ADVANCEFUEL

Role of renewable transport fuels in reducing GHG emissions in Europe

Ayla Uslu
TNO Energy Transition
ADVANCEFUEL Stakeholder Webinar
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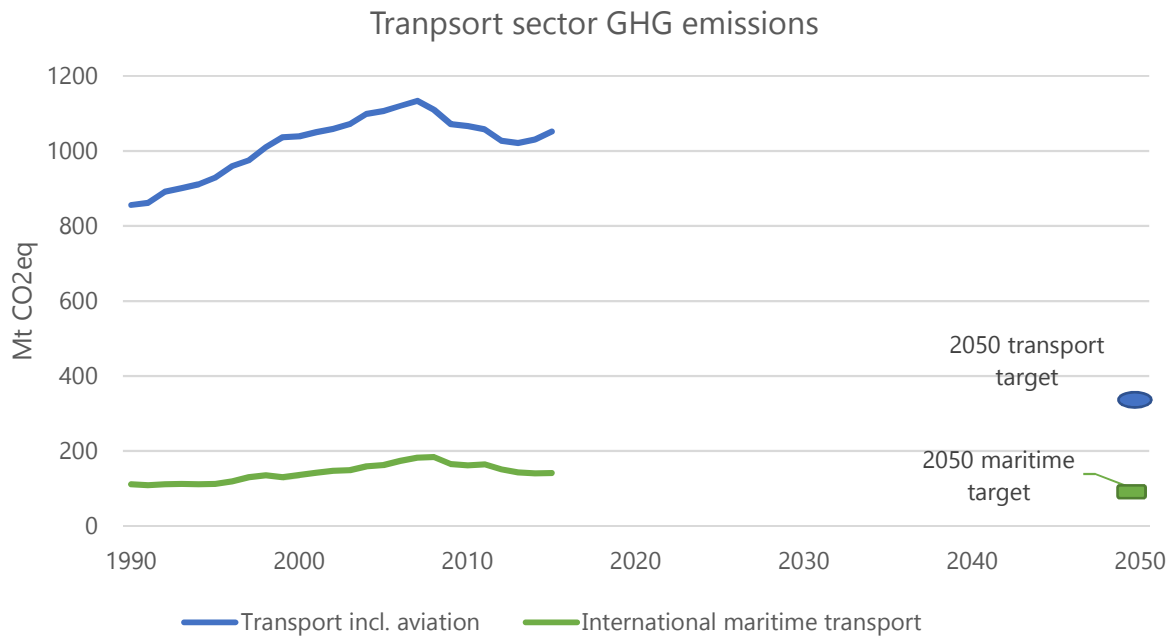
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N.° 764799.

BACKGROUND

- Transport sector is the only major EU sector where GHG emissions are continuously increasing. Contributing to Paris Agreement:
  - 85% CO_2 reduction in transport sector (including aviation with international extra-EU flights, excluding international maritime) in Europe by 2050 compared to 1990.
  - 50% CO_2 emission reduction target for the international maritime sector by 2050 compared to 2008.



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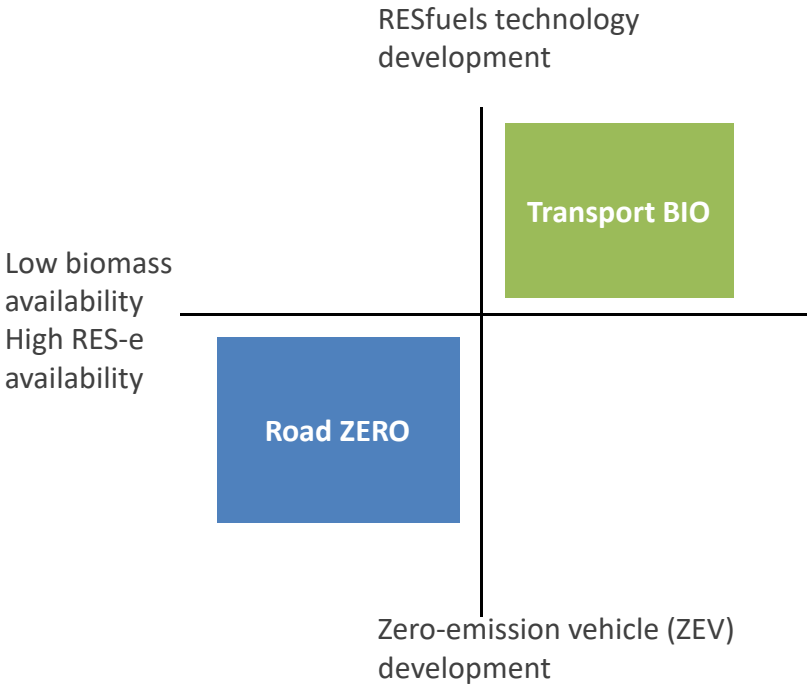
APPROACH- scenario setup



- TNO, RESolve Biomass model determines the least-cost configuration of the entire biobased production chain to meet the demand from different sectors.
- It includes, among others,
  - 16 types of vehicles for road transport
  - Biofuels, e-fuels, H_2 and direct electrification.

REFERENCE scenario: Assumes policies for 2030 are implemented, no further policy objectives

- REDII & EE
- CO_2 standards light duty and HDVs

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MODELLING RESULTS

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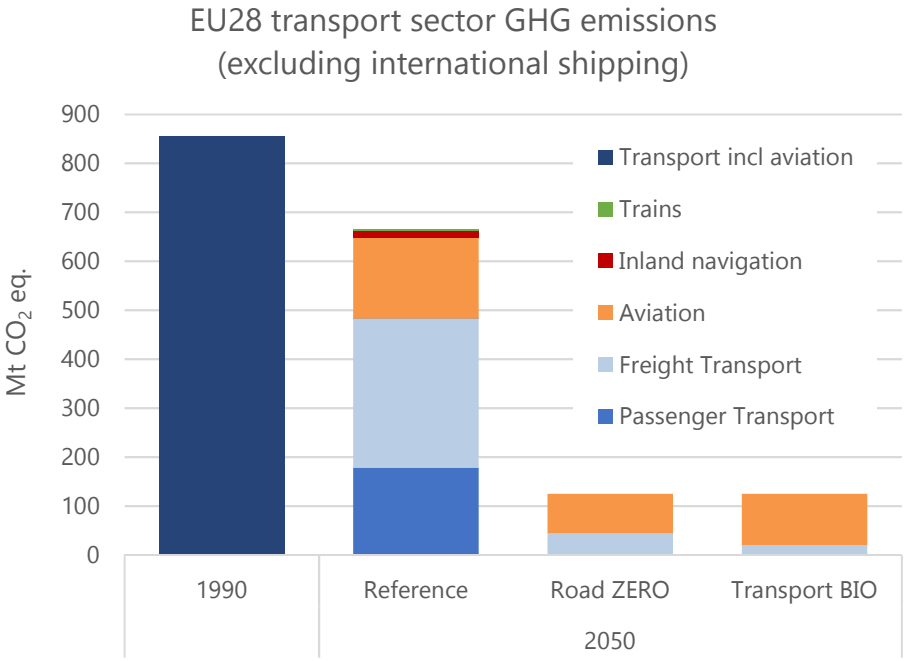
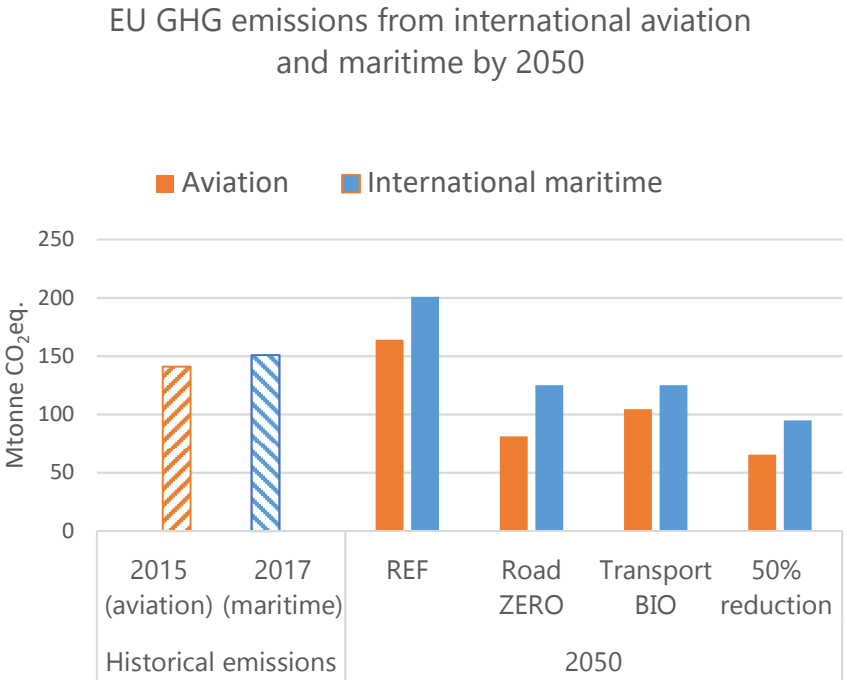
GHG EMISSIONS





- Neither aviation nor maritime sector meets the 50% GHG emission reduction vision by 2050, according to this modelling study.

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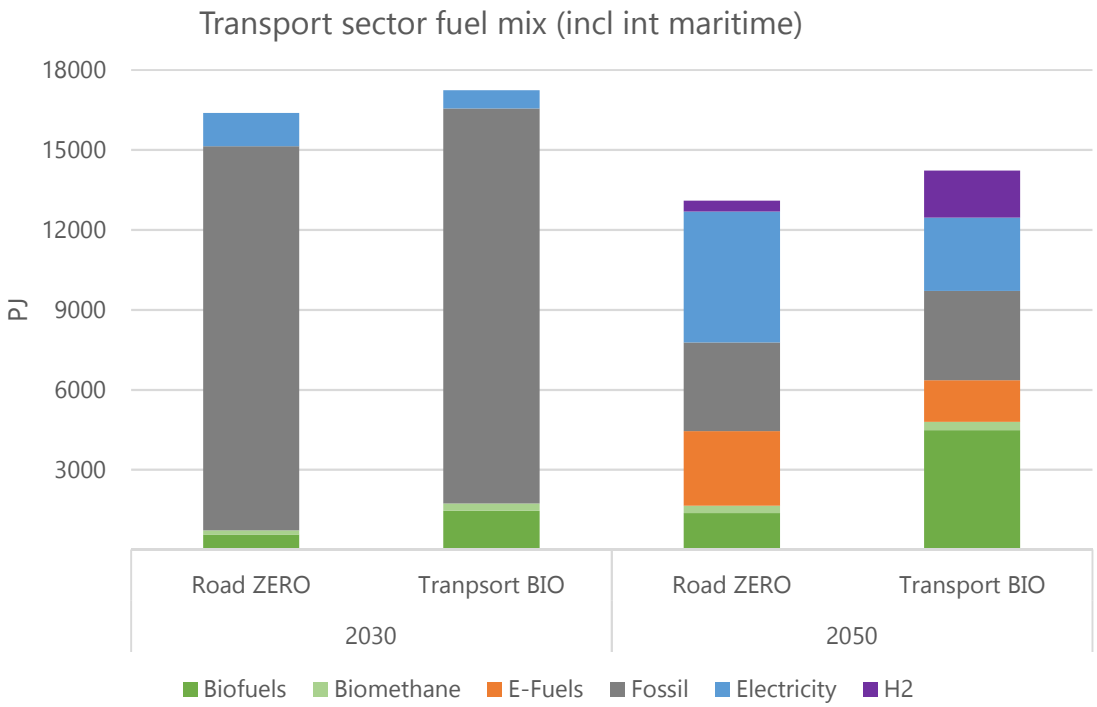
RENEWABLE FUEL MIX

- All renewable options, including biofuels, H_2, e-fuels and electrification and **more** need to be deployed to contribute to Paris Agreement Goals.



- Even with the high biofuels deployment power-to-fuel (PtX) supply options will be increasingly needed.
- Any delays in advanced biofuel deployment will shift the pressure to power sector in the energy system.
  - In both scenarios PtX is > 3000 PJ,
  - This requires ~ 1700 TWh renewable electricity.
  - Net electricity generation in Europe was around 3099TWh in 2017.

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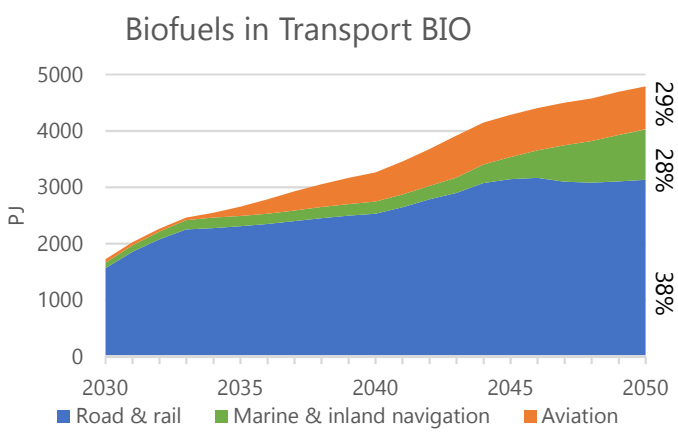
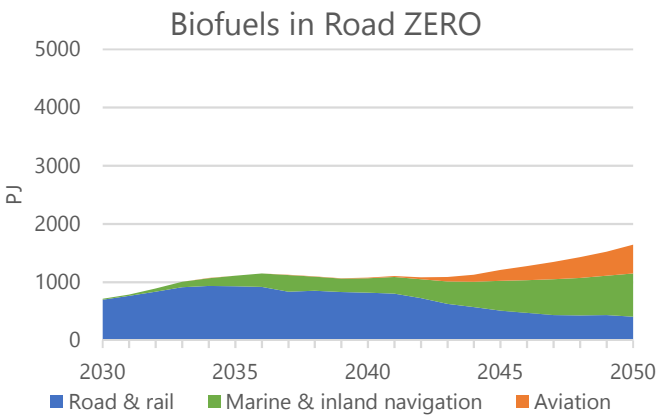
BIOFUELS

- Results confirm the need for significant deployment of advanced biofuels to help reduce the CO_2 emissions in the transport sector.

- Biofuels in Transport BIO are limited by the biomass supply potential.
- In Road ZERO, slow progress in advanced biofuel technologies results in use of more expensive supply options. Slow progress relates to:
  - Multi product refineries becoming less favourable
  - Slow mobilisation of feedstocks
  - Limited use of LNG in maritime
  - Other supply options that require changes/adaptations in ship fleet not included (i.e. methanol)
  - Limited options for aviation





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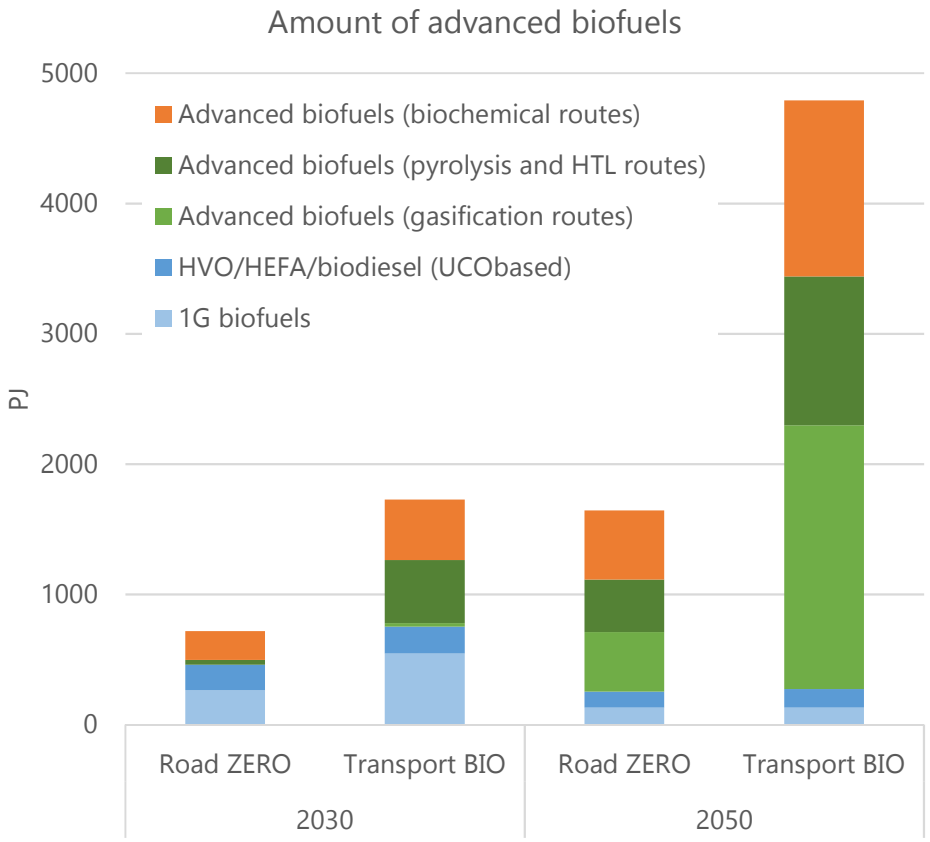
ADVANCED BIOFUELS



Advanced biofuels from lignocellulosic feedstocks comprise

- ~ 15% and 40% of biofuels in 2030, and
- ~70% and 90% of biofuels in 2050

according to Road ZERO and Transport BIO, respectively.

In Transport BIO majority of the feedstock potential is utilised.

- Mobilisation of European sustainable biomass potential becomes increasingly important to avoid unsustainable practices.

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CONCLUSIONS & RECOMMENDATIONS

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CONCLUSIONS

- The intended targets are very challenging, and require not only deployment of all renewable options, but also an increase in efficiency, and a reduction of energy demand.
- H_2 and e-fuels appear beyond 2035 and they contribute to the fuel mix of HDVs, maritime and aviation sectors.
- The two scenarios indicate the main pressure points. In Road ZERO, it is the power sector, and in Transport BIO, it is the supply of sustainable biomass resources.
- This study projects the minimum and maximum range for biofuels. When compared to current production levels these numbers indicate a significant increase: an increase of 165% and around 700% in 2050 compared to 2017.
- More than 70% of biofuels consists of advanced biofuels produced from lignocellulosic feedstocks in both scenarios and it will be very challenging to install all these plants.

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RECOMMENDATIONS

- Future policy measures need to be strong enough to ensure that significant amounts of RESfuels and ZEVs are deployed. These need to go hand in hand with the energy efficiency improvements.
- A balanced set of options (and development of new conversion routes) will be needed to avoid pressure on feedstock markets, and also the power sector.
- One of the options to reduce the pressure on lignocellulosic feedstock markets is the development of energy crops grown on marginal land.
- Another option is that policies could prioritise biomass supply to the transport sector. Such a prioritisation could reduce the future electricity demand to produce transport fuels.
- Enabling renewable fuels to aviation requires dedicated support to increase jet fuel production in biorefineries that produce a mixture of fuels.
- A combination of policies, such as quota obligation combined with feed-in premium, can be recommended to provide secure and reliable market conditions, particularly for aviation and also the maritime sector.

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Thank you for your attention

Ayla.uslu@tno.nl

Team

van Stralen, J.

Nogueira, L.P.

Detz, R.J.

Oliveira Machado dos Santos, C.

Veum, K.

Gamboa Palacios, S.