



LNG: the future fit solution for the maritime sector

What's Next: a glance into the future of shipping, Athens
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SEA LNG



THE INDUSTRY ADVOCATE

Working across the marine value chain





THE INDUSTRY ADVOCATE

Strategic and commercial focus

Three focus areas



Emissions
case



Investment
case



Infrastructure
case

EMISSIONS CASE

LNG has an unmatched local emission performance

- LNG far out performs conventional marine fueling solutions on a local emission basis
 - Zero **SO_x**
 - 90% **NO_x** reduction
 - 99% decrease in **PM**
- And no waste disposal or discharge issues (closed and open loop scrubbers)

LNG provides a
future-fit local
emissions solution
for shipping
companies and the
associated supply
chain



EMISSIONS CASE

LNG will play a major role in decarbonising the shipping industry

- LNG is a major step forward for GHG emissions reductions and will be one of the solutions to meet IMO's decarbonization targets
 - Realistic reductions of 10-20%; up to 25% compared to conventional marine fuels
 - In combination with EEDI measures can achieve a 40% reduction in carbon intensity with potential for more
- LNG is available now, commercially viable, and scalable to meet the industry's needs
- LNG makes sense as a long-term solution for the marine industry

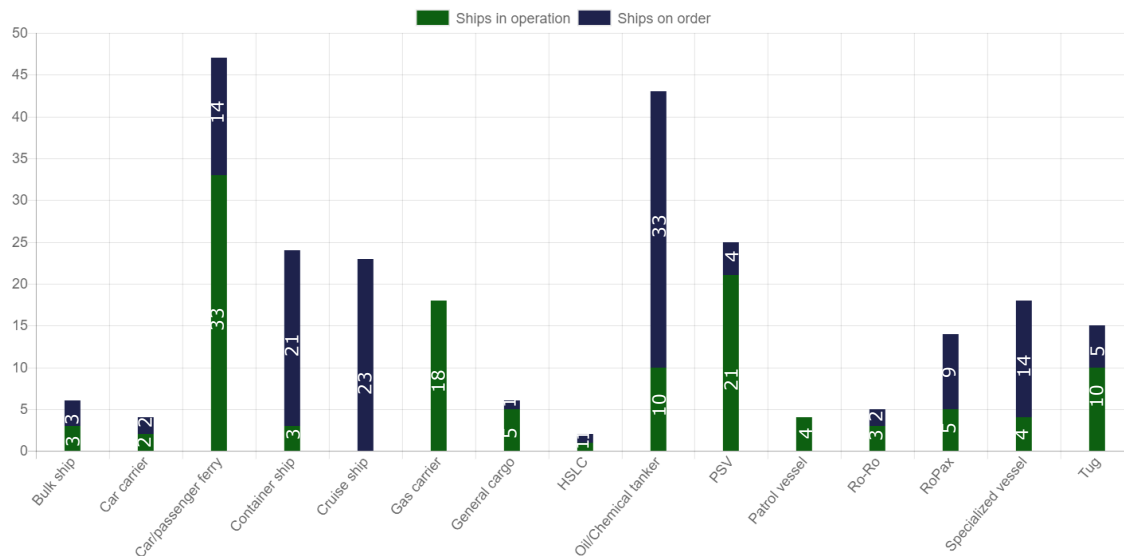




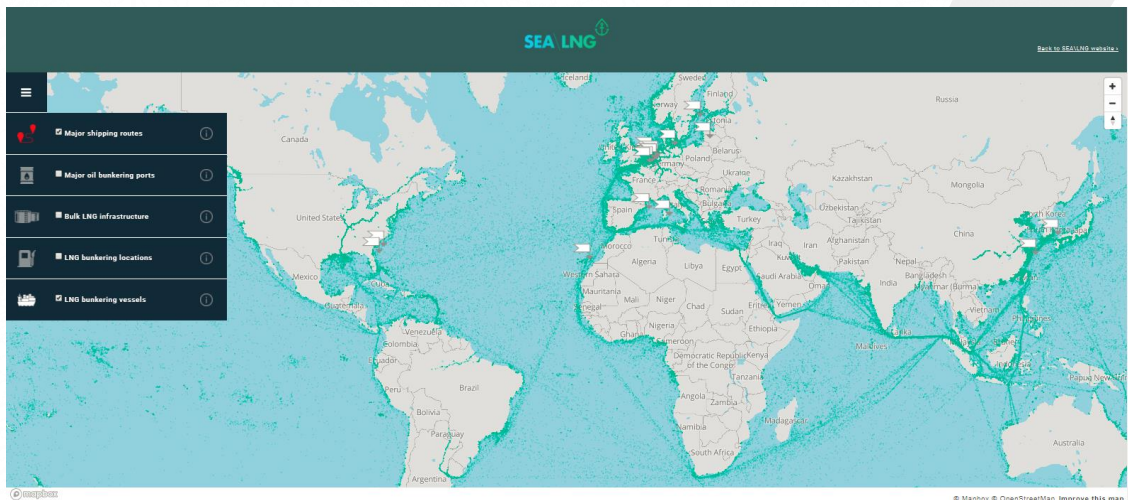
“LNG is the fuel of the future for shipping,” Rodolphe Saade, Chairman & CEO CMA CGM

- Capex increases offset by opex savings (significantly lower fuel prices)
- LNG much less volatile than oil
- Numbers of LNG fueled ships growing strongly:
 - 122 in operation (23% increase)
 - 132 on order (37 % increase)
- Move from short-sea shipping to deep-sea shipping space

Fleet by vessel type



Source: DNV GL LNGi, May 2018



Source: SEA | LNG Bunker Navigator

- Plentiful and growing LNG supply
- Bulk LNG infrastructure exists
- Last mile investments are happening (globally)
- Bunker vessels – 5 in operation and many more on order



AND WHAT ABOUT ALTERNATIVE FUELS?

Unproven and unready

	Hydrogen	Ammonia	Methanol	Batteries
Cost (capex & fuel)	✗	✗	✗	✗
Availability (supply & infrastructure)	✗	✗	✗	✗
Local emissions	✓	✓	✓	✓
GHG emissions	Depends on method of production	Depends on method of production	Depends on method of production	Depends on source of electricity
Safety	?	?	✓	✓
Tech. maturity (proven for deep-sea operations)	✗	✗	✗	✗

➤ Zero carbon fuels >30 years to deliver



At the helm of shipping's energy future

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