

Renewable Fuels in Maritime Shipping

21 July 2020 Netherlands

An ART Fuels Forum and Dutch Platform Sustainable Biofuels initiative

Lessons learned – using the RED 'opt-in' for supply to shipping and aviation

Dutch legislation allows and also RED 2¹ provides an instrument to count international bunkers for the national transport sub-target.

NL is using this instrument resulting in 0,72 PJ in 2018 and 2.3 PJ in 2019 of renewable fuels delivered to shipping and aviation (in the main maritime shipping)

However, renewable fuels for international bunkers don't count for the national CO_2 -emission reduction targets, nor for the overall renewable energy target for member states.



¹ RED = European Renewable Energy Directive

2018



Two perspectives on the opt-in

The opt-in adds additional blending space to easier meet road compliance, creating a more cost-effective deal for end-consumers in the road sector.

There are options for more cost-effective conversion paths for biofuels for marine, or lower grade biofuels, that are better suited for seagoing vessels.

Positive effect as road mandate can be flexibly met with cheaper fuel options for maritime ships.

The opt-in may well be a cheaper way to meet the Dutch obligation for transport.

Duurzam obrandsto

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In the end, marine is politically considered as the most interesting end-use for biofuels.

accelerator.

2.

emission reduction.

The opt-in instrument proved its value as an

- The opt-in is not increasing the CO_2 emissions savings in transport, rather shifting it from one transport sector to another.
- Bunker blending will go at the expense of road blending, losing track of national CO₂-
- The maritime sector will need its own instrument and policy to invest in de dedicated marine fuel supply-chains.
- Preferably an instrument at IMO-level, but also the European level is considered.

Analysis

- The two perspectives hold in common:
 - Fuel innovation is needed for a sector that will rely on these fuels for the international reductions targets in the coming decades
 - Today, CO₂-emission reductions through deployment of renewable fuels in international bunkers cannot be used for meeting the COP21 Paris goals
 - It is considered helpful to be able to count the international CO_2 -emission reductions towards the national emission targets (in the absence of an IMO-GHG reduction target) Perhaps adding an instrument to funding Carbon reduction in international maritime sector.



Q2. Cost effectiveness fuels/energy carriers

Could you choose your top-3 of costeffective paths for maritime shipping (under the conditions of supporting instruments) that you see being used at scale in 2050?

Most mentioned as the first cost-effective options are:

- 1. FAME
- 2. Renewable biogas liquid/compressed
- 3. Upgraded pyrolysis oil or other HTL routes

Considering all top-3 options mentioned, renewable methanol stands out.





Renewable Hydrogen



Q3. Which dual fuel combinations would you see as feasible towards 2030?

- Auxiliary systems on battery electric
- FAME + Low Sulphur MGO
- Renewable Methanol + H2/NH3
- **Bio LNG-FAME**
- HVO + FAME
- Liquid biogas + upgraded bio-oil
- H2 Related fuels

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- Methanol-FAME-Diesel
- Fossil fuel (heavy fuel oil or marine gasoil) + biofuels (renewable heavy fuel oil or diesel like HVO or FT-diesel)

- value feedstocks !
- LSFO and pyrolysis oil
- Diesel and LNG and Bio-LNG, Diesel and HVO
- Ethanol/HVO
- Natural gas, biogas, e-gas

Addition Q2. You cannot put pyrolysis and other HTL routes together! HTL and SvTL are much more promising for BFO using negative/low

Methanol/DME, Methanol/HVO, Ethanol/DME,

HVO/FT Diesel with gaseous fuels

MGO with bio-based components, ammonia

Q4. Which hybrid combinations would you see as feasible towards <u>2050</u>?

- Not sure at this time
- MGO with bio-based components/ammonia
- Electric battery and fuel cell in combination with methanol Fuel cell/ solar and hydrogen
- RFNBO and LSFO

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- H₂ and electricity
- H₂ related fuels
- e-methanol-ammonia
- Liquid fuel + electric for harbour operation

Q5. Considering the need for investment to scale up climate-neutral fuels: what innovation do you consider necessary before <u>2030</u>?

- 1. Regulation
- 2. Availability of feedstock (either biofeedstocks or renewable electricity and electrolyzing capacity)
- Instruments like emission trading systems
 + Innovating on sustainability (better traceability tools, more transparency)

Building further...

Carbon accounting...

Climate impact methodologie...

> Engine adaptation...

Adapting infrastructure

Regulation

Instruments like emissio...

Availability of feedstock...

Innovating on Sustainabili...

Local emissions



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Q6. Considering the need for investment to scale up climate-neutral fuels: what innovation do you consider necessary before <u>2040</u>?

- 1. Regulation
- 2. Adapting infrastructure
- 3. Innovating on sustainability (better traceability tools, more transparency)

Building further...

Carbon accounting...

Climate impact methodologie...

> Engine adaptation...

Adapting infrastructure

Regulation

Instruments like emissio...

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Local emissions





Q7. With which topics do you see the possibilities for synergies with transport renewable fuels/energy carriers?





- 1. Link to primary (agro) sector
- 2. FAME
- 3. We would like to see consistent sustainability criteria across the sectors

90% 100%

Q8. How do we get these synergies? What is required?

•

Consistent cross-sector regulation

Better understanding of how to handle FAME in maritime sector. It is already a proved method and no further changes to the infrastructure ' are needed. Therefore creating synergies with road transport as they can use same infrastructure, but both with their own fuel specification. FAME still is the cheapest fuel from a GHGperspective

Phasing is the key-word. In the coming years, transition fuels that can mix with hydrogen. Biomethanol can blend into the hydrogen economy easily > 2035. On short term, green power must be used as power

- Aligning objectives and incentives
- Most of the market push needs to come from refineries (i.e. chemistry)

Increase PV and wind power capacity

- Making EU-wide choices
- Investment in RFNBO refineries
- Development of clear pathways supported and executed by multi stakeholder coalitions
- Real LT incentive or mandate regulation
- sustainable climate for investment
- using green electricity in harbours circular economy: assessing the



priorities in biofuels usage, e.g. looking at substitutability

Activity in one sector could bring solution for the other. Similarly to the development of refineries in the past

Clear joint roadmap Vision 2020 -Mission 2030 and via backcasting to Flagships/Demos in 2025 with a linked innovation program tackling non technical AND technical issues

Q9. What type of policy innovation is needed to materialize the role that renewable fuels and energy carriers can play? And why?

Preference is for global policy through IMO. The standard for new vessels EEDI . and for existing vessel EEXI should be used to create demand.

- Level playing field in EU/ ARA ports/IMO level in all different types of policies and quality specification.
- The aspect of policy phasing must be worked out more correctly. We need transition fuels (clean, sustainable) as long as battery technology is inadequate and green hydrogen is not available

Carbon costing

attorm

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Duurzam obrandsto Regulation to assure a levelled playing field and feedstocks availability to make . sure the solution is not only environmentally sustainable but also • sustainable in time

- Financial compensation for investor risk of renewable fuels production
- Fixed targets for used of renewables in combination with financial support to get the market going
- Technology neutral subsidies/regulations, innovative financial support not affected by populism
- Strong governmental support by regulation and subsidies
- Stable LT policy either incentives , fiscal benefit or obligation

Regulation, compulsory mandates.

Stable regulation for carbon footprint

reduction, at least 15 years, looking at well-to-wheel (i.e. not differentiating regulations for fuels and equipment) support to early, demonstration investments: via European Recovery Plan and Green Deal

Regulation with penalty for non compliance, mechanism to incentivize the use of biofuels such as feed in tariff and feed in tariff such as the one used for incentivize renewable electricity

Integrated policy for sustainable use of biomass for the BioEconomy, i.e. optimal use biomass for food AND nonfood incl. fuels for shipping. Clear carbon taxation scheme for fossil and renewable based products.

Q10. Do you have topics to add or any core messages you would like to share?

- Our preference is through global policy through IMO. The pathway to NZE requires a change to vessels, fuels & infrastructure therefore a sectorial approach for the whole shipping value chain is needed.
- We will combine the construction of a bio-methanol plant at Rotterdam with a demonstration project for use of methanol in . in-land shipping. The plant will provide the required infrastructure with sales on the petrol blending market
 - A specific attention can be made to the current availability and. potentials (fast) scale up. Further have a look at enabling technologies such as changing from heavy shipping oil or diesel to LNG engines (needs promotion) to enable the increasing offtake of Bio-LNG. Sweden is a good example in road transport. they enabled in early days CNG and now 97% of the national fleet is driving on Bio-LNG
 - Strong policy recommendation of introducing a CO2 tax for fossil bunker fuels
- Drive towards real reduction in Fossil usage, affordable

pathways and level playing fields

As per every sector unless there will be a clear policy with enforceable mandate and support mechanism will be very slow the deployment.

Vision 2050 and then via backcasting - Mission 2030 -Flagships/Demos of high TRL platforms in 2025 + supportive Innovation Program tackling non-technical AND technical innovation issues, providing a stakeholder platform and develop/support schooling & training. NB Technological innovation should be part of the longer-term solution to create large-scale impact!



Create at least a regional framework (EU wide) for competitive issues to be minimized (shipping is very cost-competitive and global: easy for ship owners to "tanker", I.e. to refuel in areas where little or no environment regulation exists)

Thanks for your attention

- ART Fuels Forum: <u>www.artfuelsforum.eu</u>
- Platform Sustainable Biofuels: <u>www.platformduurzamebiobrandstoffen.nl</u>



