

Miksi Vety?

AFRY vetyseminaari 29.3.2022

ESA SIPILÄ



ENERGY TRANSITION

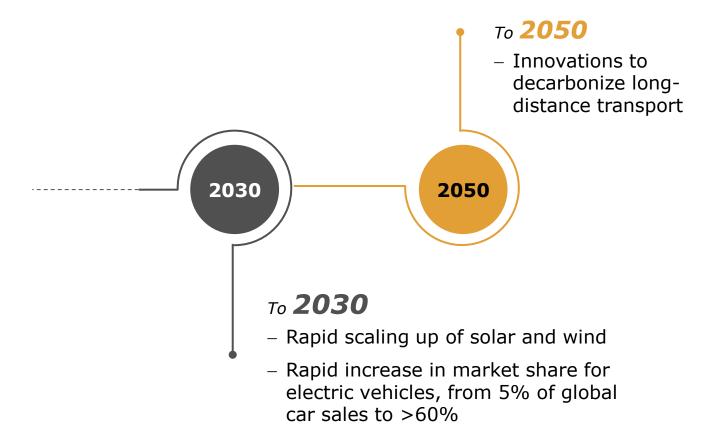
Energy contributes 75% of greenhouse gas emissions. Climate change mitigation requires complete decarbonization of the energy sector by 2050

THE ENERGY TRANSITION REQUIRES



Deep reduction in emissions in all transport modes, which will require alternative low carbon fuels where electricity cannot be used

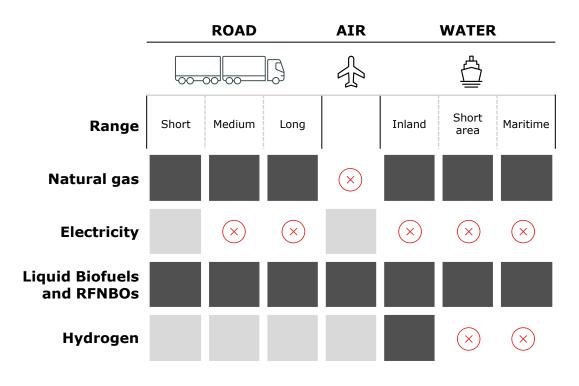
Reduction in emissions from industry, with recognition that certain sectors, such as cement and steel, will take longer to reduce emissions





ENERGY TRANSITION IN TRANPORT

Renewable fuels will play an important role in heavy-duty road transport, aviation and maritime



Available or demonstrated at scale

Feasibility demonstrated at pilot

(x)

Feasibility has not been demonstrated

Sources: ACEA, EEA, IEA, Sustainable Aviation



Electric vehicle solutions for heavy-duty vehicles are expected to become available from 2030, leading to a **gradual conversion** of this segment between **2030 and 2050**.



Aviation will still depend on liquid fuels to 2050.



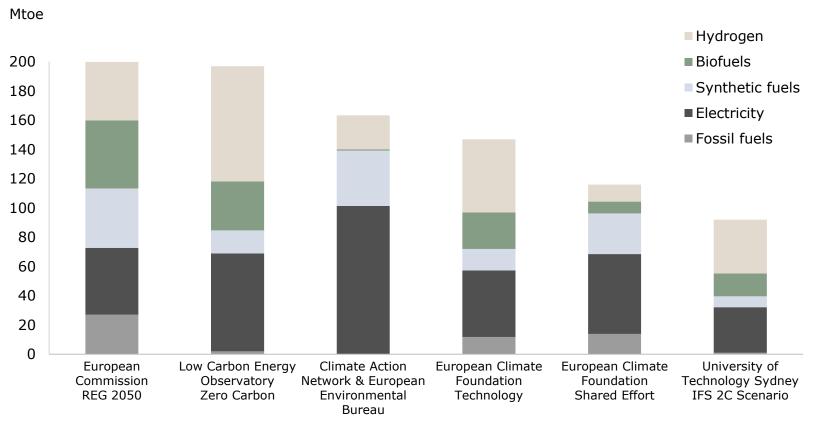
To date, maritime has **lacked policies** to drive decarbonization. The proposed FuelEU Maritime would introduce a fuel standard to limit GHG intensity of energy used on ships, with **targets for 2025 to 2050**.



ENERGY TRANSITION IN TRANPORT

Decarbonization of transport will require a combination of biofuels, hydrogen, synthetic fuels and electrification

DIFFERENT SCENARIOS FOR TOTAL EU TRANSPORT ENERGY DEMAND IN 2050

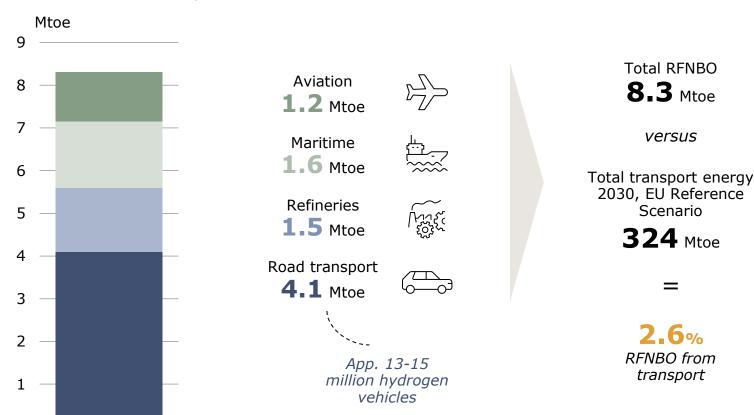




RENEWABLE FUEL DEMAND - IMPACT OF POLICY CHANGES

The 2.6% RFNBO target by 2030 in the Fit for 55 package reflects a high hydrogen ambition

RFNBO DEMAND EU-27, EUROPEAN COMMISSION SCENARIO



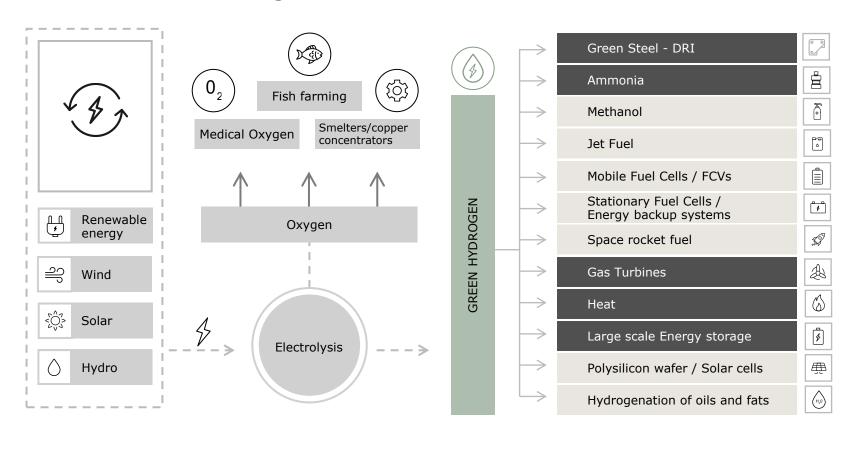
Source: EC RED II Amendment, "Promotion of innovative renewable and low carbon fuels" MIX-H2 scenario





HYDROGEN AS AN ENERGY VECTOR

Besides transport, hydrogen's role is in increasing energy independence and decarbonising those sectors with few other alternatives



POTENTIAL SYERGIES WITH OTHER INDUSTRIES

- Reduced dependence on fossil fuels
- Green Ammonia, e-Methanol, Hydrogen Peroxide
- Enabler for CO₂ utilisation
- End-use for the excess of low cost green or low carbon electricity
- Hydrogen as fuel for FCEV's (trucks forklifts etc)
- Seasonal energy storage
- Special fertilizers for forestry



WHY AFRY: #1 ADVISOR AND ENGINEERING PARTNER FOR ADVANCED BIOFUELS

Success in the first wave of PtL projects depends upon de-risking investment with public support and risk-sharing through partnerships

Partnerships

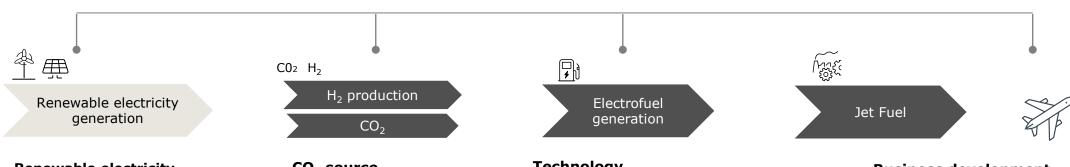
- Partnerships with industry leading companies in renewable energy
- Partnerships with companies with robust financial capability, sharing the financial risks

Regulation's support

- Favourable regulatory environment supporting RFNBOs
- Subsidies for CAPEX and operational costs like electricity

Basket of different options to mitigate risks

- Invest in developing different technology routes
- Access to multiple markets through scalable and central logistics



Renewable electricity

- At a competitive price
- Access to new capacity in compliance with regulation

CO₂ source

 In compliance with regulation for creditability of CO₂ source

Electrolysis

 Mature enough technology

Technology

- Approved SAF technology route by ASTM
- Mature enough technology

Business development

- Strategic decision making
- Joint ownership of the assets to mitigate risks

