



EUROPEAN SUSTAINABLE SHIPPING FORUM

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LNG AS MARINE FUEL

overview of the progress made in the subgroup

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ESSF LNG SUB-GROUP

SITUATION

- One of the main identified and outstanding regulatory barriers in relation to the uptake of LNG is the **current absence of a binding regulatory EU framework for LNG bunkering**.
- The absence of a binding regulatory framework may possibly lead to **different safety and bunkering requirements** across the EU.
- Many rule making initiatives are underway (IMO, ISO, IAPH, SGMF, etc.) and ESSF LNG sub-group can steer those initiatives.

→ *International Association of Ports and Harbours*

→ *Society of Gas as Marine Fuel*

OBJECTIVES ESSF LNG SUB-GROUP

1. **Facilitate** the promotion and implementation of LNG as marine fuel at EU level.
2. **Identify, assess and recommend** actions and solutions to establish the appropriate framework conditions (guidelines, standards, regulations) for the use of LNG in the EU (also in the context of the future EU Directive on the Deployment of an Alternative Fuel Infrastructure)

PROCESS

The sub-group members have jointly worked on **formulating recommendations** (preferably international) with regards to overcoming outstanding barriers hampering the uptake of LNG in the EU.

1. Members have **identified priorities** of work (work packages) + coordinators for that work within the remit of the terms of reference of the subgroup.
2. For each of the work priorities a small group of experts was established which have **shared relevant information**, defined the problem scope and proposed initial recommendations.
3. **Recommendations** for the subgroup have been forwarded to the ESSF plenary for further consideration and adoption.

TIMELINE

1st meeting of the ESSF LNG sub-group (11 December 2013)

focussed mainly on:

- compatibility of LNG bunkering rules in EU ports, and the link to international developments (ISO, IAPH, SIGTTO, ...)
- developing the business case for LNG as a marine fuel

⇒ **6 work-packages have been identified** (work packages on co-financed LNG projects and LNG pricing have not been elaborated on further in this sub-group but may be addressed elsewhere)

WP1: Hoses and Connection (coordinator : Lasse Karlsen - Norwegian Maritime Administration)

⇒ standard dimensions for the bunkering connections

WP2: LNG bunkering operations while loading/unloading or embarking/disembarking + guidance on safety distances (coordinator: Ludovic Laffineur, Royal Belgian Shipowners Association)

WP3: Training - Commission/EMSA checked what the status is of the work on training for LNG fuelled vessels in the context of STCW

WP4: gas quality, heating value and CO₂ reduction potential (coordinator Wolfgang Hintsche VDR, German Shipowners Association)

⇒ PART 1: standard gas quality and LNG (bunker) delivery note + PART 2: reduction potential of LNG

2nd meeting of the ESSF LNG sub-group (14 March 2014)

- focus on WP1, WP2 and WP4 through dedicated presentations (shipowners, engine makers, administrations, ...)
- standard connections (WP1) + gas quality and CO₂ reduction potential (WP4) were identified key priority items from the discussions at this WG
- training (WP3) and simultaneous operations (WP2) are as important but no concrete actions can be taken at this point of time. ⇒ **no harmonized approach in EU** (determined on case by case basis = problem for shipowners !)

WP1: HOSES and CONNECTIONS

A standard geometry on bunkering connection was identified as a priority item

- The basic principle for an open standard LNG quick connector is that the agreed geometry can be used by any manufacturer in their fabrication of connectors and that it can be used by any end-user.
- + This would **facilitate LNG bunkering operations** for ship owners and for gas suppliers.
- + This would **increase safety** by avoiding the use of any connector that has not been designed for the safe connection of cryogenic gasses.
- + It would also **avoid protected company standards** and prevent the safety risk of fitting additional adaptors and gaskets to convert between the various company standards
- + A standard connector would further **avoid the temptation of modifying/repairing adaptors** without having the right equipment available, and it could secure more conformity in operations and training for all personnel involved in LNG bunkering.

Sub-group recommendation(s) to the Plenary

The Plenary to take note of the sub-group's recommendations on defining standardized LNG-fuel bunkering connectors in order to enhance personal and environmental safety and to ease the development of LNG supply. **The Plenary to recommend a submission covering the recommendations to the appropriate IMO committee as soon as possible.**

Required action(s) to be considered by the ESSF Plenary based on sub-group recommendation(s):

Support the ESSF LNG subgroup to further identify ways of introducing the sub-group's recommendation on establishing world-wide standard on bunker connectors into international collaboration arenas as the IMO and ISO and where needed recommend its use in European ports. Standard connectors – which also affect LNG refuelling trucks – are part of a more general recommendation to further align seaside and shore-side regulations governing LNG fuelled ships coming to ports (incl. LNG terminals) to avoid contrary requirements.



THANK YOU !

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WP 4: Gas quality, heating value and CO₂ reduction potential

PART 1: Defining a STANDARD LNG BUNKER DELIVERY NOTE was identified a priority item

- Internationally accepted and implemented procedures, definitions and documentation are inevitably necessary for a smooth and easy interaction between LNG supplier and ship owner in the planning and decision process as well as between the bunker supplier and the ship while in port through accurately describing the LNG properties as delivered.
- **The gas quality may have a significant influence on ship safety.** Therefore the quality of the LNG available (including its methane number) must be compatible with the engines on-board. The energy content expressed as Lower Heating Value (LHV) of the LNG offered will limit the total energy available on board due to the installed LNG tank volume and is also decisive for the comparison of fuels.
- The **responsibility for providing accurate information on the LNG composition should lie with the supplier** at every bunkering operation, and the proposed BDN will be the means to provide this information in a common format

Sub-group recommendation(s) to the Plenary

The Plenary to endorse the sub-group's recommendation for a standard bunker delivery note for LNG deliveries, and the **plenary to recommend a submission covering the recommendation to the appropriate IMO committee as soon as possible.**

The Plenary to support the sub-group's intention to further discuss and determine possible contributions to international and European initiatives aiming at defining an appropriate calculation method and an operationally safe range for **the methane number** that would ensure a safe use of the current and planned LNG infrastructure on-board vessels.

Required action(s) to be considered by the ESSF Plenary based on sub-group recommendation(s):

Identify ways of introducing the sub-group's recommendations on the proposed format for a standard LNG bunker delivery note to IMO and ISO in order to **further discuss the proposal at international level.**

WP 4: Gas quality, heating value and CO₂ reduction potential

PART 2: Emission characteristics

- Following contradictory and divergent information, the sub-group decided to discuss and clearly identify the merits of using LNG in comparison with marine diesel.
- **CO₂** : The overall **Greenhouse Gas reduction is about 15%**. The overall GHG reduction is in any case 10% + potentially 20% more depending on the engine (parameters) + gas methane number.
- **NO_x** : As a result of the combustion process in most of the gas and dual fuel engines the formation of Nitrogen Oxides is reduced by 85%, so Tier III of the relevant Regulation of Annex VI to MARPOL is met. Diesel engines operating with direct injection of gas require abatement technology such as Exhaust Gas Recirculation (EGR) or SCR(Selective Catalytic Reaction) to meet Tier III levels of nitrogen oxides formation.
- **SO_x** : LNG contains no sulphur and therefore fulfils all future regional and worldwide fuel requirements.
- **PM** : No or very little amount of particulates are present. After evaporation, the gas will not contain particulates that are emitted with the exhaust gas

Sub-group recommendation(s) to the Plenary

Recommending the Plenary to take note of the CO₂ reduction and overall greenhouse gas (incl. methane) reduction potential in addition to the almost absolute absence of sulphur emissions as well as other merits of LNG as an alternative marine fuel in comparison to marine diesel

Required action(s) to be considered by the ESSF Plenary based on sub-group recommendation(s):

Endorse the conclusions of the LNG sub-group in terms of CO₂ and overall greenhouse gas reduction potential in addition to the almost complete absence of sulphur emissions and other merits of LNG as alternative marine fuel when compared to marine diesel.

Request the LNG sub-group to further assess if current regulatory (international or EU) requirements/technical specifications sufficiently ensure that **methane emissions (both during burning of the gas and bunkering)** will remain limited also when the use of LNG fuelled ships will increase more rapidly