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Technology Collaboration Programme

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Progress towards biofuels for marine shipping

Status and identification of barriers for utilization of advanced biofuels in the marine sector

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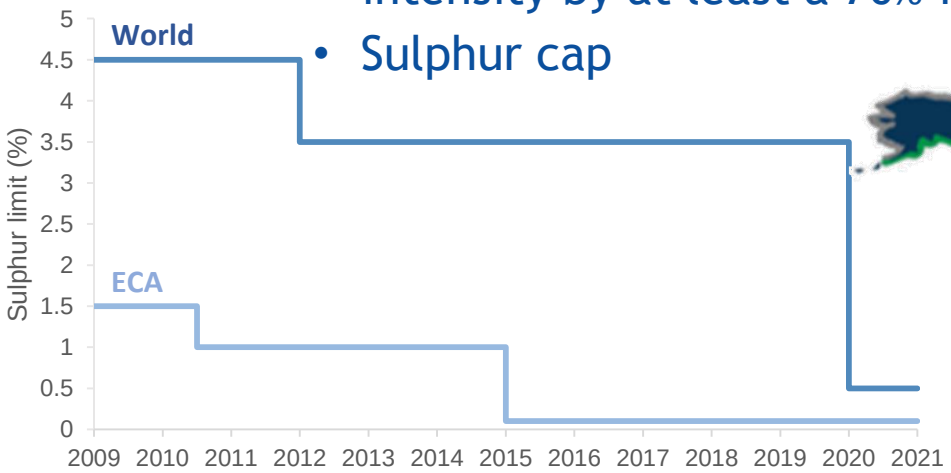
- About 12% of global trade, around one million barrels of oil, and roughly 8% of liquefied natural gas pass through the canal each day.
- Analysis showed the blockage could cost global trade between $6bn to $10bn a week

Background

- Implicates all industries
  - Globally 80-90% of all goods (by volume) is transported by sea
  - Corresponds to only 50% by value – therefore transportation is especially of “low value” / bulk goods
  - IMO (The international Maritime Organization) have two main actions impacting the sectors
    - GHG emission reduction targets (Reducing the average carbon intensity by at least a 70% in 2050)
    - Sulphur cap



Background

- Who will pay the elevated cost?
- And how to mitigate the risks involved?
  - Shipowners can only absorb 10% according to Lloyd register/UMAS study
- Prices of alternative fuels cannot – as of now - go towards the low price of bunker fuels
  - 3 times higher freight prices within the last year (covid19 induced supply and demand imbalances)
  - Low oil prices (which made charters use tankers to store large amount of cheap oil, instead of using it for active trade due to speculations.)
- There is a lot going on (EU (REDII etc.), IMO (interim), Companies (GoodFuels, Mærsk, Blended Fuel Solutions NZ, etc.)
  - For details see the report

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Central aspects of marine biofuel commercialization

Feedstock

- Availability
- Security of supply
- Cost and its variation
- Quality and its variation
- Collection
- Storage and transport logistics
- Sustainability criteria

Conversion technology

- Technological maturity
- Production capacity and scalability
- Widespread applicability
- Price per ton fuel
- Energy efficiency

Local and global regulations and markets

- Sustainability criteria
- Renewable fuel mandate
- Carbon tax
- GHG emission targets
- Sulphur gap
- R&D support

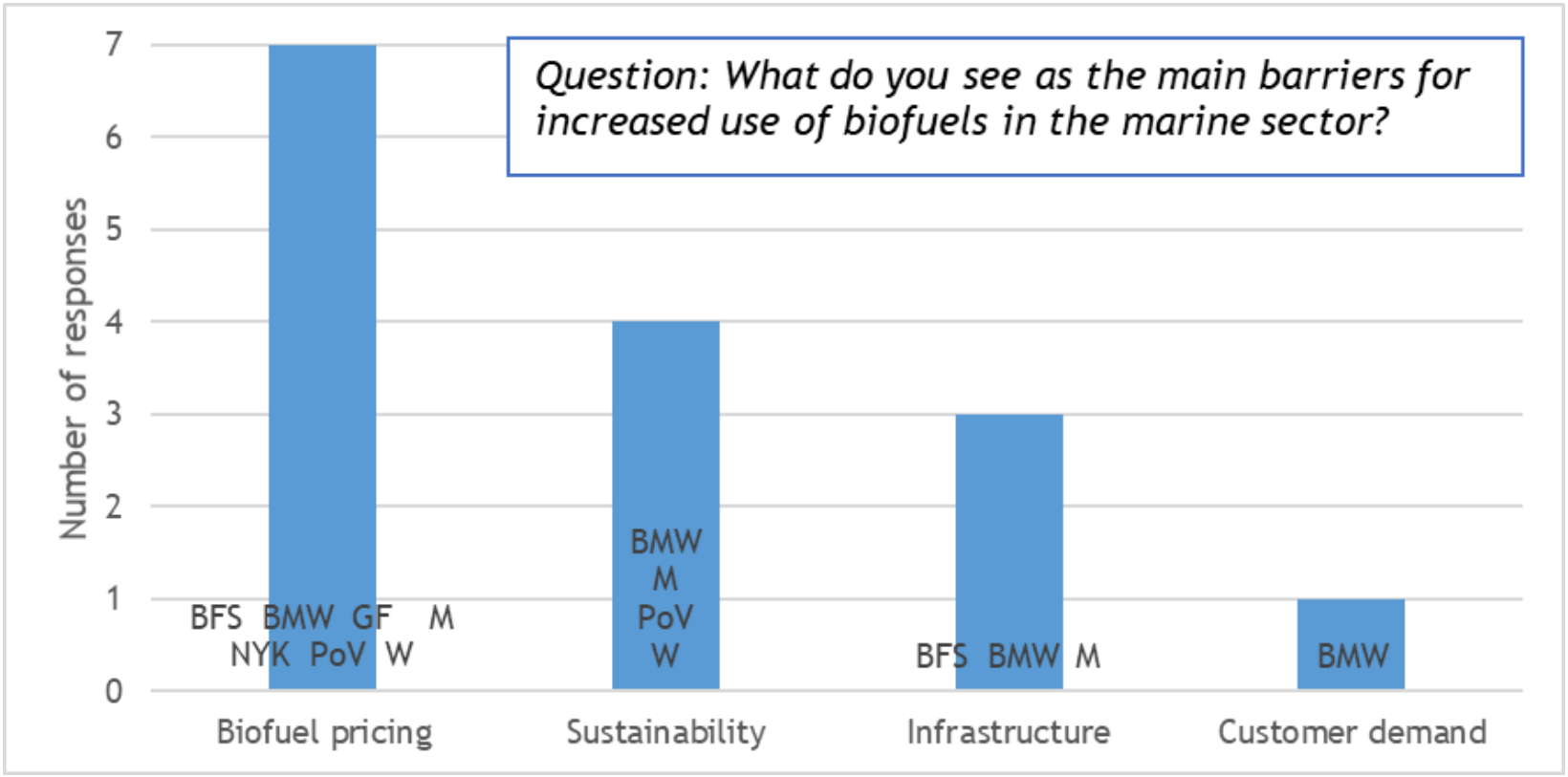
Fuel utilization

- Bunker infrastructure
- Fuel system and engine compatibility
- Fuel tank volume
- Freight price

Society and environment

- Sustainability certification
- Food vs. fuel
- Public opinion

Central aspects of marine biofuel commercialization



Most important identified barriers

- Based on our literature study and stakeholder interviews this report has identified several barriers for the commercialization of biofuels for the marine sector.
- Most importantly are,
  - *Sustainability criteria*
  - *Marine fuel standard incompatibility*
  - *Economic incentive and the lack of targeted policies*

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Sustainability criteria

- Sustainability criteria uncertainty relates to the changing regulatory framework defining fuel sustainability and the lack of an internationally recognized and utilized standards.
  - Europa has especially been experiencing shifting legislations with the implementation of the **RED I** in 2009, following the **ILUC Directive** in 2015 which was updated in 2018 (**RED II).**
  - The changeable sustainability criteria has created uncertainty on the development of future markets, thus obstructing the investment potential of sustainable fuel technologies.
- In order to facilitate the big investments needed to be biofuel-ready (on engines, fueling, infrastructure etc.), long-term stability of policies and framework conditions are needed.
- Further, international agreements and uniformity within these criteria will help reduce risks and stabilize the development within the sector.

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Marine fuel standard incompatibility

- The ISO standard ensures comparison and evaluation of fuel quality, fuel engine compatibility, safety and price, thus facilitating the use, trade and production of fuels.
- The complexity of biofuels associated with the wide range of feedstocks and production processes makes it near impossible to include it in the current ISO 8217/2017.
- Some major stakeholders have initiated large R&D efforts in different biofuels in spite of this, but not all players in the marine sector can be expected to follow their examples, and thus a general investment in R&D, trials in engine and fuel systems, and sea-going trials of emerging biofuel technologies is essential.
- Furthermore, a thorough update of the existing fuel standard and/or new ISO standards targeted biofuels, would be a game changer for further marked penetration of biofuels, as this would provide the technical specifications supporting their evaluation, before investing in large scale commercialization.

Economic incentive and the lack of targeted policies

- As long as fossil energy sources remain much cheaper ($US/MJ) than biobased alternatives, the transition towards a sustainable shipping sector will be slow.
- The majority of the interviewed stakeholders identified the lack of more targeted policies as essential to overcome the economical barrier.
  - E.g. renewable fuel mandate, carbon taxation, or subsidies directed towards biofuels
- A barrier for implementing biofuels for shipping industry is if the short-term investment costs needed to establish supply chains and infrastructure are expected to be absorbed by few stakeholder categories.
- Global legislation therefore must promote renewable technologies where the required investment cost is shared among maritime stakeholders while providing longer term legislative security to mitigate the high risk of investing in increased biofuel capacity which takes time to build
- National and supranational policies are crucial to support local fuel demands and adapt to the diversity of emerging solutions to mitigate GHG emissions in shipping.

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Outlook

- Most stakeholders think that biofuels is the most promising solution to a sustainable marine sector
  - Do not let perfection be in the way of the good!
- Large support across most maritime stakeholders – not just the interviewed
  - Examples: IMRB or Zero coalition
- It seems like a mix of a collaboration and a race to achieve/find great sustainable fuel solutions.

- Next report -> De-risking investments in marine biofuels (how to overcome the barriers)
  - All doors are open – but there are massive risks (huge investments)
  - Lack of long term support/long term regulations

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A big thanks to all contributors!

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