

# Membership case study: DSME



## Materialized LNG Fuelled Large Commercial Ship

DSME started building world's first and biggest LNG carrier with 2-stroke ME-GI engines, which are expected to be significantly more fuel-efficient and have lower emission levels.

### CONTEXT & OBJECTIVES

Bunker prices have been soaring up for years now whilst average earnings of shippers have plunged down. Regulations for preventing environment from being polluted are getting more and more stricter and safety regulations and amendments have come into force to protect the environment and the elements especially in terms of ship's fuel, emissions of nitrogen oxides, sulphur oxides and carbon dioxide. Significant reduction in the volume of trans-shipment by economic downturn and surplus of introduced tonnage leads the shipbuilding market to an even harder situation.

### SOLUTION

**To overcome this harsh environmental condition, energy saving and overall efficiency improvement becomes an essential proposition.**

In response to this market environment, DSME has been focusing on the greener ship design named "Econology" which implies "Ecology", "Economy" and "Technology". The target of DSME's "Econology" is to reduce Vessel's emission levels of NOx, SOx and CO2 upto 90%, 90% and 50%, respectively comparing with pre-EEDI ordinary design, until the year of 2020. To achieve this target, DSME categorizes the "Econology" in five different aspects as Design, Device, Material, Operation and Energy.

Most of them are already existing technologies in the market without being integrated or applied in the real Vessel. Some others are assistant techniques to operation, and some of them are awaiting the market to be more matured. Among them, in terms of Energy aspects, using natural gas instead of liquid fuel oil could be one of the most effective ways to reduce harmful emissions and ship owners' burden in fuel bills.

Especially in LNG carriers, bunkering infrastructure is not an obstacle because natural gas is already on-board. If we follow traditional track of propulsion

machinery in LNG carriers, the first generation was steam turbine and currently 4-stroke dual fuel diesel electric propulsion is dominating the market. However, in consideration of mechanical efficiency, direct propulsion with 2-stroke slow speed diesel engine is the best.

On the other hand the existing 2-stroke engines could not burn gas as a fuel and required re-liquefaction plant for handling boil-off gas. Aiming at picking advantages of natural gas as fuel and high efficiency machinery, DSME and MAN jointly developed 2-stroke gas burning engines. MAN has successfully developed gas burning module and DSME took charge of developing high pressure fuel gas supply system to the engine.

This fuel gas supply system is very compact in size and energy efficient comparing with other existing similar systems. DSME obtained scores of patents in this technology. DSME has made new building contracts applying this technology and these new contracts can be a trigger in expanding gas fuelled commercial ship market.

**"We are confident these new buildings will be especially attractive to our customers given their fuel-efficient engines as well as being built to a high specification at DSME."**  
**DSME customer quote**

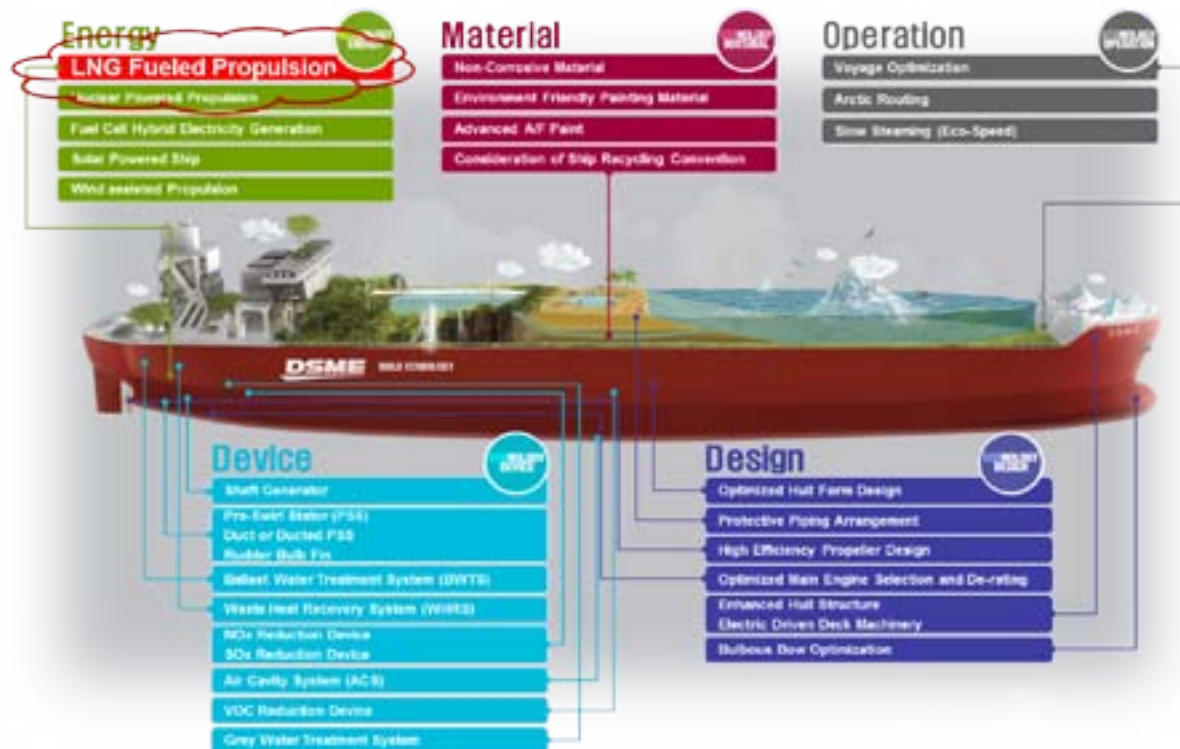


## OUTCOMES

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Comparing with existing Vessels of exactly same cargo carrying capacity, daily fuel oil consumption is lower than by approx. 28% at service speed. This amount of saving is translated as approx. 3 mil. USD saving in fuel annually, assuming 650 USD/ton of bunker price and 300 day operation a year at average speed of 16 knots.

We can easily say that the reduced amount of fuel means reduced amount of CO2. In case the Vessel burned natural gas as main fuel, fuel bill would be much lower than the case using fuel oil, and free from sulphur oxides emission. The vessel can comply with EEDI reference line of phase 3 which will enter into force from year 2025.



## What are the first steps people can take to replicate this idea/initiative?

1. Choose innovative technologies which are already around us
2. Try to make the most of the advantages of each technology
3. Combine them and make it real world

More information:  
[www.dsme.co.kr](http://www.dsme.co.kr)