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Making powerfuels happen – what does it take?

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VICE PRESIDENT
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Statkraft: Europe’s largest producer of renewable power

Own capacity

19 700 MW

61 TWh → **93%** renewable

.....

Third party capacity

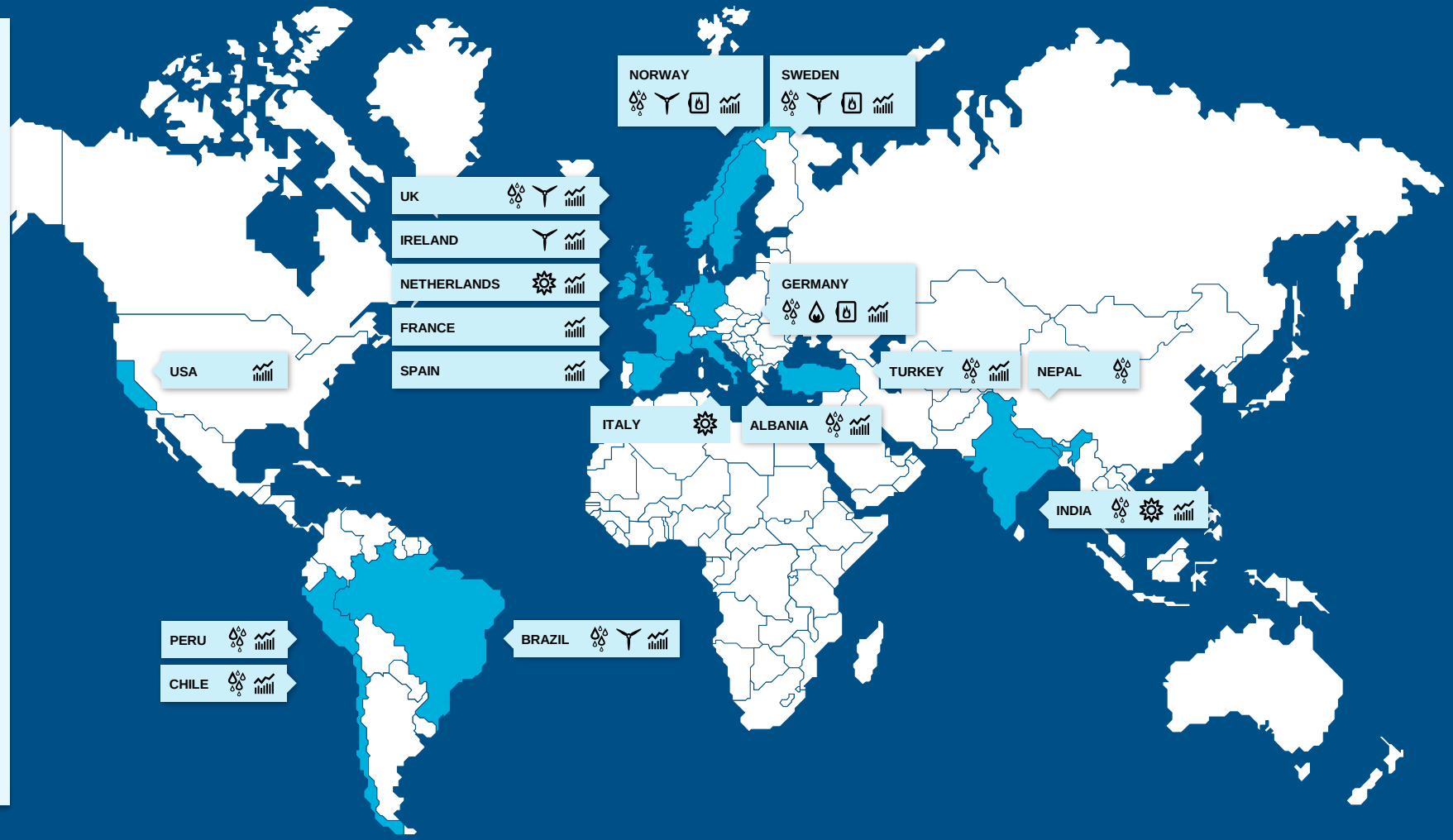
28 000 MW

100 % renewable

.....

Employees

4 000



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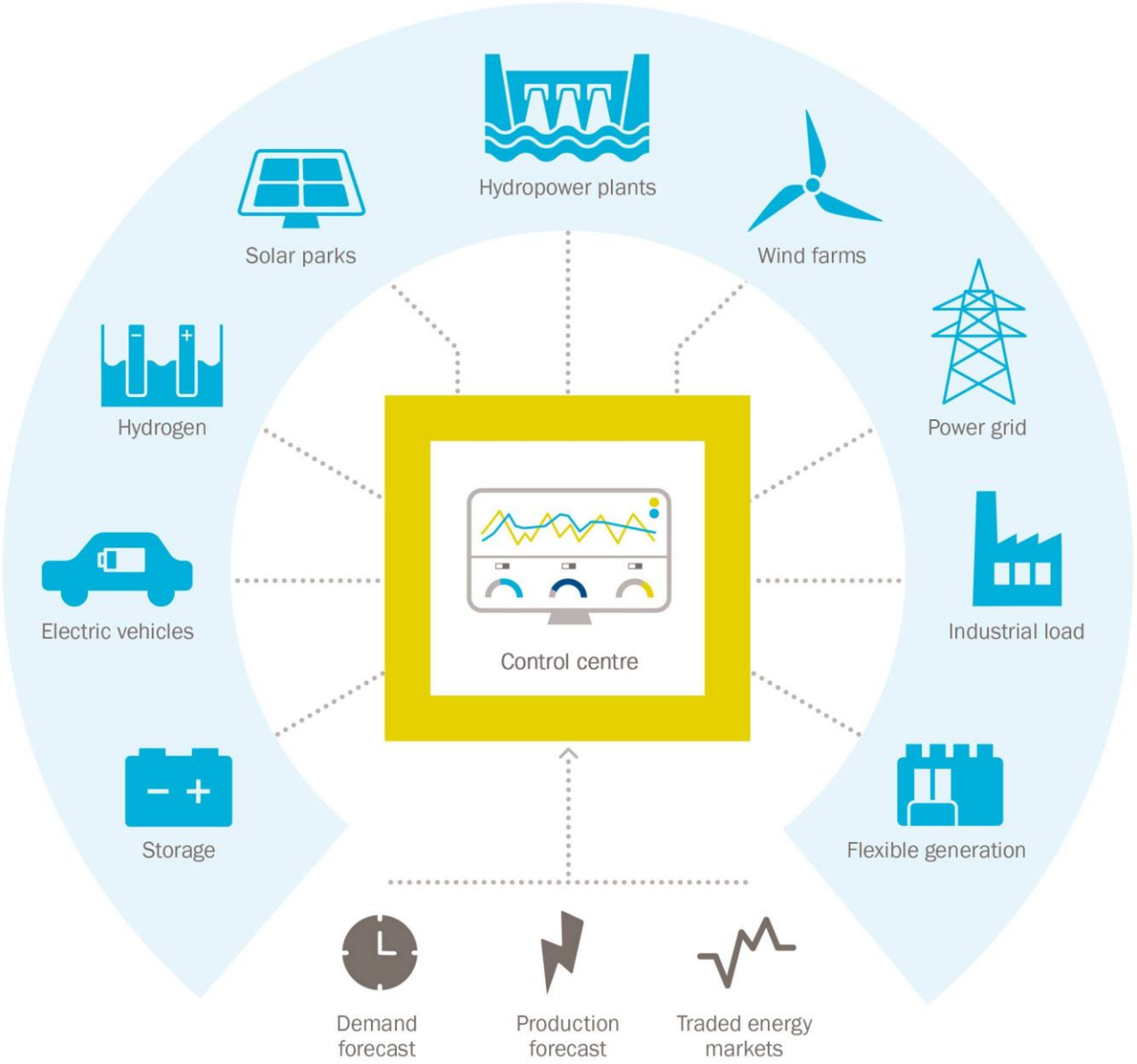
Statkraft German VPP could be used for hydrogen

- Operates own and third party renewable assets
- 23,000 MW across Europe
- Well suited for hydrogen and powerfuels



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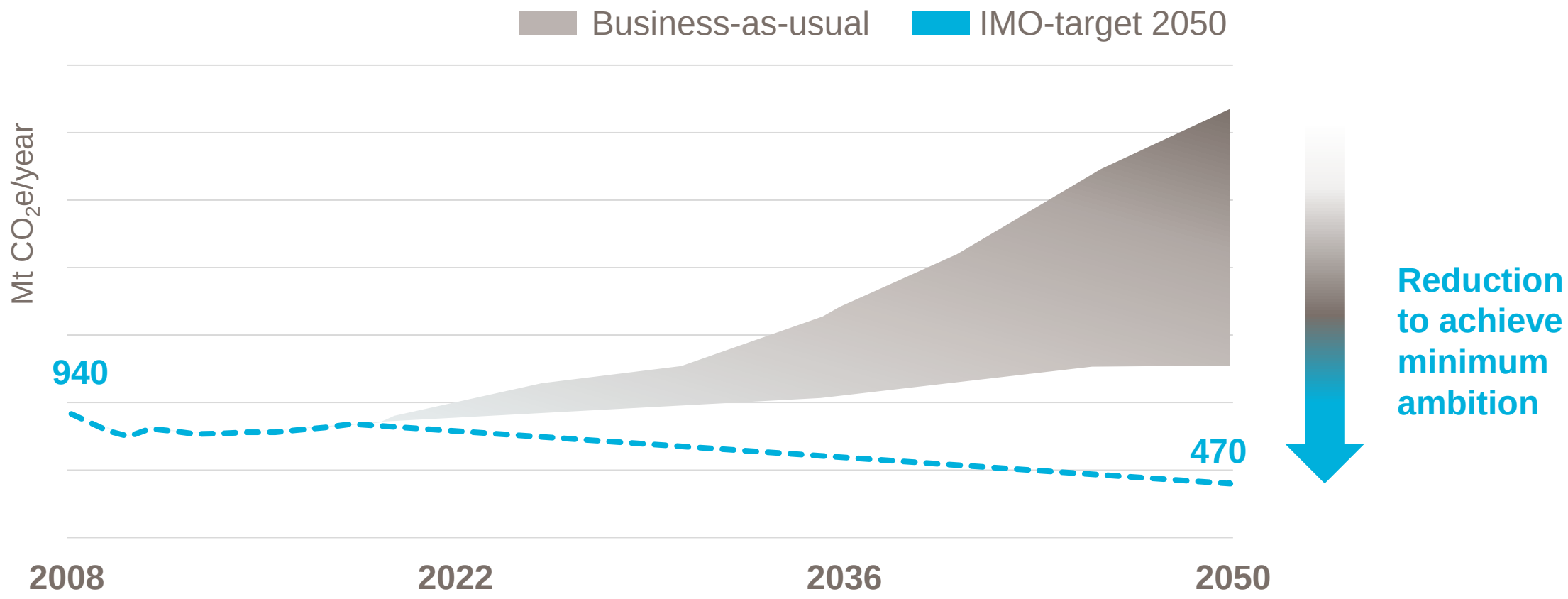
IMO-target of 50% CO_2e-reduction until 2050 not possible to reach without some Zero-Emission ships



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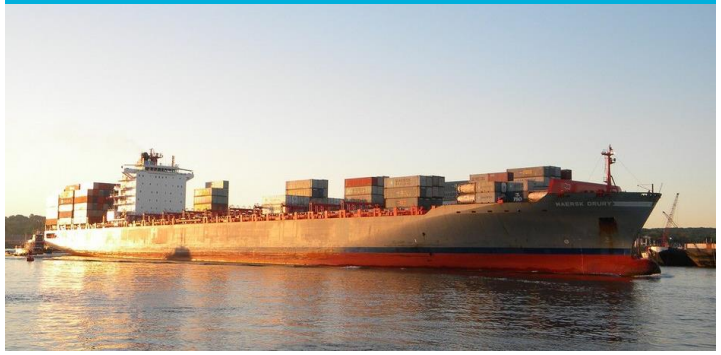
Many technologies can help, LH2 and green ammonia only zero-emission options for long-haul shipping

Batteries

Compressed hydrogen

Liquid hydrogen

Biofuel / LNG



Green methanol

Green ammonia

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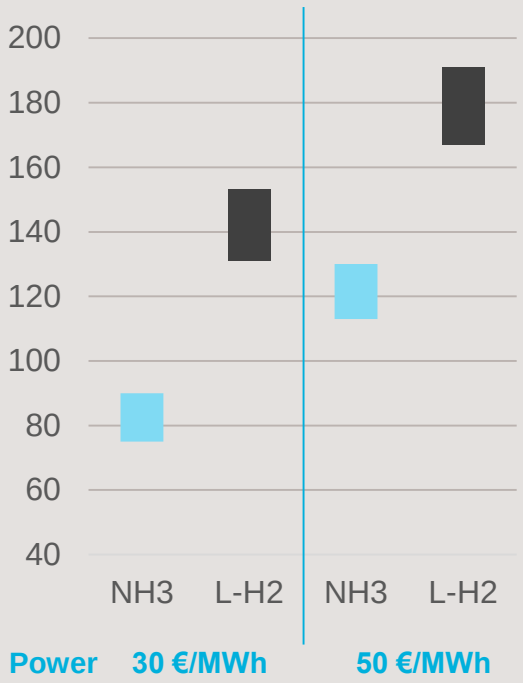
Ammonia:

The cheapest high energy-density, zero emission fuel

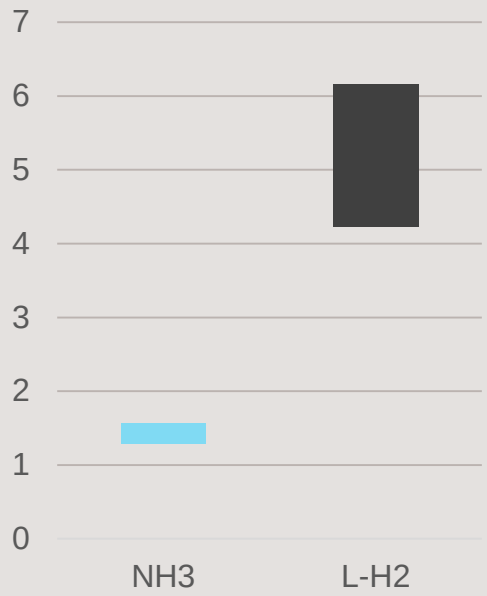
Production cost

Plant gate, EUR/MWh (LHV)



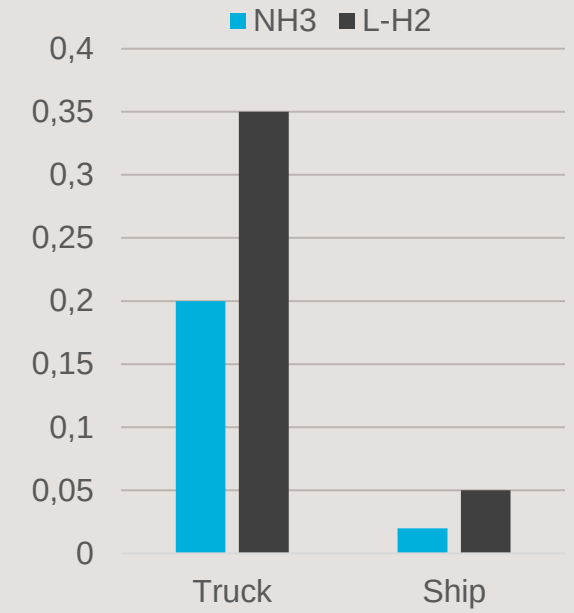
Storage cost

Levelized cost of storage (€/kg)



Transport cost

Cost of transport (€/tkm)



Sources: Statkraft analysis, IHS Markit, Bloomberg New Energy Finance, IEA, US DOE, Sintef

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Green ammonia as long haul shipping fuel

- Relatively easy to handle
- Less safety issues than alternatives
- Existing infrastructure
- Lowest zero-emission fuel cost

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Green ammonia - high potential market

Fertilizer

- Replacing 180 million tons of grey ammonia globally

Shipping

- IMO-targets: global potential for 950 million tonnes
- 0.5-1.3 million tonnes for offshore supply ships in Norway

Export and storage

- Export and store energy
- Difficult to forecast size of exports, current LNG traded market is around 1,000 million tonnes

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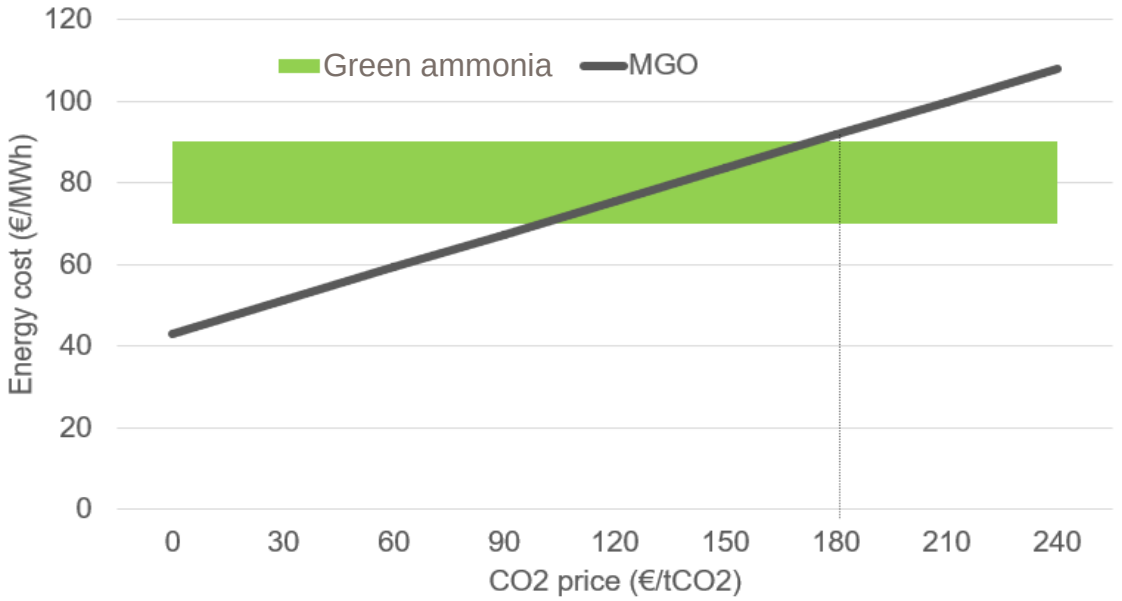
But competition from fossil fuels is strong

- The first commercial sized plant more expensive than next, expensive electrolyzers
- Carbon price of 100-200 EUR/ton might be needed for first projects to compete with grey fuels
- Reduced with scale in green ammonia
- How to bridge the gap?

Fuel cost Marine Gas Oil (MGO) vs green ammonia

Cost levels for commercial sized plant

EUR/MWh with increasing CO2-costs



Source: Statkraft analysis, IEA, BNEF, IHS Markit, Royal Society. Prices shown are in EUR/MWh Low Heating Value

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How can it happen?

- Regulation - require Zero Emission
- Public tendering requirements
- Standards and certification
- Remove extra grid costs like EEG levy
- Capex support, also for electrolysis
- Contracts for Difference
- Many good initiatives in German and EU strategy documents

EU and German strategy plans shows direction

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One of the world’s leading renewable energy companies

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