



Low-emissions hydrogen-based fuels in shipping decarbonisation

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- Annual Global Hydrogen Review
- Energy Technology Perspectives

Global Hydrogen Review
2021



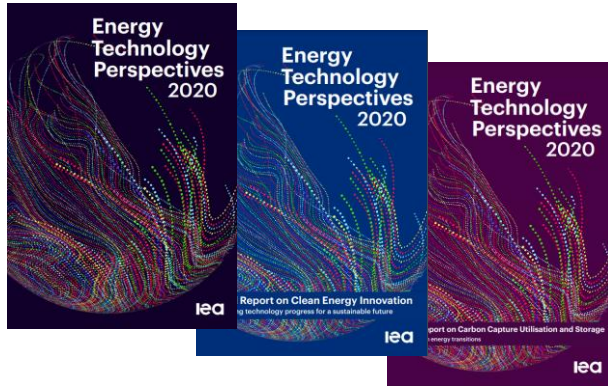
Global Hydrogen Review
2022



Global Hydrogen
Review 2023



2020



2023



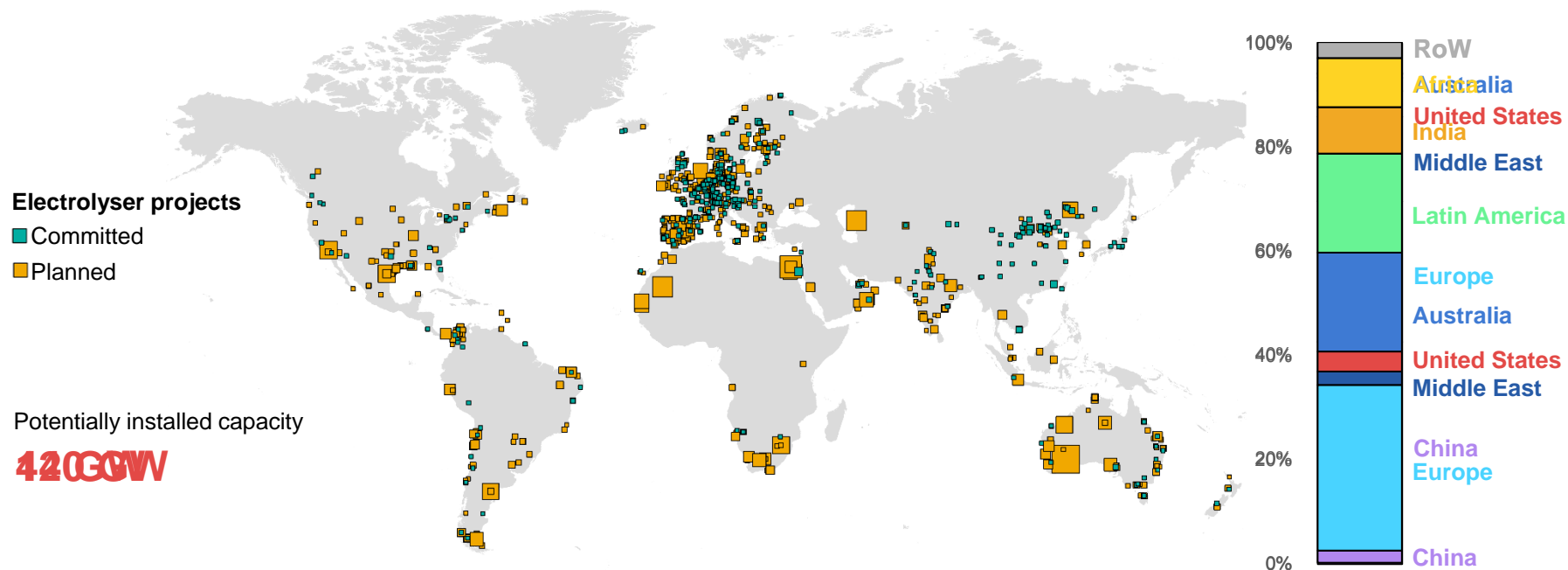
2024

Upcoming: focus impacts on
international shipping of clean
energy technology supply chains

- Hydrogen momentum is strong thanks to three drivers: decarbonisation, energy security and industrial strategies
- Production can increase massively but faces cost challenges
 - Number of announced projects growing rapidly
 - Slow implementation of government support schemes delaying investment decisions
 - Increasing equipment and financial costs putting projects at risk
- Efforts to stimulate demand are not sufficient to meet climate ambitions
 - Limited policy action on demand creation
 - First off-take agreements small and non-binding

Geographical diversity of electrolyser projects is increasing

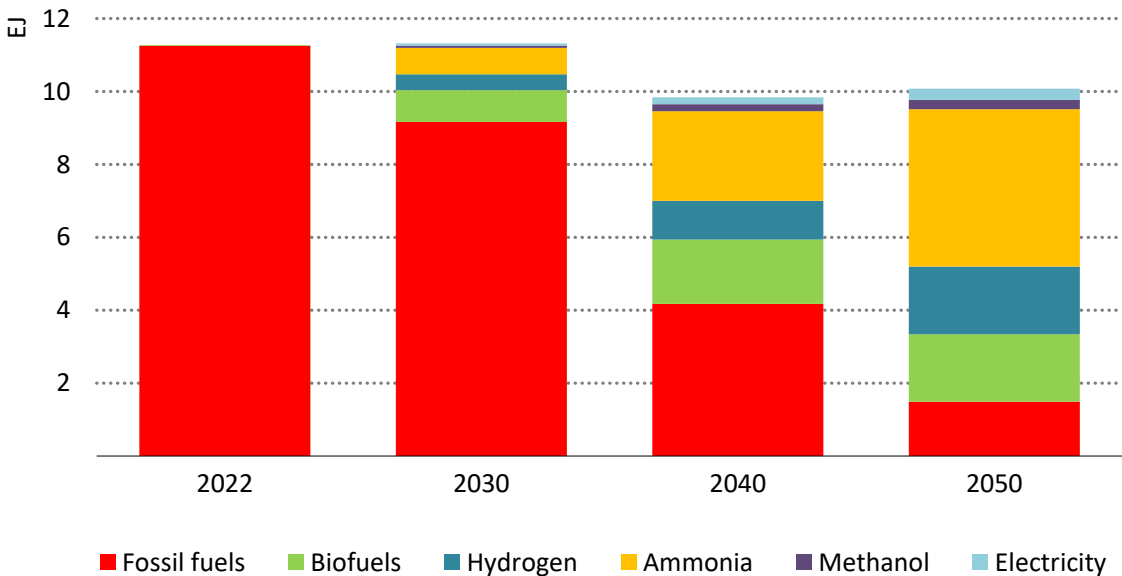
Announced electrolyser projects in 2030



Projects under construction or having reached FID are concentrated in Europe and China, but a growing number of projects are being developed around the world.

Fuel switching is key for achieving NZE emissions reductions

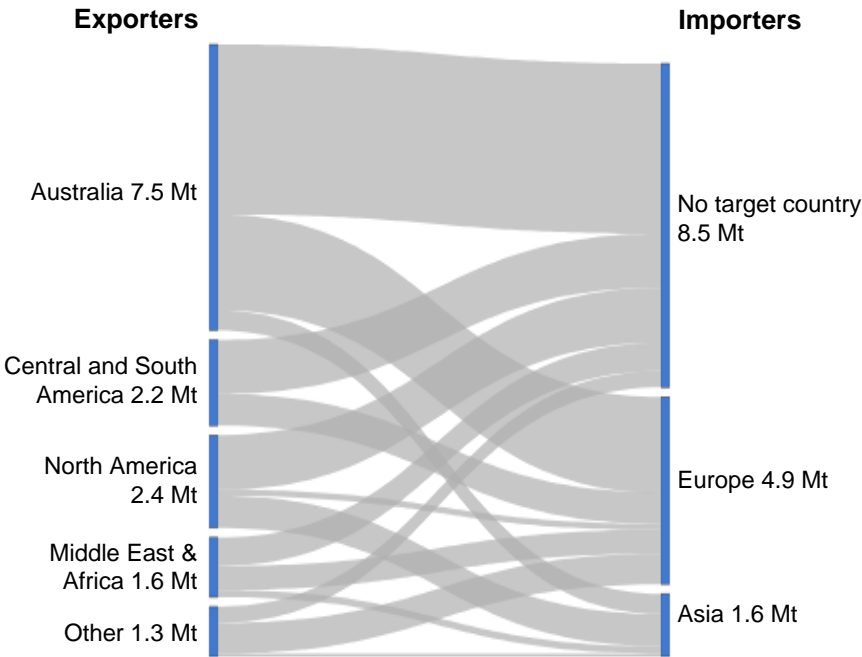
Global energy consumption for shipping in the Net Zero by 2050 Scenario (NZE), 2022-2050



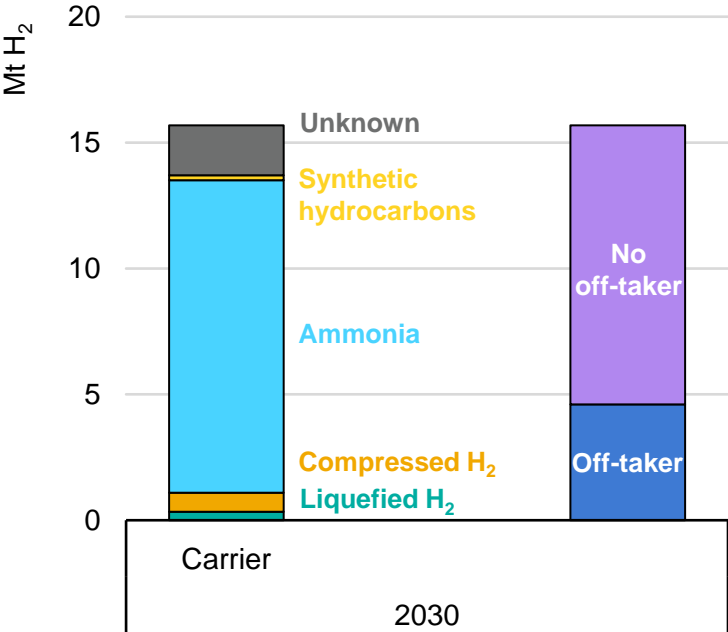
Biofuels are constrained by the availability of sustainable biomass; hydrogen-based fuels are key to decarbonise the shipping sector.

Interest in hydrogen trade is growing, but barriers remain

Announced low-emissions hydrogen trade flows in 2030



Low-emissions hydrogen trade



Planned hydrogen exports could reach 16 Mt by 2030, though almost all projects are at early stages and less than one-third have identified a potential off-taker.

