

LNG Fuelling

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LNG fuel to play 'significant role' in clean transport

The use of LNG as a transport fuel is expected to play a 'significant role' in the marine sector and improve air quality levels worldwide, according to research by the International Gas Union (IGU).

The IGU report titled *Enabling Clean Marine Transport*, highlights the need for strong policy responses to encourage a "widespread switch" to the fuel and includes a range of recommendations aimed at G20 governments.

"G20 governments should provide de-risking funding for technology innovation and unique bunkering investments. [LNG bunkering] is a young industry, and a standardized one-size-fits-all solution does not exist... each port must assess it on a case-by-case basis, to find the most cost-effective option... Hence, the first-mover challenge will persist for port bunkering investment for some time," the IGU states.

Report suggests four-pronged approach

The reports outlines four main directions for action: an increase of emission regulation for marine transport providers, elimination of gaps in existing regulatory frameworks, facilitation of access to finance and direct funding for

- Confusing regulatory landscape
- Gaps in Emission Controls
- Regional inconsistencies
- Uncertainty in future policy direction

Regulatory

- Difficulty to access financing
- Diffuse benefits misaligned with costs
- Resale value uncertainty
- Future fuel price uncertainty

Commercial

- Bunkering availability concerns
- "First Mover Tax"
- New technology concerns
- Impacts on Safety, Space and Range

Technical

- As in any similar situation, with a long-established industry facing a paradigm shift - in this case - fuel - the operators may be resistant to change

Cultural

Source: IGU

LNG technology development and deployment.

"When lines between diverse regulatory bodies blur, it often leads to significant barriers for industry. This situation is a key barrier facing LNG marine deployment globally and government must be encouraged to set clear regulatory guidelines that are essential in achieving broader and fleet-wide conversions," the IGU notes.

Fuel switch equivalent to removing 50 million cars

The study suggests that marine transportation pollution is often overlooked when considering air quality levels and notes that one large container ship, powered by

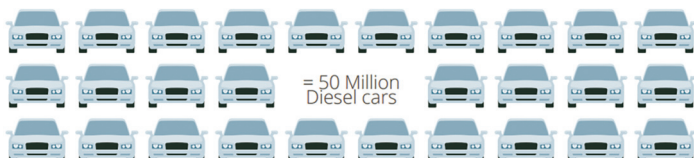
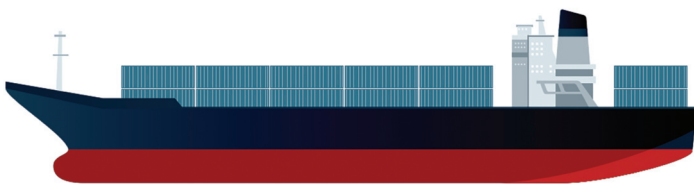
3% sulphur bunker fuel, typically emits the same amount of sulphur oxide gases, as 50 million diesel-burning cars.

"In Hong Kong, ship traffic is responsible for half of the city's total toxic pollutants - more so than those produced by the power generation and transportation sectors. In the world's top 100 ports, roughly 230 million people are exposed directly to the harmful emissions produced by shipping," the IGU report authors note.

The IGU is a worldwide non-profit organisation aimed at promoting the political, technical and economic progress of the gas industry. It comprises over 150 members, representing approximately 97% of the world gas market, and hosts working groups covering all aspects of the gas industry from exploration and production to storage, LNG, distribution and natural gas utilisation.

"This report, and our recent reports on urban air quality, demonstrates the key role natural gas plays in tackling the issue of air pollution and improving the quality of people's lives. The case for using LNG fuel for shipping is clear," David Carroll, President of the IGU, said.

"One large container ship at sea (using 3% bunker fuel) emits the same amount of sulphur oxide gases as 50 million diesel-burning cars."



Source- China Daily Asia

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Total and Pavilion sign Singapore LNG bunker MoU

Bunker specialist Total Marine Fuels Global Solutions (TMFGS) is to partner with LNG supplier Pavilion Gas to develop LNG bunkering solutions in Singapore.

The two firms have signed a memorandum of understanding (MoU) to facilitate LNG deliveries to marine fuel customers in the port of Singapore. Pavilion Gas is a subsidiary of state-owned wealth fund Temasek and has been awarded licences for LNG bunker supplier and LNG import by the Maritime Port Authority of Singapore (MPA).

"Pavilion Energy views LNG bunkering as a future driver for LNG demand growth and welcomes this MOU with Total. Our role as an LNG bunker supplier is reinforced by the appointment of

Pavilion Gas as an LNG importer in Singapore," Seah Moon Ming, CEO of Pavilion Gas, said.

Total aims to become 'key player' in LNG bunker sector

TMFGS is a subsidiary of French gas major Total which operates



Representatives from Total and Pavilion sign the MoU

across the entire LNG chain. The firm expects the MoU will allow Total to make further inroads in this "promising" new market.

"Total has a long-established bunker activity and is also a strong worldwide LNG player, thus providing the required conditions to position the Group in the emerging LNG bunker market, where our ambition is to become a key player. In this context, developing a competitive worldwide LNG bunkering network will be key for the industry; securing access in the main hubs, such as Singapore, is part of our strategy," Patrick Pouyanné, Chairman and CEO of Total, said

Pavilion has been tasked by the Singaporean government with developing the island as the de facto

regional hub for LNG trading as well as ensuring its position as leading developer of LNG bunker technology.

The supply of LNG by Pavilion Gas as a bunker fuel in the port of Singapore supports Singapore's position as a leading bunkering port, and contributes towards establishing a global LNG bunkering ecosystem.

"The supply of LNG by Pavilion Gas as a bunker fuel in the port of Singapore supports Singapore's position as a leading bunkering port, and contributes towards establishing a global LNG bunkering ecosystem. Pavilion Energy is pleased to collaborate with industry partners to build a robust LNG bunkering hub in Singapore and the region," Ming added.

Bomin Linde rebrands as Nauticor

LNG-fuelling specialist Bomin Linde has rebranded as Nauticor following its acquisition in full by technology company Linde Group.

Linde Group was a partner in the venture with bunker fuels supply firm Bomin and management services company Marquardt & Bahls but completed acquisition of the remaining shares in autumn 2016. The company started trading under the new name of Nauticor from 1 April, 2017.

"The rebranding is another step in our development and positioning in a space as dynamic as the market for LNG as a marine fuel. In this environment, the combination of a financially and technically sound partner such as Linde with a high degree of autonomy and flexibility is of great importance," Mahinde Abeynaïke, managing director of Nauticor, said.

Unique LNG supply network

Located in Hamburg, Germany, Nauticor supplies LNG as marine fuel as well as developing and installing a range of cryogenic engineering, logistics and fuel supply solutions. Nauticor is one of the leading LNG infrastructure suppliers with a strong focus on its home markets of Northern Europe and the Baltics.

"Nauticor brilliantly complements our LNG business. In addition to our LNG terminal and our bunker barge near Stockholm, we are able to offer our customers a unique LNG supply network in the Baltic Sea region thanks to Nauticor," Olaf Recken-

hofer, gas business manager for Central Europe at Linde Group, said.

The firm states that its strategy is "to cover the complete LNG value chain" - from sourcing and transport through storage and distribution to refueling ships with LNG in strategically important ports.

The Bomin Group has sold its shareholding last year due to "slower than anticipated" demand for LNG and the "speed of transition within the marine fuel supply chain". The group has since refocused on its existing bunker fuel portfolio and expand its physical operations in Singapore.



Mahinde Abeynaïke, managing director of Nauticor

World's largest LNG refueling to launch in coming year

The firm has been a key investor in LNG technology and one of its biggest ongoing projects will involve the launch of a record-sized LNG refuelling vessel.

"Our planned commissioning of the world's largest LNG refuelling ship in the coming year demonstrates that we are on course for growth."

LNG Fuelling

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British Columbia backs investment in LNG fuelling

The government of British Columbia is to support investment in a range of new LNG infrastructure projects for the transport and marine sectors in Canada as part of its Climate Leadership Plan.

The strategy announced by the Canadian Ministry of Energy and Mines includes plans to create incentives for gas utilities to invest in LNG bunker projects and for shipping companies to convert vessels to run on LNG.

"We're working with utilities to stimulate the use of LNG as a marine fuel in large, ocean-going ships, and to increase the supply and use of renewable natural gas," Bill Bennett, Energy and Mines Minister, said.

Clean Energy Act to drive incentives

The Ministry will seek to boost investment via the Amendments to the Greenhouse Gas Reduction Regulation (GGRR) under the Clean Energy Act to encourage utilities to provide incentives for

shipping companies.

"We are creating market opportunities for British Columbia's natural gas sector, offering utilities flexibility to create new incentive programs so we can continue to build a strong economy and a cleaner future," Deputy Premier and Minister of Natural Gas Development, Rich Coleman, commented.

Furthering the case for LNG use in the province, Canada's Kitselas First Nation people recently signed an agreement with the B.C. government to export LNG from the Port of Prince Rupert. Government and Indigenous leaders said the deal will help Pacific NorthWest LNG's decision-making process as it ponders whether to press ahead with building a US\$11.4-billion liquefaction terminal on Lelu Island.

RNG investment to strengthen gas infrastructure

Alongside investment in LNG bunker facilities and LNG-fuelled vessels the government will also seek to increase the supply and use of renewable natural gas (RNG). The government estimates that RNG use in Canada could result in "up to 450,000 tonnes of GHG reductions per year in B.C."

"Utility investments in LNG fuelling infrastructure will help establish B.C. as a marine bunkering centre on the west coast capable of providing LNG to an increasing number of LNG vessels and leading to global reductions in GHG emissions," a spokesperson for the government of British Columbia said.

Typically derived from biogas produced by organic waste, RNG can be produced by landfills, agricultural and forestry waste sites as well as wastewater treatment facilities. The resultant gas can be used in a similar way to naturally occurring gas or liquefied to produce renewable LNG, or RLNG.

"Encouraging the development of renewable natural gas provides additional business opportunities... These initiatives not only benefit our customers by optimizing our natural gas system year-round, they benefit all British Columbians by lowering operating costs for businesses and by reducing carbon emissions in our air," Michael Mulcahy, CEO of Canada's largest private utility FortisBC, said. ■

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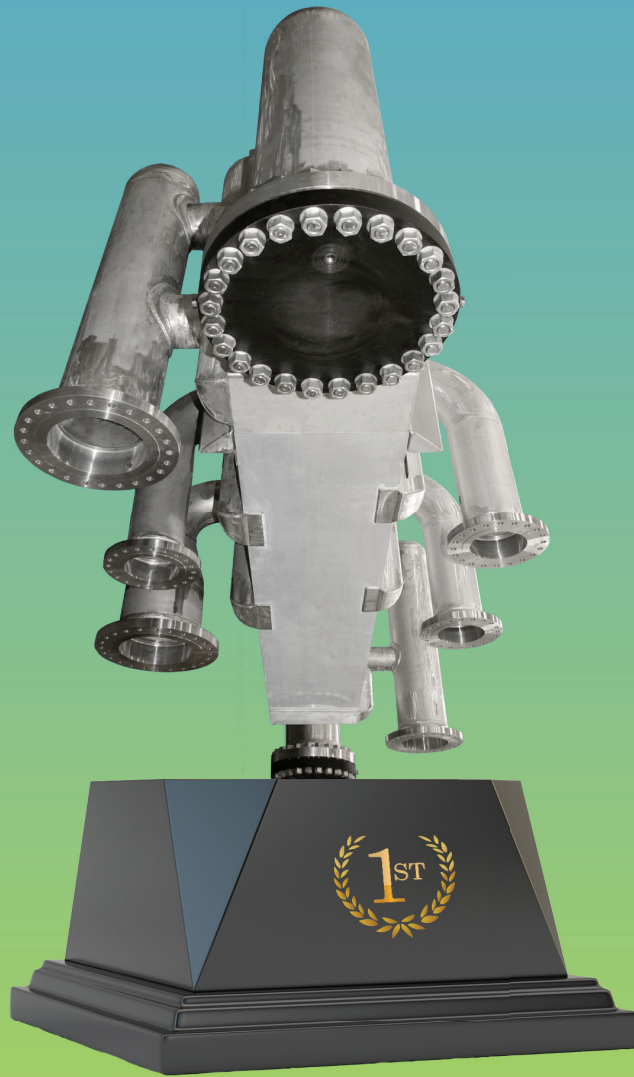
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AET orders four LNG-fuelled Aframax tankers

Tanker operator AET has ordered four new LNG-fuelled Aframax tankers from Samsung Heavy Industries (SHI).

The 113,000 deadweight-tonne vessels will replace existing tankers as part of AET's ongoing fleet renewal programme and their dual-fuel capability is expected to strengthen AET's resilience to fluctuations in operating costs.

"As a business, it is important that we have the ability to operate with flexibility in the face of change, which means developing a diverse fleet portfolio, expanding our core capabilities and investing in people - both at sea and onshore - who are equipped to flawlessly operate our vessels with optimum efficiency," Captain Rajalingam Subramaniam, CEO, of AET, said.

The new Aframax tankers will be fitted with twin LNG tanks allowing them to trade on LNG fuel for about a month before needing to refuel. They will initially be deployed in areas with LNG bunker availability and AET predicts that

operation is likely in "North America, Northwest Europe and Asia".

Over the longer term the vessel will have "global trading flexibility" and AET anticipates that up to half of its Aframax fleet and other petroleum assets, including VLCCs, will adopt the LNG dual fuel option over the next few years.

The vessels are currently under construction at SHI's shipyard in South Korea and are due



AET ordered four LNG-fuelled tankers

for delivery from the third quarter of 2018 onwards.

"These new vessels represent a milestone for AET, the tanker sector and the commercial shipping industry as a whole... By choosing the LNG option, AET has raised the bar and it will be only a matter of time before other operators follow," Dae-young Park, CEO of SHI, commented.

AET predicts 'significant growth' in LNG fleet

AET is a wholly owned subsidiary of Malaysian energy shipping corporation MISC Berhad, anticipates "significant growth" in the global fleet of LNG-fuelled vessels in parallel with an increase in LNG bunkering infrastructure.

"Our experience allows us to have confidence that the required infrastructure for LNG bunkering will develop at pace as we ap-

proach 2020 giving much more trading flexibility in the future," Yee Yang Chien, CEO of MISC Berhad, said.

The firm's current fleet renewal programme follows a comprehensive review that and is designed to ensure "security of supply and optimum operational efficiency" across its global operations from 2020 onwards.

"We have complete confidence that LNG will play a significant part in the marine fuels mix in the coming years, and we have been reviewing the feasibility of developing a dual fuel LNG fleet since 2015," Chien added. ■

NEWS NUDGE

Shell to supply first LNG-fuelled Aframax tankers

Energy major Shell has signed a deal with Russian tanker operator Sovcomflot to supply LNG to the first Aframax crude oil tankers in the world to be powered by the fuel.

Shell Western LNG will provide refuelling capabilities from a specialised LNG bunker vessel at the Dutch Gate terminal at the port of Rotterdam and from a second undisclosed supply point in the Baltics.

The four ice-classed, dual-fuelled tankers will operate in the Baltic Sea and Northern Europe and bunkering operations are scheduled to begin at the end of next year.

Port of Bilbao completes first LNG refuelling operations

Authorities in northern Spain have bunkered the first LNG-fuelled vessel at the port of Bilbao.

Bahía de Bizkaia Gas (BBG), Basque Energy Entity (EVE) and the Port Authority of Bilbao, refuelled the LNG-powered MV *Ireland* using a tanker from Molgas Energy in a five-hour truck-to-ship transfer. ■

Skangas to receive *Coralus* bunker vessel in June

LNG specialist Skangas is set to receive its newbuild LNG bunker vessel - *Coralus* - in June from shipyard Royal Bodewes in the Netherlands.

The *Coralus* will have capacity for 5,800 cubic meters of LNG and will be operated by Swedish fuel provider Sirius Rederi. The vessel's main area of operation will be from the Kiel Canal in the German state of Schleswig-Holstein up to mid Norway, via the North Sea.

"Currently we bunker by truck and directly from our terminals, along the coast. From June this year, however, our customers can experience swifter and more flexible bunkering operations than ever," Tor Morten Osmundsen, CEO of Skangas, said.

The *Coralus* is owned by Dutch gas tanker line Anthony Veder and was developed in partnership with Skangas and Sirius Shipping. The three companies announced that the design drew upon "their individual broad LNG experience" with the aim of creating "a flexible, efficient and safe system" for LNG bunkering.

Skangas predicts significant rise in LNG fuelling

The new vessel will measure 100 meters in length and will be 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.

"LNG as marine fuel becomes even more accessible in our area by ship-to-ship bunkering," Osmundsen said.

The *Coralus* 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," a spokesperson for Skangas commented.

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



The Skangas Coralus

SEA\LNG adds JAX LNG, Petronet and TTC

Cross-sector industry partnership SEA\LNG has announced the addition of three new members to its coalition with the membership of JAX LNG, Petronet LNG and Toyota Tsusho Corporation (TTC).

The new partners will support the coalition's goal of creating an "effective and efficient" global LNG value chain by 2020 through the growth in shipping sector confidence.

"As a coalition, SEA\LNG is expanding, which continues to illustrate the support for and momentum behind the use of LNG as a marine fuel... SEA\LNG members span the entire LNG value chain and recognise that by pooling knowledge and working together, we can help drive the change needed across the marine transportation system," Peter Keller, SEA\LNG Chairman and Executive Vice President of TOTE, said.

The addition of the new members expands SEA\LNG's membership list to 24 including: ABS, Bureau Veritas, Carnival Corporation & plc, Clean Marine Energy,

DNV GL, Eagle LNG Partners, ENGIE, ENN Group, Gas Natural Fenosa, GE, GTT, JAX LNG, Keppel Gas Technology, Lloyd's Register, Mitsubishi Corporation, NYK Line, Petronet LNG, Port of Rotterdam, Qatargas, Shell, Total, TOTE Inc., Toyota Tsusho and Wärtsilä.

JAX LNG will bring expertise in LNG supply to the coalition from its work constructing a state-of-the-art liquefaction and LNG storage facility with marine and trucking loading capabilities in Jacksonville, Florida. The firm is a partnership between Pivotal LNG, a wholly owned subsidiary of Southern Company Gas, and NorthStar Midstream, backed by funds managed by Oaktree Capital Management.

"Once complete, the new JAX LNG facility will provide a reliable LNG fuel source located on one of Florida's key waterways ... and will

expand the use of LNG throughout the southeastern U.S. We're excited by the expanded use of LNG as a transportation fuel," Tim Hermann, manager of JAX LNG, said.

As one of the fastest growing companies in the Indian energy sector, Petronet LNG is expected to bolster SEA\LNG's understanding of the Indian market. The firm set up the country's first LNG receiving and regasification terminal at Dahej, Gujarat, and another terminal at Kochi, Kerala. The company has four long-term chartered LNG ships transporting LNG from Qatar and Australia to India.

"Petronet LNG is at the forefront of India's all-out national drive to ensure the country's clean energy security in the years to come. As such, we have signed MoUs with the Indian Ports Association and the Inland Waterways Authority of India

to set up LNG bunkering facilities along the coast of India, and in National Waterways. By sharing intelligence with other SEA\LNG members, we know that the potential of LNG as a clean and commercially viable marine fuel can be realised more quickly," Prabhat Singh, CEO of Petronet, said.

The final new member, TTC is the sole trading company of Toyota Group. The group supplies over five million tonnes of bunker fuel every year and trades bunker fuel in over 150 ports worldwide.

"As a member of the Toyota Group, we are committed to playing our part in lowering global emissions and are very pleased to collaborate with all members of SEA\LNG to challenge the future marine fuel environment," Yoshihiro Inoue, Executive Officer at TTC, said. ■

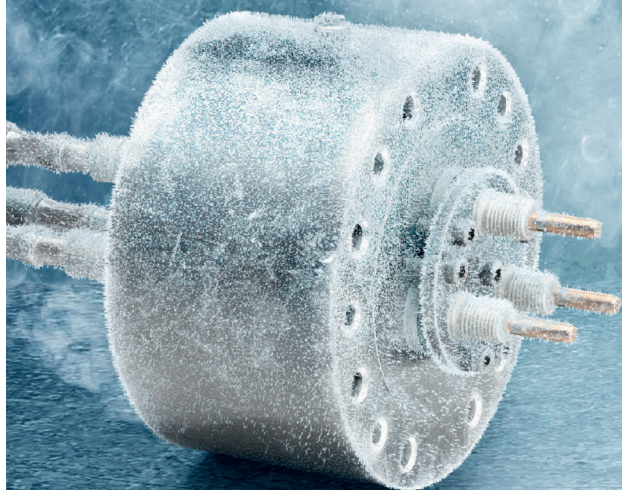
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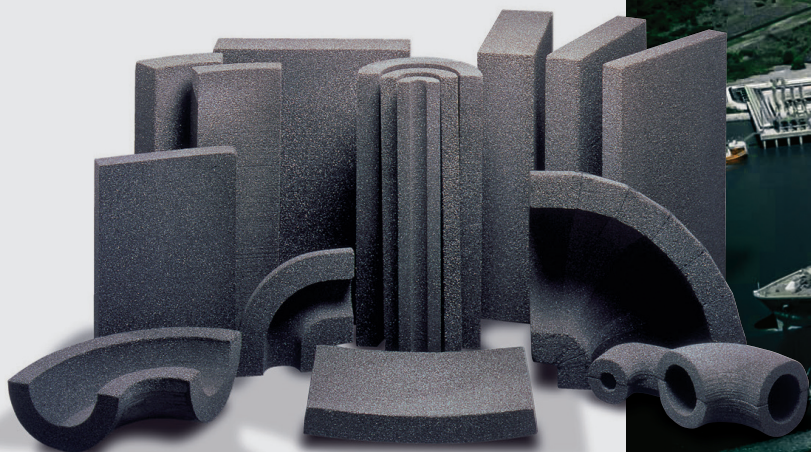
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LNG-FUELLED SHIPS IN OPERATION WORLDWIDE

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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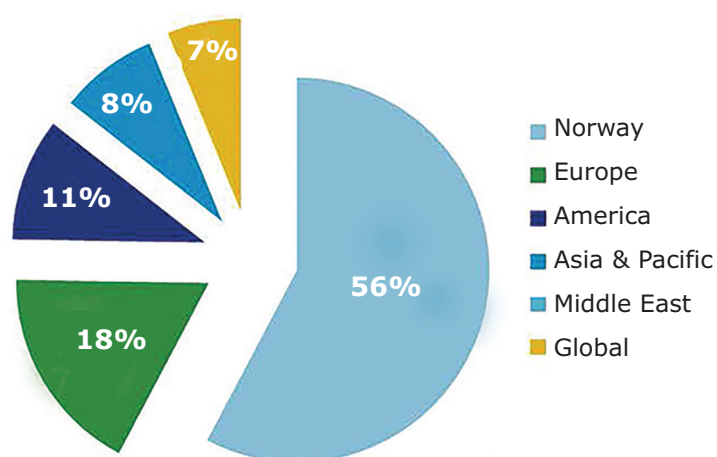
Data last updated: 15 February 2017

* = conversion projects

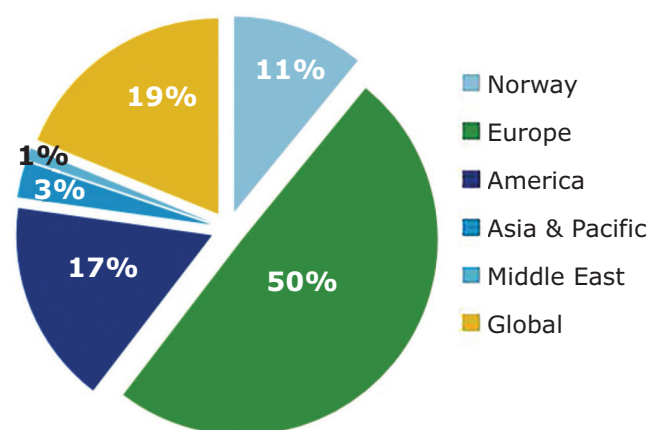
Year	Type of Vessel	Owner	Class
2015	Gas carrier	Evergas	BV
2015	Gas carrier	Evergas	BV
2015	Tug	CNOOC	CCS
2015*	Car/passenger ferry	AG Ems	DNV GL
2015	Tug	NYK	NK
2015	Gas carrier	Chemgas Shipping	BV
2015	Gas carrier	Evergas	BV
2015	PSV	Harvey Gulf Int.	ABS
2015	Container ship	TOTE Shipholdings	ABS
2015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