Liquefied Natural Gas (LNG) as a Marine Fuel: Optimising the Associated Infrastructure in the Baltic Sea Region

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Liquefied Natural Gas (LNG) as a Marine Fuel: Optimising the Associated Infrastructure in the Baltic Sea Region

Dimitrios Dalaklis, Josefin A. Madjidian, Aykut Ölcer, Fabio Ballini, Momoko Kitada
WMU's mission is to be the World Centre of excellence in postgraduate maritime and oceans education, professional training, and research, while building global capacity and promoting sustainable development.
Develops global regulations - maintain safety and security of international shipping and to prevent marine pollution from ships

Adopts instruments (legislation) and guidelines at the intergovernmental level

Member Governments are responsible for implementing and enforcing the adopted regulatory framework
International Convention on Prevention of Pollution by Ships, MARPOL 73/78

Annex VI represents the regulatory framework tackling exhaust gas emissions from ships

- prohibits deliberate emissions of ozone depleting substances
- sets progressive reductions (tiers) in emissions of sulphur oxides (SO\textsubscript{X}), nitrogen oxides (NO\textsubscript{X}) and particulate matter (PM)
- also introduces designated emission control areas with more stringent standards for above emissions
- ensures an energy efficiency standard for ships: (1) the Energy Efficiency Design Index (EEDI), for new ships, and (2) the Ship Energy Efficiency Management Plan (SEEMP) for all ships
WHAT ABOUT THE BALTIC SEA REGION?
The EMISSION CONTROL AREAS

SECA / NECA

Baltic Sea (SO<sub>x</sub> only)

North Sea (SO<sub>x</sub> only)

North American area (SO<sub>x</sub>, NO<sub>x</sub> and PM)

United States Caribbean Sea area (SO<sub>x</sub>, NO<sub>x</sub> and PM)

In November 2016 IMO designated the North Sea and the Baltic Sea as NECAs, starting 1 January 2021
These regulations have and will continue to change the shipping industry’s demand for alternative fuels!

....which in turn affects the fuel prices and the cost effective available technology and infrastructure
The alternatives

operations in SECA areas have a choice of

a) integrating an emission abatement technology (i.e. a scrubber)

b) using low sulphur -but more expensive- fuel such as MGO (marine gas oil) or MDO (marine diesel oil)

c) opting for liquefied natural gas (LNG)
Liquefied Natural Gas

LNG is the most promising alternative shipping fuel technology in the short to medium term, specially for Short Sea Shipping and inland waterway transport.

Reaches environmental targets of sulphur, nitrogen and particulate matters emissions in SECAs and NECAs.
GoLNG

www.golng.eu

20 main partners and 50 associated partners

2016-2019
Directive 2014/94/EU

framework of measures for the deployment of alternative fuels infrastructure in EU

setting out minimum requirements for e.g. recharging points for electric vehicles and refuelling points for natural gas (LNG and CNG) and hydrogen

*to be implemented by means of Member States' national policy frameworks*
<table>
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<td>LNG at maritime ports</td>
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<td>LNG at inland ports</td>
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<td>LNG for heavy-duty vehicles</td>
<td>Appropriate number of points along the TEN-T core network</td>
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... links transport flows, LNG infrastructure development, and business models into an **efficient LNG distribution strategy for the BSR**

... maps **development patterns** of LNG-related activities and capabilities

**Online:** Toolbox with **regulations and guidelines**

LNG **bunkering map**

*Points out the missing links and suggests the ways forward that will have a positive effect on both business and technical development in the region*
Widening the LNG VALUE CHAIN → sharing the costs and having more than one user

• Visualize the existing LNG value chain

• Describes the possibility for a wider value chain:
  - incorporating other modalities and industries
  - incorporating biogas into the gas grids
LNG bunkering stations

EU transport corridors that include the BSR region

Major heavy industries that use LNG as main energy source

Potential industries using LNG
Thank you very much for your attention!