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LNG systems for natural gas propelled ships

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In order to reduce the atmosphere pollution generated by ships the International Marine Organization has established the Emission Controlled Areas. In this areas nitrogen oxides, sulphur oxides and particulates emission is strongly controlled. From beginning of 2015 the ECA covers waters 200 nautical miles from the coast of US and Canada, US Caribbean Sea area, the Baltic Sea , North Sea and English Channel. From beginning of 2020 strong emission restrictions will be also in force outside the ECA. This requires newly constructed ships to be equipped with exhaust gas cleaning devices or to be propelled with emission free fuels. In comparison to low sulphur Marine Diesel and Marine Gas Oil, LNG is a competitive fuel, both from technical and economical point of view. LNG can be stored in vacuum insulated tanks fulfilling difficult requirements resulting from marine regulations. LNG must be vaporized and pressurized to the pressure compatible with engine requirements (usually a few bar). The boil-off must be controlled to avoid occasional gas release to the atmosphere. The paper presents the LNG system designed and commissioned for a Baltic Sea ferry. The specific technical features and exploitation parameters of the system will be presented. The impact of marine strict regulations on the system thermo-mechanical construction and its performance will be discussed. The review of possible flow-schemes of LNG marine systems will be presented with respect to the system cost, maintenance and reliability.

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