

D. 3474/09
SF 6.210

**EMSA/ECSA MEETING ON THE POSSIBLE USE OF LNG AS ALTERNATIVE FUEL FOR SHORT SEA SHIPPING – 24th NOVEMBER 2009
DISCUSSION PAPER**

LNG Fuelled Ships – State of the art

- Current level of development and future innovations.
- Multi fuelled ships vs 100% LNG fuelled ships – Existing ships and concepts.
- Actual total delivered environmental gain.

Economic and environmental decision factors

- Level of interest in LNG propulsion (Reederi Stena, Maersk, Mols-Linien, ...) – Not only for Short Sea Shipping.
- Current and future emissions regulations (NOx ECA in Baltic, CO2 reduction mechanism).
- Economical burden on ship and incentive (e.g. NOx tax in Norway financing supply of LNG).
- Potential competitive advantage for green shipping companies.
- Selling or exploitation of LNG fuelled ships in other areas where no LNG bunker fuel infrastructure available.
- Refit or new ship. Cost savings on the fuel must also fund the additional capital cost (CAPEX) of investing in the LNG technology, which is some 20% higher than conventional arrangements.
- Costs/Availability of LNG vs Costs/Availability of other fuels (from HFO to very low sulphur fuel) taking into account:
 - o the use of alternative technologies (scrubbers and potentially Selective catalytic reduction);
 - o Investment and refit already performed in order to meet the 2005/33/EC 0.1% at berth as from 01.01.2010 requirements.
- Necessary to keep a short turn-around time in port.

Port infrastructure and LNG availability

- Level of demand.
- Current LNG bunker fuel availability (Worldwide and in the EU).
- Development of a bunkering network and easy access to LNG bunkering infrastructure in key ports.
- Limited storage onboard ships and regular port calls implies an extended network.
- Possibility of bunkering installation connected to LNG Port terminal, industrial plant or (inter)national LNG distribution network. Interest of LNG suppliers in bunkering activities.

- To which extend the shipowners investing in LNG fuelled ships would necessarily be involved in implementing the bunkering activity? Will EU support investments for achieving LNG-infrastructure? Will LNG be a tax free fuel in the future?
- Infrastructure to be implemented and developed to meet ships requirements
- Use of LNG fuel in port as an alternative to Shore Side Electricity.
- Role of IMO and Classification societies.

Technical constraints

- Possibility of refitting to LNG for ships in service or limited to new buildings.
- Storage of the LNG on board: similar requirements as for LNG vessel cargo tanks, containment systems, protection in case of grounding or collision, leakage detection system. Bunker storage tank above lower deck (weather deck?).
- LNG storage tank construction constraint: limited room onboard existing ships and shape of the LNG storage tank (Pressurized or cooled storage).

LNG fuel characteristics

- Total energy balance:
 - o Estimated energy losses in the order of 30% as measured from well to engine onboard the vessel when using LNG as a fuel (10% for conventional marine fuels). Need to seek scientific analyses of what the losses actually are in an LNG-fuel chain for maritime transports.
 - o Use of heat recovery onboard ships to be taken into consideration.
- Methane slip: unburned LNG passing through the engine rendering the actual CO₂ emissions similar to conventional fuels.
- LNG engines versus Dual Fuel Engines (Energy efficiency, emissions, methane slip)?

Safe operation of LNG fuelled ships bunkering activity

- Additional safety barriers during bunkering operations.
- Will there be safety requirements for simple loading and unloading ports (without bunkering)?
- Bunkering during loading and unloading operations - Special requirements for passenger ships?
- Ship-to-ship bunkering.
- All aspects of the bunkering activity to be encompassed in the implementation of the Code of Safety for Gas Fuelled ships (IGF Code) in order to avoid any additional flag or port requirements.
- Safety onboard during normal operation at sea.
- Significant costs for training to be expected.