MARITIME

LNG READY SERVICE

Get ready for the future – today

If you are ready to improve the way you do shipping, the LNG Ready service from DNV GL is just right for you. In light of ever-tightening emission regulations, you need an expert partner on your side who can support you in discovering if the switch to LNG as ship fuel is the most cost-effective solution for your vessel and individual needs.

Is LNG right for me?

Clearly, your shipping business has to remain competitive. Not only do you have to counteract ever-changing risky bunker charges, you also have to comply with emission regulations that are becoming more and more demanding. The 2015 ECA sulphur emissions cap poses the most immediate concern and is forcing the maritime industry as a whole to rethink fuel options.

Ship owners will need to choose one of the three available options: fuel switch to MGO, scrubber, or an alternative fuel like LNG. Avoiding ECAs entirely is not an option for most shipping companies. Additional emission regulations are on the horizon and will further punish vessels burning conventional fuel oil. The wrong choice may prove costly, and this is an opportunity to make a smarter choice than your competitors.

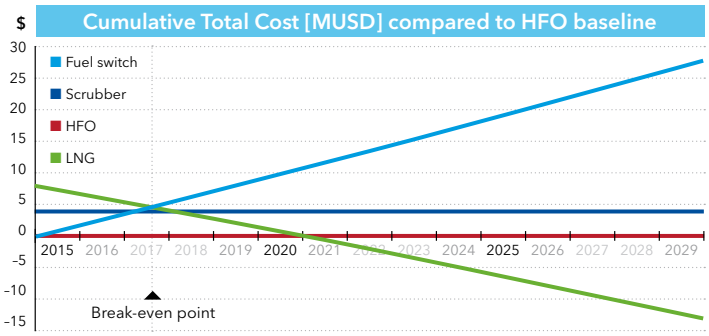
LNG as ship fuel can support you in meeting two main goals: lowering operational expenditure and satisfying environmental requirements. But is it the right solution for your vessel and needs? And what are the alternatives? DNV GL's LNG Ready service has the answers for your individual case.

Forward-thinking LNG Ready service

As part of DNV GL's LNG Ready service, we provide decision support to ship owners, designers and yards for making vessels ready for future LNG retrofitting or for LNG operation today. Backed by our expert technical and financial feasibility studies, we help you select the best solution according to operational, environmental and financial requirements:

- **Ready for future LNG retrofit.** You can build a vessel that can easily be retrofitted to run on LNG in the future. This is a good option, for example, in situations where LNG will not be available on the vessel's trade route for another few years.

- **Ready for LNG operation today.** You can build or retrofit a vessel that is fit for LNG fuel today, already equipped with LNG system and gas engines. Payback time starts immediately, and our cost–benefit assessment can illustrate your vessel's performance with LNG.



Payback time and value of the investment over the lifetime of the ship, taking into account all relevant options for future emission compliance

Our analysis will show which alternatives are available for your ship and under which conditions the investment in LNG or scrubber technology is financially attractive.

Four easy steps to becoming LNG Ready

Our tried-and-tested LNG Ready process – from planning and concept design to approval in principle and final risk assessment – will get you started on the course to LNG as ship fuel.

1. Fuel decision support

Technical feasibility assessment

- LNG tank location and range in gas mode based on the ship's operational profile
- Outline of the necessary requirements for an LNG-ready or LNG-fuelled design
- Overview of LNG availability in relevant locations

Financial analysis

- A high-level financial comparison of LNG, MGO and HFO with scrubber options, including investment cost, operational expenses and payback time
- Sensitivity analysis of the impact of fuel price development

2. Concept review

- Development assistance for novel ship designs and detailed technical feasibility studies tailored to the specific design and technical challenges of your vessel
- Hazard identification (HAZID) review of all newbuild concepts to identify hazards which could lead to high risks in operation
- Assistance for design reviews of existing drawings at an early stage

3. Approval in Principle

- Verification of the third-party design concept and confirmation of compliance through DNV GL's Approval in Principle
- Support in the identification and mitigation of risks associated with a given design to ensure the development of a safe system right from the beginning

4. Risk assessment

- Risk assessment to quantify the risk level of the LNG-fuelled ship compared to the acceptance criteria, as defined by IMO Resolution MSC. 285(86) "Interim Guidelines"

The next step for your newbuilding – GAS Ready notation

A natural extension of the LNG Ready service, the new GAS Ready notation provides a formal framework for documenting the LNG-fuelled preparedness of your vessel, as well as providing guidance on the scope of the contemplated work to all involved parties at the newbuilding stage. It also shows that the vessel is in compliance with all safety and operational requirements to meet the applicable global standards as well as class standards for gas fuel operations.

The basic notation with nominators D and S – GAS READY (D, S) – verifies that the vessel is in compliance with the gas fuel rules in terms of its overall design for future LNG fuel operations, and that the structural reinforcements to support LNG tanks and materials used around the tanks have been considered. Extra optional levels cover the certification of additional systems, including LNG fuel tanks (T), gas fuel system installations (P), Main Engine (ME), Auxiliary Engine (AE), Boiler (B) and Additional systems and equipment (Misc.).

YOUR TRUSTED PARTNER – DNV GL

- More than 150 years of expertise in the maritime industry
- Comprehensive research and development within LNG as ship fuel
- 15 years of experience with LNG as fuel, with first rules for gas-fuelled ships in 2001
- 57 LNG-fuelled ships in operation worldwide; 95% to DNV GL class
- 77 confirmed orders for LNG-fuelled newbuilds worldwide; close to 50% to DNV GL class
- Well-proven tools that ensure efficient work and reliable output

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