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Stakeholder meeting: Update Total Cost of Ownership (TCO) analysis for Seagoing Shipping

Thursday 2 April 2026, online

Background

Platform Renewable Fuels conducted a total cost of ownership (TCO) analysis exploring the costs of different fuel and engine combination for seagoing shipping. The analysis takes into account the regulatory costs from EU ETS and FuelEU Maritime.

As a starting point, we used the findings of the research project from Radboud University where they concluded that the OPEX which include the fuel costs for ship play a significant role in the total costs of a ship.

The Platform is also taking part in meetings of the steering group for the renewable fuels for seagoing shipping (Brandstoffentransitie Zeevaart) where results from the TCO analysis help shape the discussion on the instruments needed to stimulate the developments in the sector. The results of the fuel and engine costs for ships over their lifetime, whether in existing or retrofitted ships, provide valuable insights on the innovations for new fuels and the fuel system that need to be built with it.

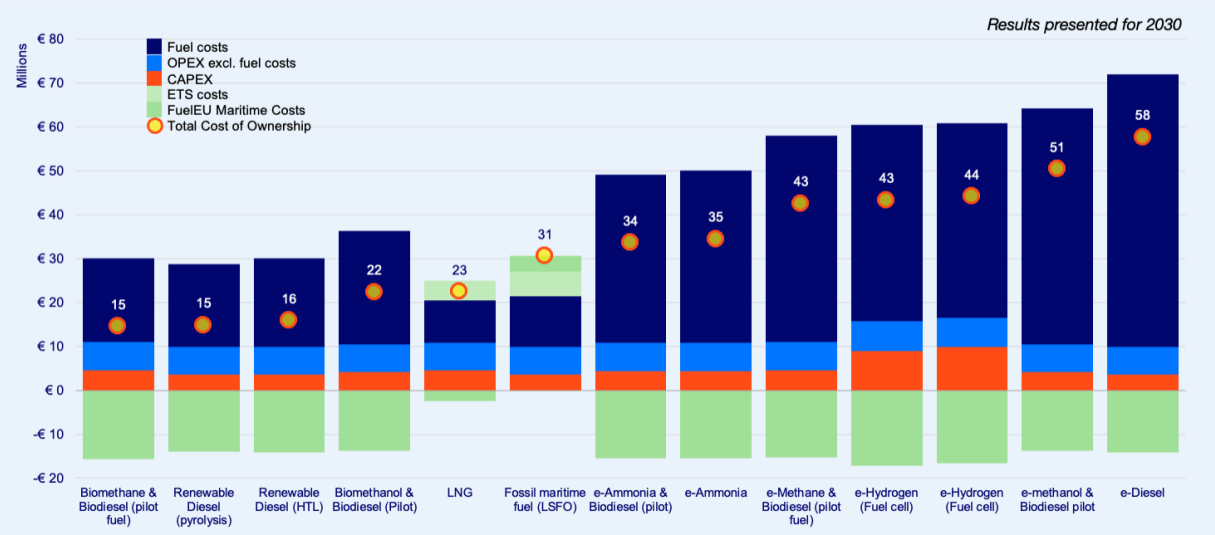

Figure: Total cost of ownership for analysed engine + fuel combinations of medium sized containership with a lifetime of 25 years, including the regulatory costs (Sources: results based on data retrieved from Mærsk-McKinney-Møller total cost of ownership model for decarbonisation of vessels and studio Gear Up price development tool for maritime fuels).

Takeaways

Vessel CAPEX and OPEX exluding the fuel

- The calculated OPEX (excl. fuel) is similar for all vessels
  - Contains mostly maintenance costs for main engine, which is assumed similar for all engine types
- CAPEX of the different vessels analysed do not vary much, except for the vessel using a fuel cell

- Fuel cell is still the most expensive engine to produce

Fuel costs

- The costs for the fuel make up the largest share in the total costs
- Mærsk-McKinney-Møller model assumes a strong price reduction for the total fuel costs over time – this may only be achieved under the condition that actual production facilities are developed to allow a learning curve

Regulatory costs

- The regulatory costs strongly influence the cost competitiveness of the fuels
- LNG is over compliant up to 2035 under current FuelEU regulations and can sell or bank the surplus emission savings credits

Considerations

- The TCO-analysis is conditional, as it is based on a set of assumptions on how the technology develops (learning curve)

Recommendations

- LNG should not be considered as a compliant fuel in FuelEU Maritime as this hinders the deployment of other fuels
- It is recommended to innovate in feedstock-fuel systems, connected to engine developments

Key discussion points

- The impact from methane slip for methane ships needs to be considered and is overlooked in policy. Although it is difficult to take this into account, methane slip will be increasing with the use of ships using methane in the future
    - FuelEU Maritime already uses a correction factor for methane slip in the default values
- LNG is also a compliant fuel under the IMO, however due to higher emission reduction targets LNG will no longer be compliant after 2030
    - The Platform believes that LNG should not be a compliant fuel since it will hinder the need for development in other energy carriers
- The Platform came up with a calculation for the necessary investment roadmap for renewable fuel availability. We know the engine power and capacity and when considering the typical fuel consumption of these ships, we can start thinking about the amount of production capacity required to power these and the investments needed to build them.
- To power a typical ship of 8,000 TEU, a 100 MW plant is required producing 700 thousand tonnes of biomethanol per year. This represents a capital investment of approximately 250 million EURO.
- There are key questions that need to be addressed:
    - Where do we need to start investing to get this capacity online?
    - Who are the parties that will invest in the fuel supply system?
    - Who will be the fuel owner?
    - What are the innovation questions that need to be researched?
- Questions on biomass feedstock availability for fuels in seagoing shipping were raised considering the demand in other sectors
    - On a system level and considering the demand for seagoing shipping – there is a lot of biomass available for the maritime sector which has the benefit of being able to use low grade biomass that is more difficult for other sectors to use.
- Our estimation on the investments required to deploy the renewable fuel capacity for ships was validated by the insights of Enerkem. First of a kind plants typically allow for the optimisation and learning which can be taken on when replicating
- Mandates for the chemical sector in the long term would help support the investments required for seagoing shipping.