2-sided refuelling of LNG and to add a LCNG system," LIQAL states.

The firm offers turnkey supply and commissioning of the MRU, and can also take responsibility for technical operation and maintenance of the system once in place.

Technology portfolio enhances LNG viability

Earlier this year the firm obtained a patent for a new design of LNG dispenser to improve the refuelling process for LNG-powered vehicles. The nozzle docking bay system offers "tension-free connection and de-coupling of the nozzles" to and from LNG-powered vehicles and is designed to integrate the LNG dispenser in such a way as to extend the life of nozzle seals and hoses.

"The LNG fuel dispensers, designed and produced by LIQAL, are fully certified to operate on the European market and comply with the latest standards to sell LNG as transport fuel including the Measuring Instruments Directive (MID)," a LIQAL spokesperson said.

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

> **"The LNG fuel dispensers, designed and produced by LIQAL, are fully certified to operate on the European market and comply with the latest standards ..."**
>
> *- LIQAL spokesperson*

NEWS NUDGES

Coralius completes ship-to-ship LNG first

LNG bunker vessel *Coralius* has completed its ship-to-ship refuelling operation docking with the tanker *Fure West*.

The operation took place in international waters at Northern Kattegat, in the middle of the sea between Frederikshavn, Denmark and Gothenburg, Sweden.

"This is a key milestone in our history of developing the LNG availability. We are happy working together with our customer Furetank for this first of several upcoming ship-to-ship bunkerings," Kimmo Rahkamo, CEO of Skangas, said.

The receiving vessel, *Fure West*, measures 144 metres in length and operates mainly in the Baltic and Kattegat area.

Aritst's rendtion of the LIQAL LNG system

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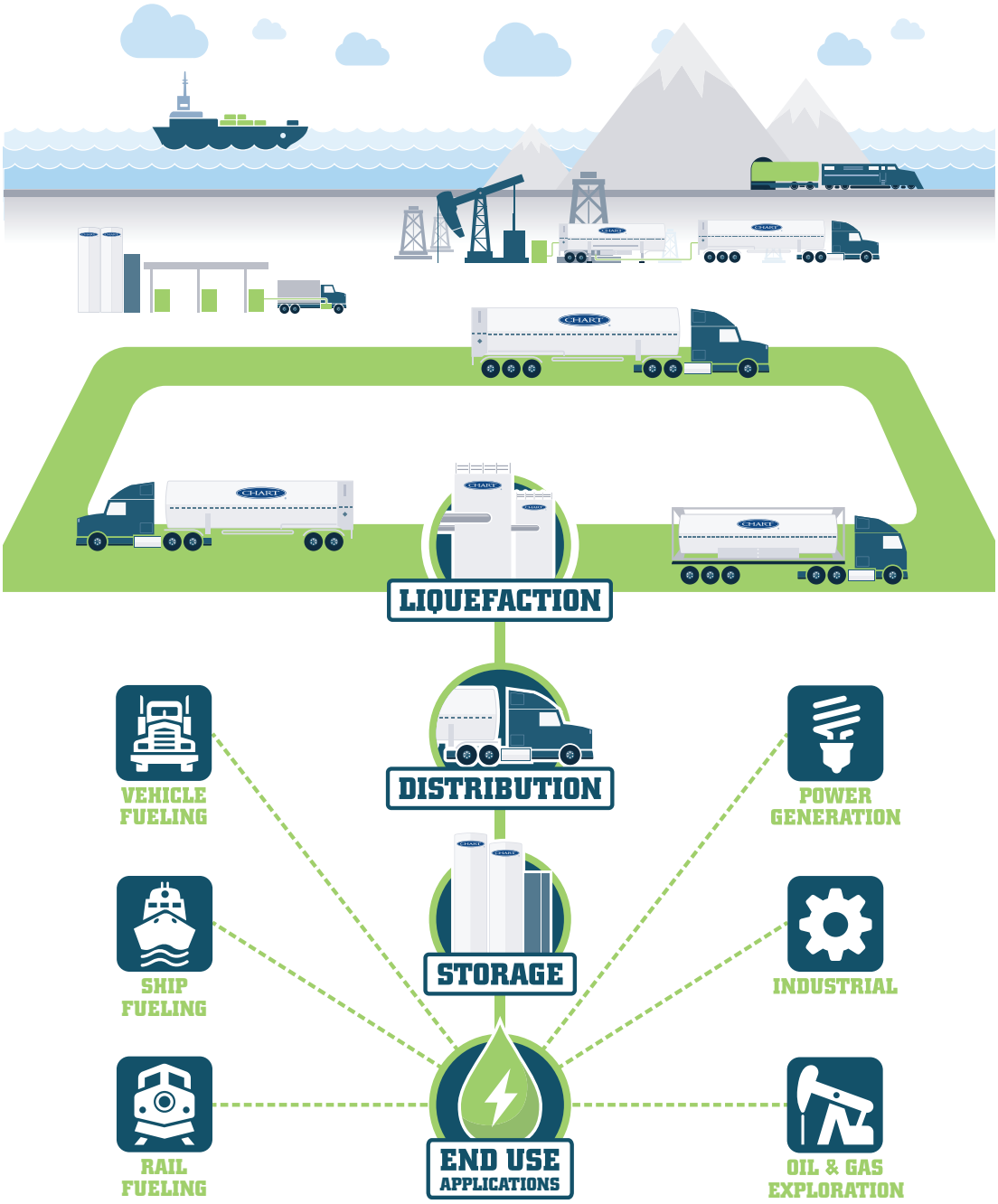

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MAN Cryo to deliver LNG bunkering for Swedegas

Fuel-gas-system manufacturer MAN Cryo has signed a contract with infrastructure firm Swedegas to deliver an LNG bunkering facility at the Port of Gothenburg.

The project will involve the construction of a new facility designed to enable vessels to bunker LNG from trucks or containers while simultaneously loading or unloading cargo at two jetties. The facility will be lcoasted at the Gothenburg's Energy Port and will be increase flexibility for customers and LNG suppliers.

Gothenburg continues LNG journey

As the largest port in the Nordic countries, the Port of Gothenburg handles over 6,000 ship visits per year and has previously stated its aim to develop LNG as a fuel of choice for marine traffic. It the only Swedish port with the capacity to cope with the largest container ships and handles nearly 30% of the country's foreign trade.

"We are very happy to have won the contract to build this first such bunkering facility in the important Port of Gothenburg. Our strategy to offer LNG solutions to the marine market, both on board vessels as fuel-gas supply systems but also as bunkering infrastructure, dovetails perfectly with the general development towards cleaner ship propulsion," Mikael Adler, Managing Director of MAN Diesel & Turbo, Sweden, said.

Swedegas to meet new sulphur directives

The purpose-built discharge station will include LNG trailers or containers, feeding pumps, vacuum-insulated piping and bunkering equipment and will be operated by Swedish firm, Swedegas. The facility will meet new sulphur directives for shipping and has been designated by the EU as one of the most prioritised infrastructure projects in Europe.

"MAN Cryo will oversee the project under the terms of an EPC contract including engineering, procurement and construction, and managed from MAN Diesel & Turbo's local Gothenburg office," a MAN spokesperson said.

Port of Gothenburg

The LNG bunker station is scheduled to start operation during 2018 and will be operated in close cooperation with the Port of Gothenburg.

MAN Cryo is based in Gothenburg, Sweden and was formed in 2016 after German manufacturer MAN Diesel & Turbo acquired Swedish industrial firm Cryo AB in 2016. Situated in Gothenburg, Sweden, MAN Cryo develops and manufactures cryogenic equipment for the storage, distribution and handling of LNG. ■

Wärtsilä to supply LNG Shipping bunker barge

Finnish equipment manufacturer Wärtsilä is to supply various cargo systems for a new LNG bunker barge to be chartered by Shell Western LNG.

The new vessel will have 3,000 cubic metre capacity and will be owned by LNG Shipping, a consortium between Belgium based Victrol and CFT Corporation based in France. The cargo systems will be supplied by Wärtsilä subsidiary Wärtsilä Gas Solutions.

"Undoubtedly the award of this contract was based largely on Wärtsilä's vast experience and broad in-house know-how concerning gas systems. Our strength throughout the LNG value chain is well known, and this new bunker vessel provides yet another link to this chain," Timo Koponen, Vice President of Flow & Gas Solutions at Wärtsilä, said.

LNG bunkering barge

The new vessel is one of a growing fleet of bunker barges that Shell will operate at the port of Rotterdam in the Netherlands.

Romanian shipyard to build vessel

Wärtsilä will supply the cargo handling system and cargo tanks for the barge, which will be built in Romania and outfitted in the Netherlands. The Finnish firm will also be responsible for installation of the cargo arrangement onboard the vessel.

"Wärtsilä is a leader in gas handling technology and we are pleased to have them as a partner in this newbuild project. Furthermore, their ability to provide the equipment on a fast-track basis is important for the delivery scheduling of this barge," Gisele Maes Buelens of Victro, said.

Wärtsilä has developed the design of its Cargo Handling Systems based on extensive experience delivering fuel and cargo systems for LPG, LEG and LNG carriers. The available scope includes Cargo handling, Boil-off gas handling, Cargo tank design and complete tank delivery, Ship design and LNG fuel supply systems.

"There is a growing demand for small-scale transportation of LNG to end users that are located in areas where pipelines are not feasible or economically viable. Typically, such end users are power generation plants, land based industries, and suppliers of LNG as fuel for vehicles or ships," a Wärtsilä spokesperson commented. ■

Meyer Starts work on LNG-fuelled *Costa Smeralda*

Finland's Meyer shipyard has begun construction of Costa Cruises' first LNG-fuelled cruise ship the *Costa Smeralda*.

The vessel is one of seven LNG-powered cruise ships ordered by Costa Cruises' parent company Carnival Corporation. The 180,000-gross-tonne vessel is set to enter service in October 2019

"Today is a very special moment in shipbuilding, when all the ideas, creativity, technology and signature design that is going into Costa's new ships, are finally starting to become reality… In the last two years, we have had a very intense design collaboration with our customer and the outcome is a really fresh and new design fused with the latest of technology" Jan Meyer, CEO of Meyer Turku, said.

Costa signs up for LNG pair

The two LNG Costa ships – as well as two new ships for AIDA Cruises – are part of a multibillion dollar contract signed between Carnival and Meyer shipyards in Turku, Finland, and Papenburg, Germany.

"The multibillion dollar contract with Meyer, which also includes two new LNG-powered ships to be built for our German brand, AIDA Cruises, reflects our strategy of constantly innovating our vacation offerings and providing our guests with an unmatched cruise experience," Michael Thamm, CEO of the Costa Group and Carnival Asia, said.

The *Costa Smeralda* will be followed by an as yet unnamed sister vessel, delivered by Meyer Turku in 2021. Each vessel will offer more than 2,600 passenger cabins for a total of about 6,600 passengers onboard.

"These ships will strengthen the leadership position for the Costa Group, which is already the market leader in all the major continental Europe markets," Thamm added.

Shell Western to provide LNG bunkering

The *Costa Smeralda* will enter service in the Western Mediterranean, with LNG bunkering provided by Shell Western LNG.

"The two new Costa Cruises ships are a true global innovation and set new standards for the entire sector… they will be the world's first LNG-powered ships that will be marketed to consumers from multiple countries, including Italy, France, Spain, Germany and Switzerland," Neil Palomba, president of Costa Cruises, said.

Michael Thamm

Anglo-American owned Carnival is the largest cruise company in the world, and operates 100 ships berths with 10 new ships scheduled to be delivered between now and 2018. ■

> "These ships will strengthen the leadership position for the Costa Group, which is already the market leader in all the major continental Europe markets."
>
> *- Michael Thamm, CEO of the Costa Group and Carnival Asia*

The Meyer Turku shipyard

NEWS NUDGES

Rosmorport Plans LNG Bunker Barge

Authorities at the Russian port of Rosmorport are reportedly considering construction of an LNG bunkering vessel to support marine traffic.

The proposed bunkering vessel would have capacity of between 3,000 and 5,000 cubic meters, according to comments by Vladimir Shtrambrand, head of Rosmorport's Fleet Construction and Development Department.

Shtrambrand was speaking at the recent 2nd International Conference in Saint-Petersburg. The port is reported to be in negotiations with three undisclosed bunker supplying companies to operate the proposed bunker vessel.

Volvo backs LNG fuelled future

Swedish truck manufacturer Volvo has backed the use of LNG to power its future fleets, claiming that the fuel can deliver gains of as much as 25% in fuel efficiency.

The firm expects that its FH and FM truck product lines will help drive LNG fuel uptake and is also investigating alternative gas fuels, including compressed natural gas and biogas.

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

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

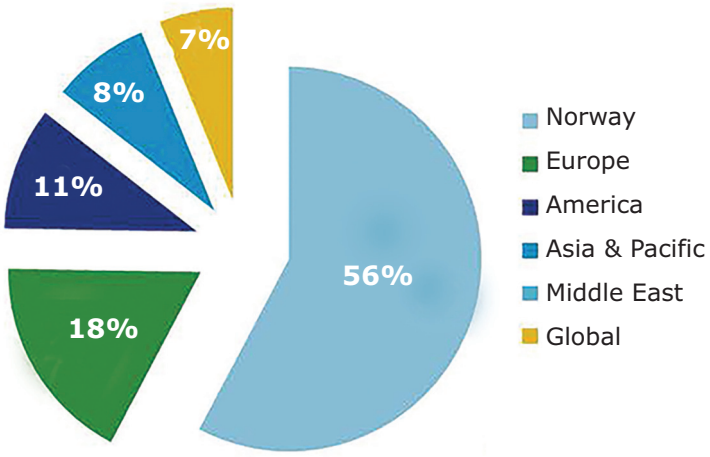
For more information please visit www.dnvgl.com
Data last updated: 15 February 2017
* = conversion projects

DNV·GL

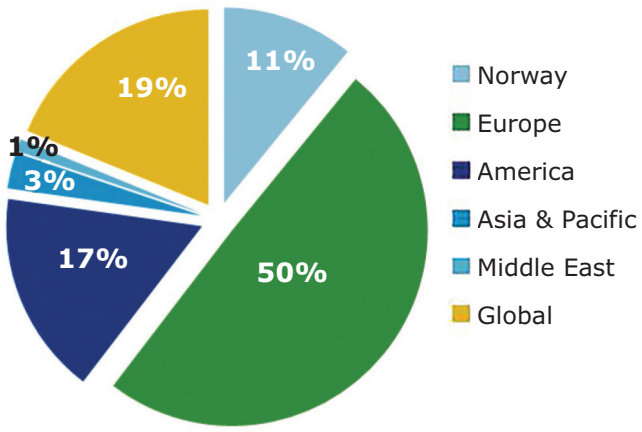
Year	Type of Vessel	Owner	Class
2015	Gas carrier	Evergas	BV
2015	Gas carrier	Evergas	BV
2015	Tug	CNOOC	CCS
2015*	Car/passenger ferry	AG Ems	DNV GL
2015	Tug	NYK	NK
2015	Gas carrier	Chemgas Shipping	BV
2015	Gas carrier	Evergas	BV
2015	PSV	Harvey Gulf Int.	ABS
2015	Container ship	TOTE Shipholdings	ABS
2015	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 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 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?
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	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

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 = 24th May 2017

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Built	Name	CBM	Cargo Type	Trading area	Trading in LNG?	Ship Owner / Operator
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	Yuan He 1	30,000	LNG	China	Yes	CSR
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	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	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
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	Stolt TBN (option)	7,500	LNG		Yes	Stolt-Nielsen Gas
2020	Stolt TBN (option)	7,500	LNG		Yes	Stolt-Nielsen Gas
2021	Stolt TBN (option)	7,500	LNG		Yes	Stolt-Nielsen Gas

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