

LNG Fuelling

AN LNG JOURNAL PUBLICATION

23 February 2017

ISO publishes new LNG bunker standards

The International Standards Agency (ISO) has issued new LNG bunkering guidelines that promise to improve processes and help drive uptake of the fuel across the shipping sector.

The new standards - ISO 20519 - provide guidelines for operators to select vessel fuel providers and meet defined safety and fuel quality standards. The ISO document, *Ships and marine technology - Specification for bunkering of liquefied natural gas fuelled-vessels*, is available in English and French.

"As demand for LNG-fuelled vessels has increased, so has the demand for practical, cost-effective and efficient LNG bunkering, so there was an urgent need for an International Standard to ensure LNG bunkering operations could be conducted safely," a spokesperson for the ISO said.

Beyond IGC code

The new standards includes a wide range of requirements that are not covered by the IGC Code, the prevailing international code for the safe carriage by sea of liquefied gases in bulk.

These are encapsulated in five broad themes, covering: hardware for liquid and vapour transfer systems, operational procedures, requirements for LNG providers to deliver an LNG bunker delivery note, requirements to train personnel and requirements



ISO 20519 was developed by the TC 8 technical committee

for LNG facilities to meet applicable ISO standards and local codes.

The new guidelines were produced by the ISO TC 8 technical committee working group WG 8, chaired by ISO representative Steve O'Malley who also chairs the Ships and Marine Technology committee and the Intermodal and Short Sea Shipping subcommittee SC 11.

"The requirements of ISO 20519 can be incorporated as a management objective into existing management programmes and provide verifiable compliance. This is important because the requirement to comply with ISO standards is often incorporated into business contracts and may also be referenced by local regulations," O'Malley said.

Drafting of the ISO 20519 standards involved participation of several different stakeholders,

including specialists from the maritime industry, equipment manufacturers, the Society for Gas as a Marine Fuel (SGMF), trading companies, class societies, international registries and the US Coast Guard.

New group to monitor bunker incidents

To ensure the standards remain relevant and that new technology is continuously incorporated into best practice the ISO has also established a working group on the topic to monitor and facilitate changes in the ISO 20519 standards

"The use of LNG as a vessel fuel is relatively new, so the standard will need to be brought up to date periodically to incorporate lessons learned over time and technological changes. To facilitate this, a group has been created to track LNG bunkering incidents and help identify when the standard should be updated," the ISO stated.

The standard ISO 20519:2017 was produced at the request of the International Maritime Organization (IMO), the European Commission and the Baltic and International Maritime Council (BIMCO), the world's largest international shipping association. ■



The new guidelines will ensure safety standards

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LNG bunker vessel *Engie Zeebrugge* leaves Yeongdo

French energy firm Engie along with Fluxys, Mitsubishi Corporation and NYK Line has taken delivery of the first purpose-built LNG bunkering vessel from Korean shipbuilder Hanjin Heavy Industries & Construction.

The vessel - *Engie Zeebrugge* - was fabricated at Hanjin's Yeongdo shipyard in Busan, Korea and following shore-to-ship fuelling operations at the shipyard the vessel proceeded on its maiden voyage to Zeebrugge, powered by LNG.

"The challenge in making LNG grow in the bunker market is to develop sufficient supply infras-

tructure to support the increasing number of LNG-fueled ships that are expected to come into operation. *Engie Zeebrugge*, in this respect, marks a milestone in the development of the European LNG bunkering chain," a spokesperson for Engie said.

The *Engie Zeebrugge* has capacity for 5,000 cubic metres of LNG and measures 108 meters in

length and 18 metres in breadth. The ship is powered by dual-fuel engines that can run on either LNG, marine gas oil or marine diesel oil.

It will operate from Fluxys' LNG terminal in Zeebrugge, where small carriers with capacities from 2,000 cubic metres upwards can dock at the recently commissioned second jetty. NYK will provide ship management services for the *Engie Zeebrugge*.

First vessel under Gas4Sea brand

As well as being the first purpose-built bunker vessel designed to service a variety of LNG-fuelled ships, the *Engie Zeebrugge* will also be the first to operate under

the Gas4Sea brand, launched last year, by Engie, Mitsubishi Corporation and NYK.

"Through Gas4Sea, using the world's first purpose-built LNG bunkering vessel, we and our partners ENGIE and Mitsubishi Corporation will offer ship owners and operators the opportunity to participate in this innovation and further enhance our industry's ability to operate in a more environmentally responsible way," Hitoshi Nagasawa, Senior Managing Corporate Officer of NYK Line, said at the launch of Gas4Sea.

The *Engie Zeebrugge* will initially start supplying LNG fuel for United European Car Carriers' new dual fuel car carriers operating in the North Sea and Baltic Sea. ■



The *Engie Zeebrugge*

Baleària plans €450m investment in LNG-fuelled fleet

Spanish shipping line Baleària plans to invest €450 million in LNG-fuelled vessels and intelligent terminals as part of a strategic upgrade programme over the next five years.

The financing will be used to purchase three new LNG-powered smartships as well as the purchase of other units and modernization of vessels in the fleet.

The firm reports that one of the proposed smartships will be built by the LaNaval shipyard in Vizcaya, Spain and the other two vessels will be built by the Cantieri Navale Visenti shipyard in Donada near Venice, Italy.

The investment plan was announced by Adolfo Utor, president of Baleària, who reinforced a "commitment of the shipping sector to innovation and energy efficiency as a basis for further growth" adding that the investment from Baleària was aimed at delivering "the best services

at the best prices".

Vessels scheduled for 2018

Earlier this year, Baleària signed a €200 million contract with Cantieri Navale Visentini for two dual-fuel gas engine sister ferries, each with capacity for 810 people. Both vessels are expected to be operational by the end of 2018.

An earlier contract placed with Spanish shipyard Construcciones Navales del Norte last year for an LNG-fuelled ferry was priced at €175 million. LNG propulsion equipment for this ferry will be supplied by Finnish equipment manufacturer Wärtsilä which will also provide project support ser-



Baleària will invest in LNG-fuelled ferries

vices as well as commissioning of the combined systems.

Fleet growth fuels turnover growth

Baleària also recently announced strong annual results with group turnover rising 13% to €329.5 million. The group cited "increased supply" thanks to new ships and lines as a driving factor in the revenue growth.

"Consolidated gross profit (EBITDA) stood at an amount of 78.8 million euros in 2016 and a profit of 39 million euros, "attributed to the adjustment of fuel prices and the increase in supply and demand," Utor. said.

Across all its three international routes the company transported more than 700,000 passengers during 2016, a rise of 15% compared with the year previous. ■

LNG Fuelling

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SEA\LNG adds three new members

Industry consortium SEA\LNG has added three new members to its coalition as part of its mission to “break down the barriers” to LNG uptake and establish LNG fuel as an economically viable alternative to fuel oil.

The new members include classification body Bureau Veritas, LNG solutions provider Clean Marine Energy (CME), and integrated utility Gas Natural Fenosa.

The addition of these three firms expands SEA\LNG's membership list to 23.

“Bureau Veritas is committed to helping make LNG one of the preferred, and safe solutions for a clean shipping future, which is why it makes sense to work collectively with SEA\LNG members to achieve this,” Philippe Donche Gay, President for Marine and Offshore at Bureau Veritas, said. “We play a significant role in helping ensure safe LNG as fuel operations from design through to construction and into operations, including a safe bunkering framework

SEA\LNG includes ABS, Carnival Corporation, DNV GL, Eagle LNG

Partners, ENGIE, ENN Group, GE, GTT, JAX LNG, Keppel Gas Technology, Lloyd's Register, Mitsubishi, NYK Line, Port of Rotterdam, Qatargas, Shell, Total, TOTE, Toyota Tsusho, and Wärtsilä.

CME promises increased funding for LNG fuel

Alongside the strategic impetus that the three members will add to the coalition the broadening of the coalition is expected to deliver a practical boost as CME

“The greatest barriers for shipowners and operators to convert to LNG are access to capital and guaranteed LNG supply. CME's ability to provide funding for LNG powered vessels and our commitment to developing the supply chain will lower these barriers,” Ralli said.

Founded in 2012, CME finances

the construction or retrofit of LNG-fuelled vessels alongside developing the necessary distribution infrastructure. The organisation is a key partner in the construction of the JAX LNG terminal, the first fully-integrated LNG marine fuelling facility in North America.

CME was also responsible for the first US Jones Act LNG bunker vessel at Conrad's Shipyard in Orange, Texas. The vessel is based on a design by Bristol Harbor Group and incorporates a single GTT

membrane tank of 2,200 cubic metres capacity. The 222-foot vessel will be delivered to service anchor customer TOTE Maritime in Q2 2017

“We look forward to working collectively with the SEA\LNG coalition to provide owners and operators with the confidence to make the transition from conventional marine fuels to natural

gas,” Pace Ralli, CEO of Clean Marine Energy said.

GNF brings 30 bcm portfolio

The consortium will also benefit from the addition of Gas Natural Fenosa which brings with it a diversified natural gas and LNG portfolio, amounting to approximately 30 billion cubic meters (bcm). The firm also operates a fleet of new methane tankers for the transportation of LNG worldwide.

“As a leading LNG operator, we hope that the SEA\LNG coalition will benefit from our presence throughout the gas value chain. We continuously strive to adapt to the evolving market by ensuring a strong presence in emerging LNG bunkering markets,” Alejandro Garcia, head of Global Gas Origination at Gas Natural Fenosa said. ■

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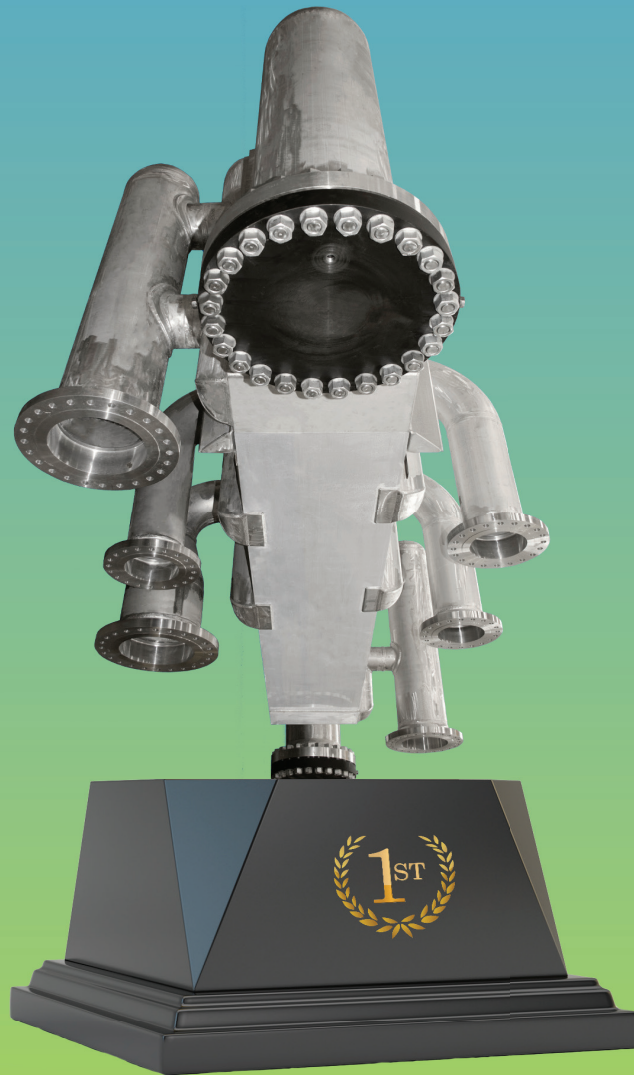
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Evol LNG completes Australian LNG bunker first

Fuelling specialist Evol LNG has completed the first commercial LNG bunkering operations in Western Australia's north-west, having refuelled vessels at King Bay Supply Base and Fremantle Port.

The firm successfully refueled the platform supply vessel, *Siem Thiima*, at King Bay Supply Base near Dampier and a vessel at the port of Fremantle on behalf of Australian oil and gas company Woodside.

"Our decision to enter the LNG bunkering market is part of a long-term strategy that recognises environmental and economic sustainability of LNG as a transport fuel. It also recognises that the LNG marine fuel market is still in development so the fact EVOL has over 15 years' experience in distributing LNG means we saw an opportunity to provide a suite of services that perhaps others can't," Nick Rea, business manager at EVOL, said.

Australia's first LNG-fuelled PSV

The bunkering operations for the *Siem Thiima* were the first for an LNG-fuelled platform supply vessel in Australia and were completed on behalf of Norwegian owner Siem Offshore Australia. LNG was delivered EVOL LNG's Kwinana plant, 1,320 kilometres to the south of Dampier.

The Fremantle operations were completed utilizing a bunkering system designed and fabricated for Woodside by EVOL to ISO 18683:2015 standards.

Last year, authorities at port of Fremantle approved plans to develop the LNG bunkering facilities in response to demand from the regional shipping industry which



The *Siem Thiima*

has grown rapidly as a result of a boom in mining and petrochemical activity.

IMO regulation expected to drive further growth

The advent of stricter regulations from the International Maritime Organisation (IMO) is expected to further bolster support for LNG fuelling in Australia as international

trade to the region grows.

"Interest in LNG as a marine fuel is growing, especially since the IMO announced that it would introduce a global marine fuel sulphur limit of 0.5 per cent from 2020," Rea said.

"It's certainly an offering we'd like to expand, particularly as truck-to-ship LNG bunkering can be achieved relatively inexpensively with existing logistics assets."

The firm is currently considering investments in infrastructure "to meet the market's needs" and aims to obtain licences from other major Australian and regional ports to conduct LNG bunkering operations should interest from clients strengthen. ■

CIMC to deliver tanks for Zhoushan LNG bunker project

Chinese equipment manufacturer CIMC Enric is to deliver two storage tanks for an ambitious LNG refuelling project in Zhoushan, eastern China.

The tanks will be used to develop an LNG facility to refuel international vessels docking at Zhoushan Archipelago New Area. The tanks will each have capacity of 160,000 cubic metres and the facility is expected to be operational in 2018.

Design, procurement and construction work for the storage tanks will be completed by CIMC Enric subsidiaries - TGE Gas Engineering, based in Germany, and Nanjing Yangzi Petrochemical Design Engineering, based in eastern Jiangsu province.

ENN project to transform Marine Industry Cluster Zone

The bunker storage and infrastructure are part of a larger US\$1.5

billion LNG fuelling terminal under development in the Marine Industry Cluster Zone by Chinese energy firm ENN Group.

CIMC Enric is the equipment manufacturing division of China International Marine Containers and part of state-owned transport conglomerate China COSCO Shipping.

Pushing the agenda for LNG fuelling, CIMC Enric has also recently unveiled designs for large-capacity 40-foot LNG tanks, according to Chinese media. The new designs are reportedly suitable for multi-modal transfer of LNG and compliant with U.S. regulations.

"Once this mode of transportation is launched and widely accepted, a lot of wasted offshore natural gas will be saved," Yang

Baoying, deputy general manager at CIMC Enric, told China Daily.

Tests are also reported to be ongoing for a 14,000 cubic metre LNG feeder carrier, which will incorporate two inde-

pendent 7,000 cbm liquid cargo tanks. The novel design follows development by CIMC to produce the world's first Compressed Natural Gas (CNG) transport ship, capable of moving 700,000 cubic meters of CNG.

China invests in LNG fleet opportunities

China has pushed ahead with plans to develop LNG fuelling infrastructure in recent months as part of a strategy by the Ministry of Transport to support a wider LNG fleet across the country's ports and waterways.

Last month, Hong Kong-based investment holding company China LNG signed an agreement with Chu Kong Shipping to construct LNG refueling docks, LNG refueling stations and LNG storage facilities in the Pearl River Delta, China.

This follows US\$15 million of capital registered in 2016, for a new government-backed joint venture between energy firm China LNG Group and Huaqiang Natural Gas to develop LNG refueling facilities in China. ■

NEWS NUDGE

Salish Eagle sets sail from Remontowa

Canadian shipping firm British Columbia Ferry Services has announced that the second of three newbuild dual-fuel ferries - the Salish Eagle - has departed from Poland bound for Canada.

"We are looking forward to introducing all three new Salish Class vessels into service this year, which will serve British Columbians for decades to come. We plan to operate these ships on natural gas, which will improve our environmental footprint and reduce our operating costs," Mike Corrigan, CEO of BC Ferries, said.

The vessel set sail from Remontowa shipyard in Gdansk, Poland and is expected to take 45 to 55 days, with bunkering stops scheduled in Santa Cruz, Canary Islands, and Panama City, Panama.



New infrastructure is planned for the Zhoushan Archipelago New Area

Skangas to supply LNG fuel to Vaasa

LNG specialist Skangas has signed a contract with Finnish waste management company Stormossen to deliver LNG fuel to a biogas station in Vaasa.

The biogas station will be Stormossen's first such facility in Vaasa and will support the firm's provision of fuel for the regional public transportation sector and passenger cars. The plant will create gas from local waste and as a result output will be variable, dependent on the volume of waste produced in the region each month.

"Skangas is our back-up for fuel

deliveries to our new station. Choosing Skangas give us the option for steady supply of either liquefied natural gas or biogas as they have a reliable gas distribution chain outside the gas grid," Leif Åkers, managing director of Stormossen, said.

Flexible backup to ensure uninterrupted supply

The contract with Skangas ensures flexible delivery of LNG for Stormossen, allowing the firm to ensure uninterrupted supply of biogas to their customers.

"This is the first gas station but it will not be the last.

We are aiming at increase the availability of gas as fuel in order to meet the market needs and public demands for a more sustainable and cleaner environment," Åkers added.

The biogas plant is scheduled to open in the first half of 2017 and will have capacity to produce methane gas equivalent to 1,500,000 litres of diesel. It will deliver fuel for the city's fleet of 12 buses and approximately 1,000 private cars.

Growth for LNG as municipal transport fuel

Skangas expects the market for LNG as fuel for municipal transport to grow and cites Vaasa as "a perfect example" of the development in the region.

"From a larger perspective this



LNG tank-photo Stormossen

is an example that natural gas plays an important role in the vehicle gas supply chain. The consequence is that natural gas will contribute in the future development of biogas supply chain in the Nordics", Tommy Mattila, Sales and Marketing director in Skangas, said.

Skangas is one of the largest LNG suppliers in the Nordic region and provides fuel for shipping, industrial and heavy-duty road transport needs. The firm is joint-owned by Finnish natural energy gas expert Gasum (51%) and Norwegian electricity group Lyse Energi (49%). ■



Tanking of LNG Stormossen

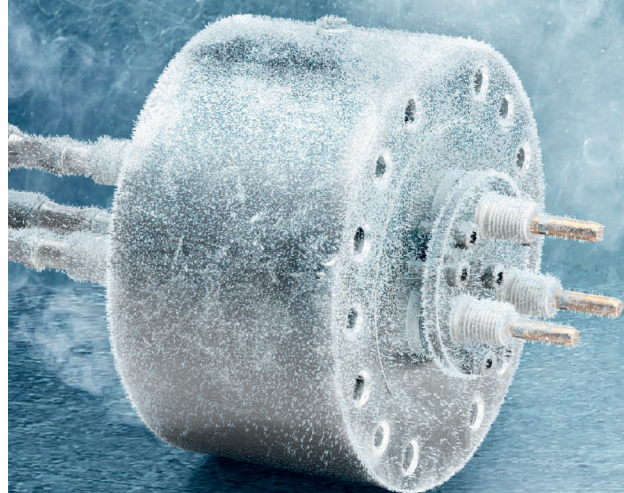
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LNG-FUELLED SHIPS IN OPERATION WORLDWIDE

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	Samsøe 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

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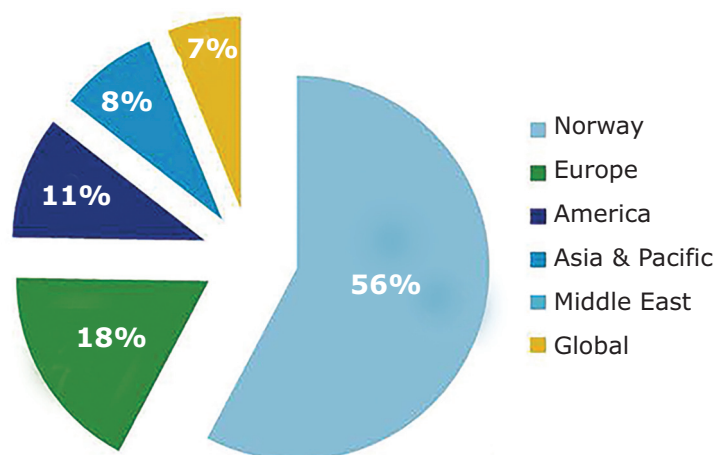
Data last updated: 15 February 2017

* = conversion projects

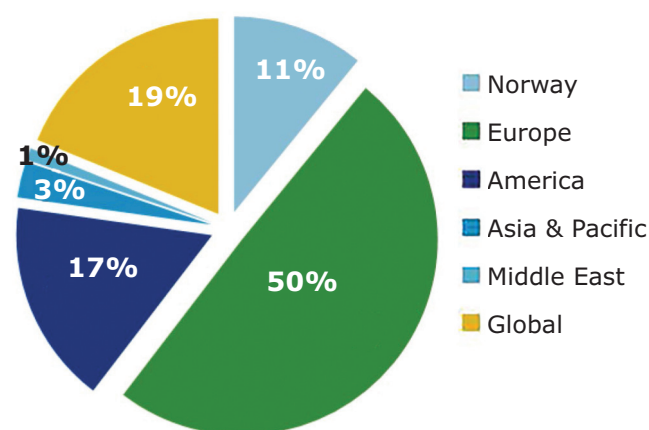
Year	Type of Vessel	Owner	Class
2015	Gas carrier	Evergas	BV
2015	Gas carrier	Evergas	BV
2015	Tug	CNOOC	CCS
2015*	Car/passenger ferry	AG Ems	DNV GL
2015	Tug	NYK	NK
2015	Gas carrier	Chemgas Shipping	BV
2015	Gas carrier	Evergas	BV
2015	PSV	Harvey Gulf Int.	ABS
2015	Container ship	TOTE Shipholdings	ABS
2015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

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	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

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 Innovation	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