

Newsletter IEA Bioenergy Task 37: 05/2020

Biomethane in shipping

Biomethane among “best-positioned fuels” in shipping to reach net zero emissions

Biomethane has been named as one of the best-positioned fuels to reach net zero emissions by a recent study of Lloyd’s Register (LR) and A.P. Moller – Maersk (known as Maersk). The study found that biomethane, alcohol and ammonia are the best options to decarbonize shipping. Biomethane, ammonia and alcohol have relatively similar cost projections, according to the study, but varied challenges and opportunities. Alcohols such as ethanol and methanol are not a highly-toxic liquid, with various possible production pathways including directly from biomass and/or via renewable hydrogen combined with carbon from either biomass or carbon capture. However, the companies point out that the transition of the industry towards alcohol-based solutions is “yet to be defined”. Ammonia is carbon-free and can be produced from renewable electricity. LR and Maersk claim the energy conversion rate of this system is higher than that of biomaterial-based systems, but the production pathway “cannot tap into potential energy sources” such as waste biomass. The main challenge for ammonia is that it is highly toxic and small accidents can present huge risks both to staff and the environment. On the other hand, biomethane has a potentially smooth-transition, as technology and infrastructure are already in place. The main concern highlighted by the study is so-called ‘methane slip’ – the emission of unburned methane along the supply chain. According to the research by Maersk and LR, batteries and fuel cells are unlikely to have an immediate role in propelling commercially-viable carbon neutral deep-sea vessels. Shipping is responsible for 2-3% of global greenhouse gas emissions.

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Costa Cruises takes delivery of LNG-powered Costa Smeralda

Costa Cruises, the Italian brand of Carnival Corporation has taken delivery of Costa Smeralda, the brand’s first ship powered by liquefied natural gas (LNG). The handover ceremony was held at the Meyer shipyard in Turku, Finland, where the brand’s new flagship was built. Costa Smeralda becomes Carnival Corporation’s fourth new ship of 2019 and its second LNG-powered ship, the company said in its statement. Costa Smeralda is the first of two new sister ships for Costa Cruises that can be powered in port and at sea by LNG. The second vessel, Costa Toscana, is currently under construction at Meyer Turku and scheduled to be delivered in 2021. In total, following the delivery of Costa Smeralda and the launch of AIDAnova at the end of 2018 as the world’s first cruise vessel to be powered by LNG, Carnival Corporation has an additional nine next-generation LNG-powered cruise ships on order using the company’s innovative environmental design, with expected delivery dates for these new ships between 2020 and 2025.

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New LNG technology for short-distance vessels

The Finnish technology group Wärtsilä has been contracted to supply the main equipment for the first liquefied natural gas (LNG) fueled short-sea Ro-Lo (roll-on, lift-off) vessels to be operated by Finland based Bore. Three ships have been ordered by the Dutch Spliethoff Group's Bore and are being built at the WuHu Shipyard in China. Wärtsilä has worked with both the owner and the naval architect to develop a vessel optimized integrated LNG system. As a result, it has been possible to locate a 250-cbm Wärtsilä LNGPac storage and supply system below deck without compromising the cargo capacity, Wärtsilä said. The 120-meter long ships will be chartered to Finnish forestry company UPM, and will operate in the Baltic and North Seas. They will have Finnish/Swedish Ice Class 1A classification. The first vessel is scheduled for delivery by mid-2021.

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Solutions to decarbonize shipping

On average, the shipping sector is responsible for 3% of annual global green-house gas emissions on a CO₂-equivalent basis. International shipping represents around 9% of the global emissions associated with the transport sector. The report from the International Renewable Energy Agency (IRENA) explores the impact of maritime shipping on CO₂ emissions, the structure of the shipping sector, and key areas that need to be addressed to reduce the sector's carbon footprint.

There is no clear-cut path to decarbonization. Cutting CO₂ emissions in half is therefore likely to require a combination of approaches, including the use of alternative fuels, upgrading of onshore infrastructure, and reducing fuel demand by improving operational performance, the report finds.

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Availability and costs of liquefied bio- and synthetic methane in shipping

The CE Delft study commissioned by SEA-LNG analyses the availability and costs of Liquefied Bio Methane (LBM) and Liquefied Synthetic Methane (LSM). It included the latest academic and industry literature, comprising thorough analysis of circa 150 publications. The findings are that both LBM and LSM are scalable solutions for the maritime sector, with estimated sustainable global supplies potentially exceeding the demands of shipping in the future, and likely to be commercially competitive relative to other low- and zero-carbon fuels like green hydrogen and ammonia. Compared to those fuels, LBM and LSM have the advantage that they can be transported, stored and bunkered, utilising existing and technically matured LNG infrastructure. Analysis of the global sustainable biomass resource shows that biomethane from energy crops, agricultural residues, forestry products and residues could significantly exceed the global total energy demand of the maritime sector.

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Baleària presents its first LNG ship

Baleària & Fred. Olsen Express presented Marie Curie, its first LNG driven ship, which connects the Huelva port with the Canary Islands, Spain. The Marie Curie, 168 meters long, has a capacity for 880 people, 169 vehicles and more than 2,000 linear meters of cargo. Thanks to natural gas, it has remarkably reduced emissions such as particles, GHG emissions and before all, completely eliminates sulfur emissions.

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Russia builds its first LNG passenger ship

Russia's Gazprom announced the keel-laying for the country's first passenger ship to be powered by

liquefied natural gas (LNG) was held at the Zelenodolsk shipyard. The Chaika LNG leisure and sightseeing boat (motor ship) is intended for passenger voyages, including via tourist routes. The vessel, which can accommodate at least 170 people, is expected to be launched as early as this year. The Republic of Tatarstan is a unique location from a logistics standpoint, and it has robust transport potential in terms of cutting-edge industrial technologies. It is planned that the region will produce LNG-powered tourist ships and Gazprom will be responsible for refueling said ships. Zelenodolsk Plant named after A.M. Gorky is one of Russia's largest shipbuilding companies. The Plant has produced more than 1,500 maritime and river vessels.

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Total charters its first LNG powered very large crude carriers

Total has signed an agreement to charter its first two liquefied natural gas (LNG) powered very large crude carriers. The two vessels, which are able to carry about 300,000 tons of crude oil each, will be delivered in 2022 and will join the time-chartered fleet of Total. These VLCCs will be chartered to Malaysian ship-owner AET. The vessels have been designed with LNG propulsion to benefit from reduced GHG emissions and with the latest technologies to further lower their consumption. Total shipping is convinced that LNG is the best and immediately available solution to reduce the environmental footprint of shipping. The supply of LNG for these two carriers will be provided by Total Marine Fuels Global Solutions, Total's dedicated business unit in charge of worldwide bunkering activities.

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Lundqvist Rederierna orders LNG-powered Aframax tanker

Finnish shipping company Lundqvist Rederierna has ordered a liquefied natural gas (LNG) powered Aframax tanker from Japan's Sumitomo Heavy Industries. The 112,000-deadweight-tonnage ship is scheduled for delivery by January 2022, according to Lundqvist Rederierna. Lundqvist Rederierna did not reveal the price tag of the order saying that the order would be financed by the shipping company's own funds. The new tanker is largely a sister vessel to Lundqvist's 2019-built crude oil tanker Alfa Finlandia. The main difference is that, unlike Alfa Finlandia, the new tanker would be able to sail under LNG-powered propulsion. Alfa Finlandia is 207 meters long and 44 meters wide and was also built by Sumitomo Heavy Industries. What is interesting about this order is that there have been no physical meetings between Lundqvist and Sumitomo representatives due to the COVID-19 outbreak. This has been possible thanks to the strong relations created between the two companies during the construction of seven Aframax tankers delivered over the period of the last five years.

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