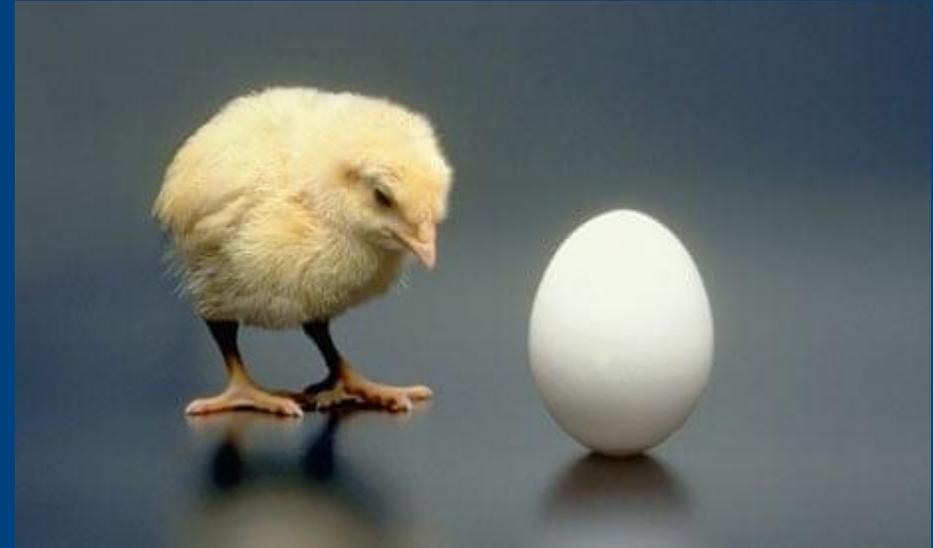


Chicken and Egg

Producing and using hydrogen in Scotland

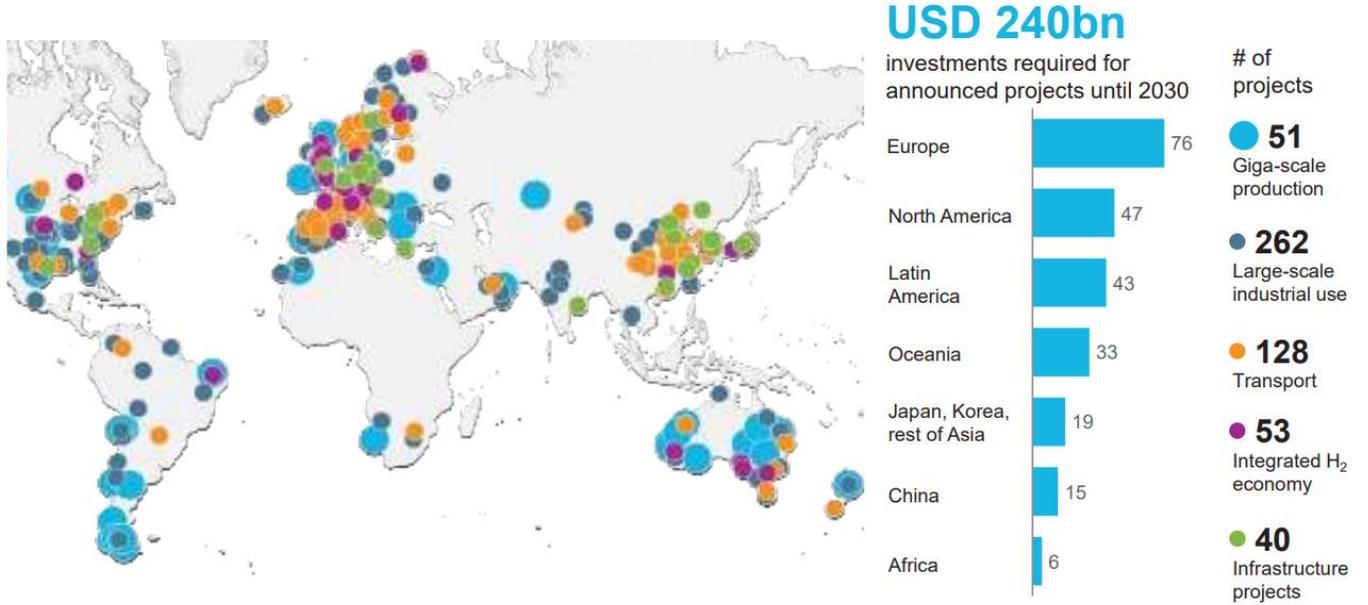
Irina Bonavino

May 2023



1. The supply

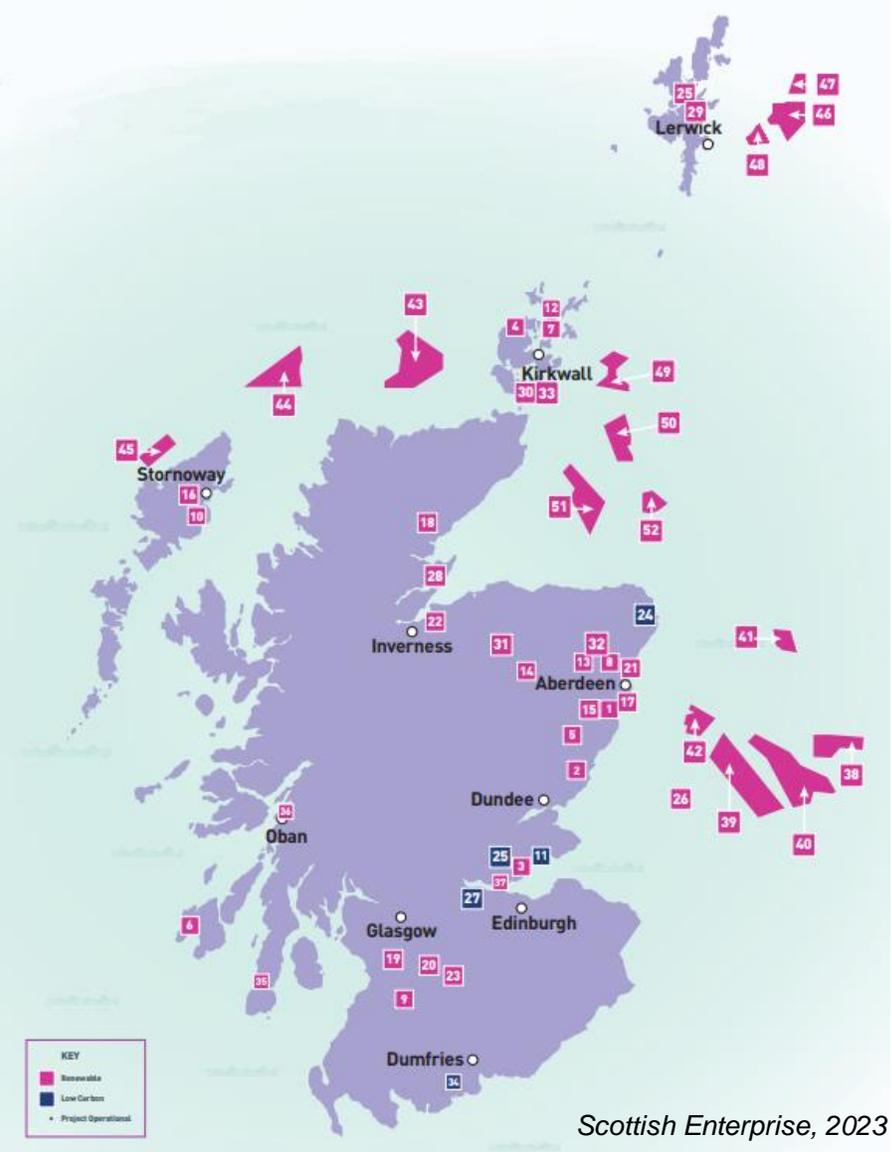
Out of 534¹ large-scale projects worth USD 240 bn announced globally ...



Hydrogen Insights, 2022

1/3 undergoing feasibility and FEED

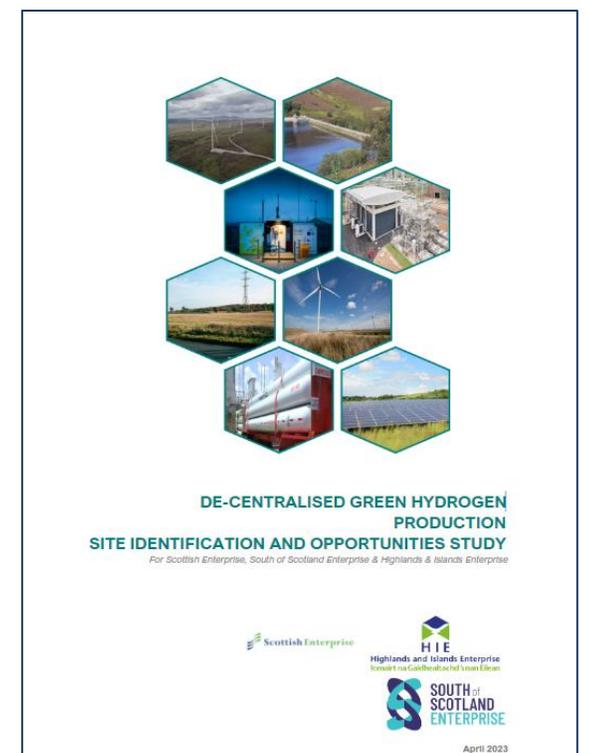
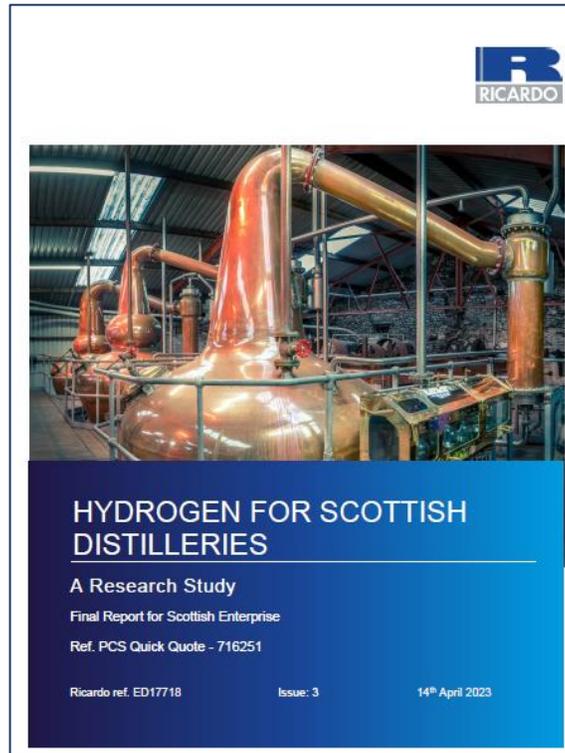
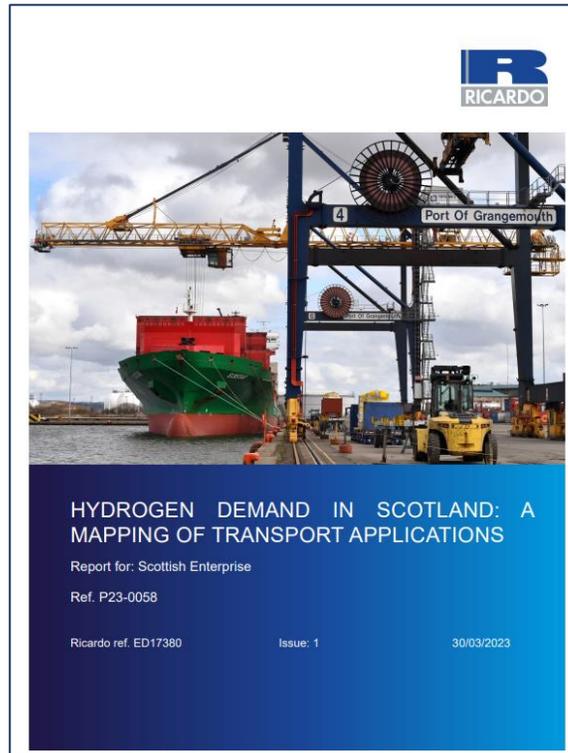
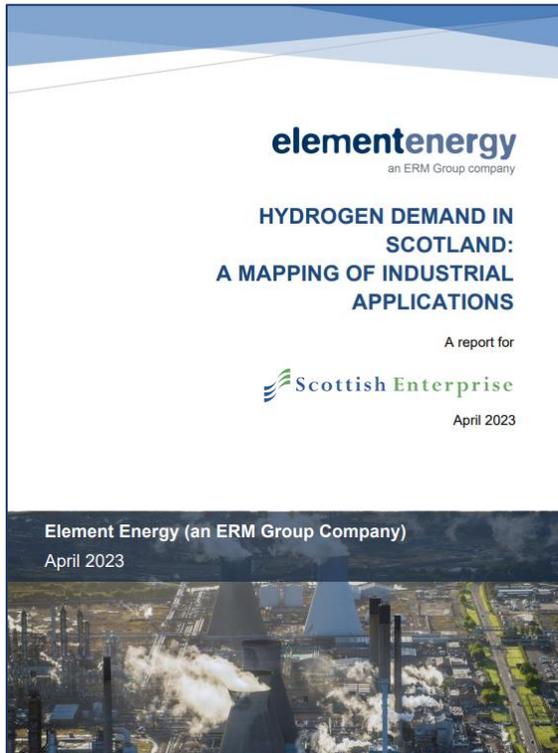
Only ~10% have reached FID



Scottish Enterprise, 2023

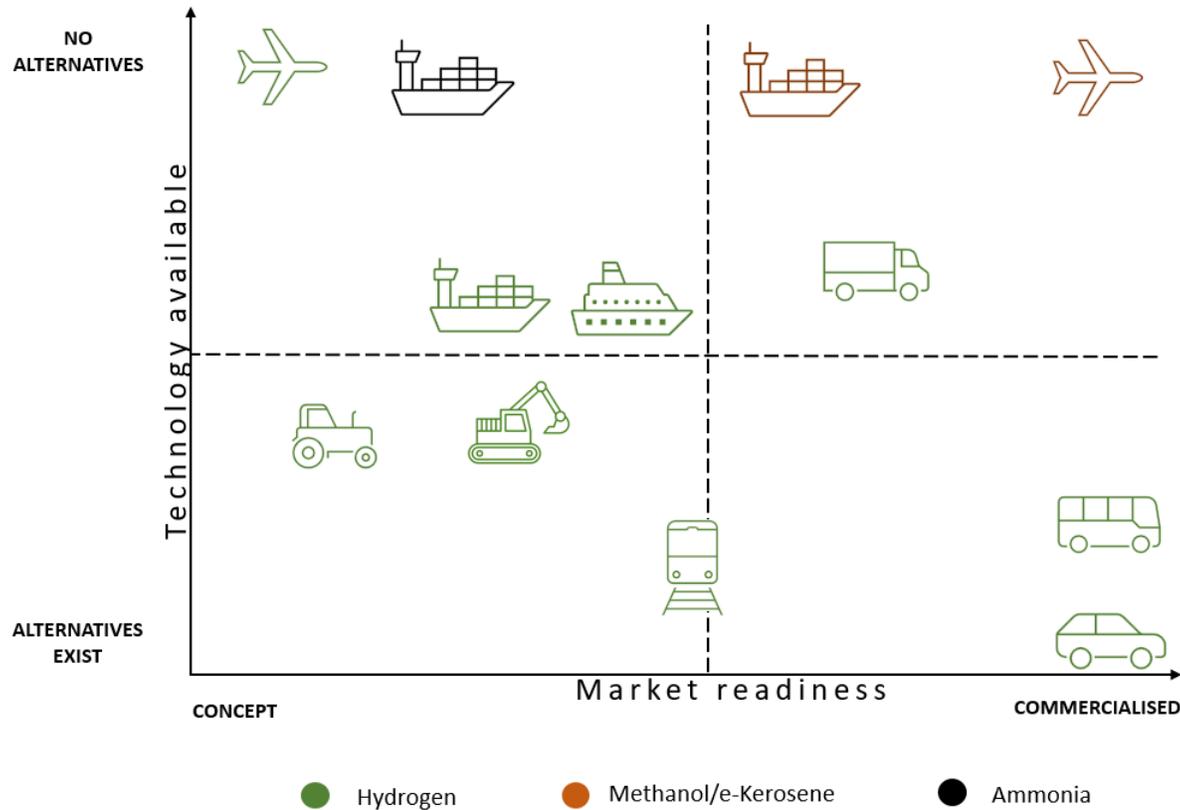
Our new reports

- Describe, quantify and map the potential hydrogen offtake in Scotland
- Locate suitable sites for decentralised production, with constrained energy generation



Sectoral adoption

Transport

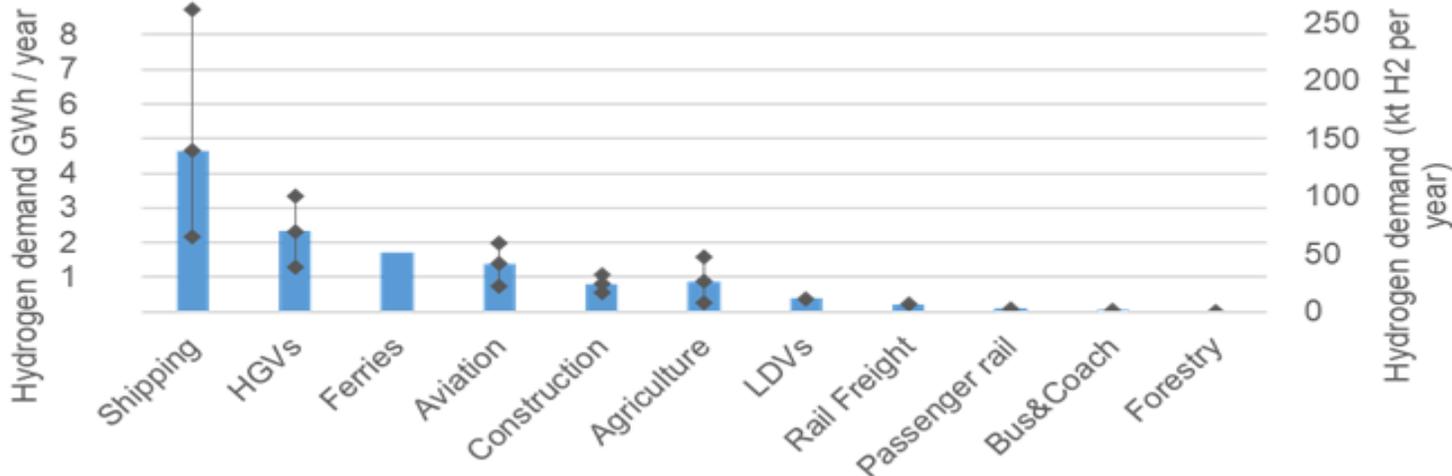


Industry

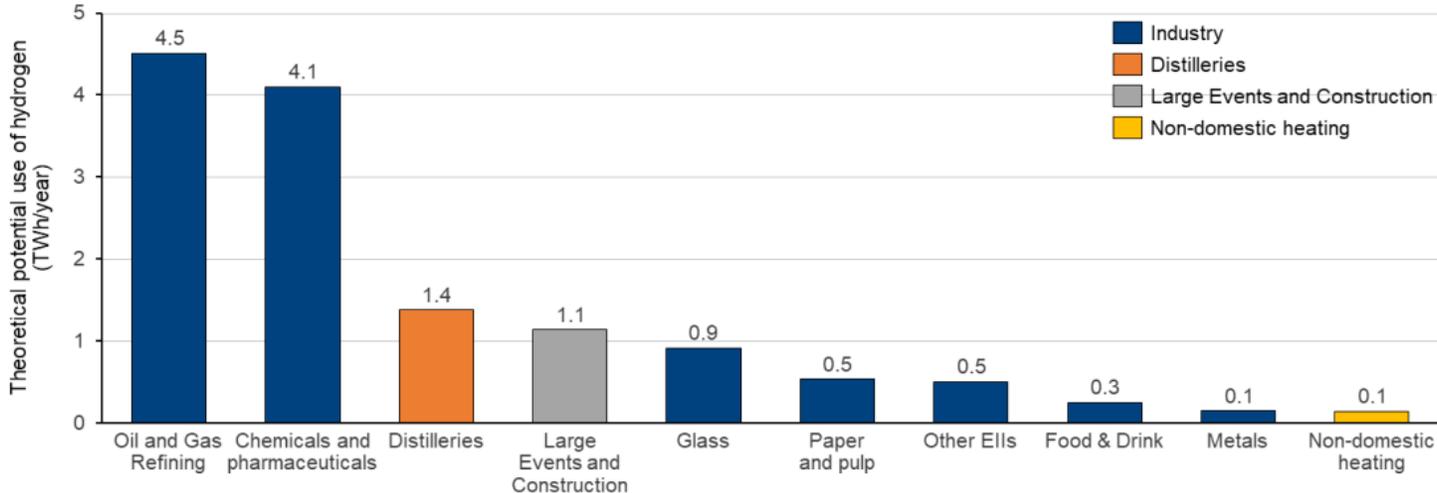
Sector	Alternative technologies	Likelihood in Scotland	TRL (1-9)
Chemicals & pharmaceuticals	Electrification, CCUS	High	4-8
Oil and gas refining	CCUS, electrification	High	5-8
Glass	Electric furnaces	High	6
Large Events and Construction	Electrification, Biofuels	Med.	9
Non-residential heating	Electrification	Med.	7-9
Distilleries	Electrification, Biomass	Med.	7
Paper and pulp	Biomass, Waste-derived fuels	Med.	4-8
Fertilisers	Electrification, alternative fuels	Low	7-9
Power Generation	CCUS, Renewables	Low	8
Food and drink	Electrification	Low	4-8
Cement	Biomass, CCUS	Low	4

Demand estimates 2045

Transport
12.5TWh/year



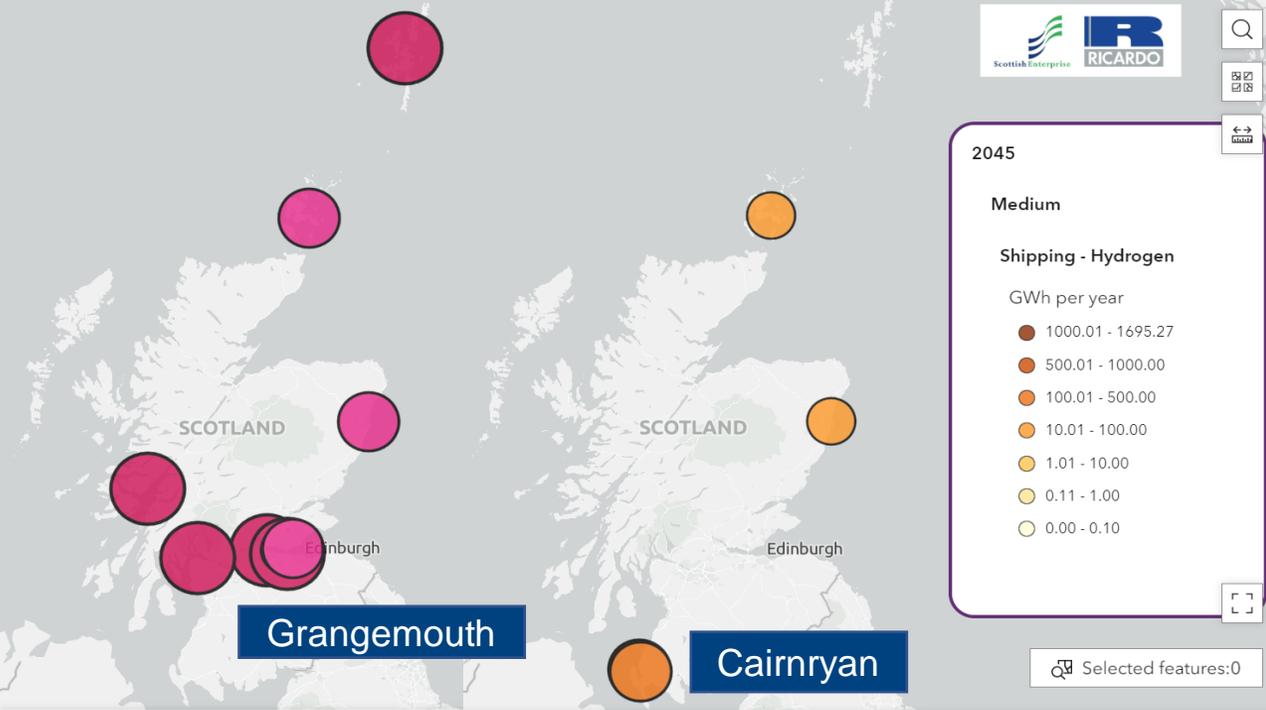
Industry
13.5TWh/year



Mapping of demand

Transport

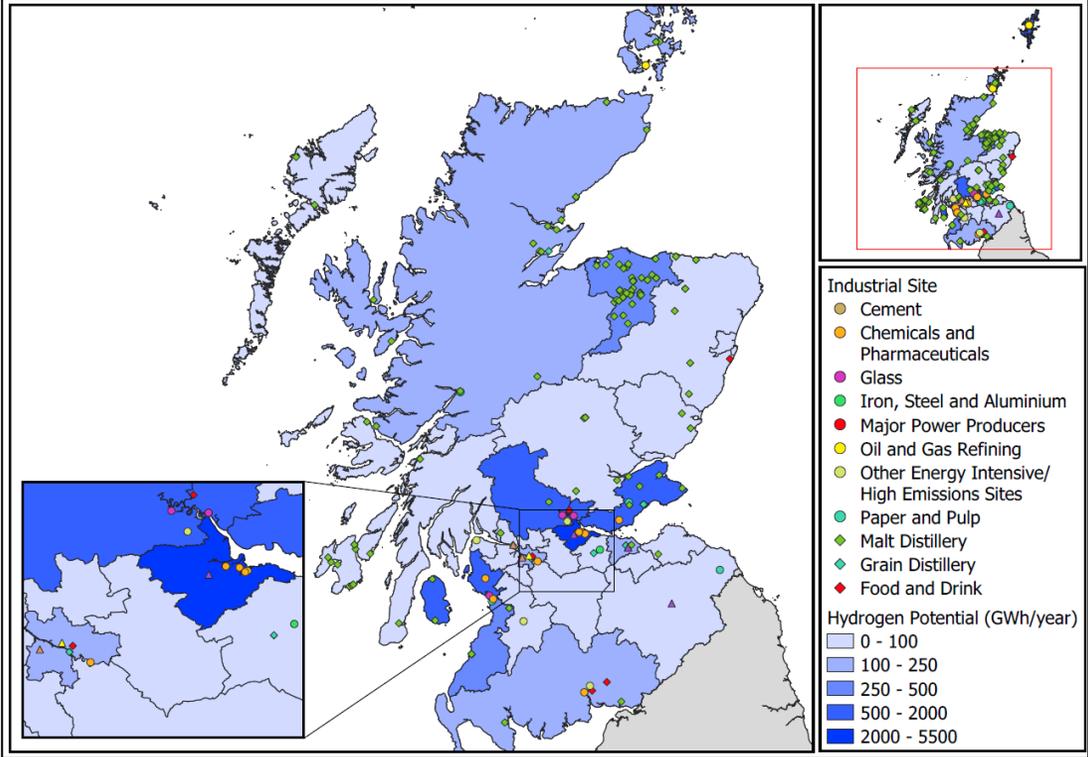
e.g. Shipping demand



Ammonia

Hydrogen

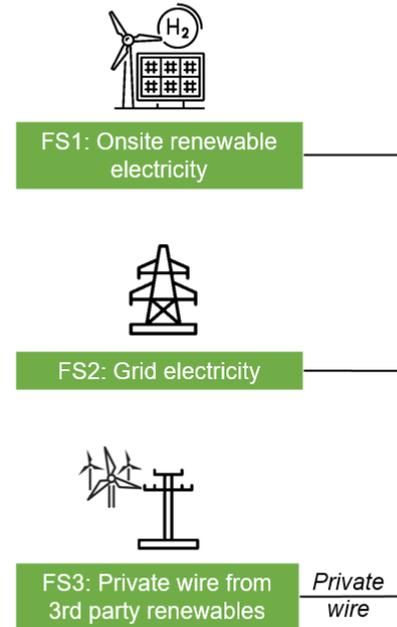
Industry



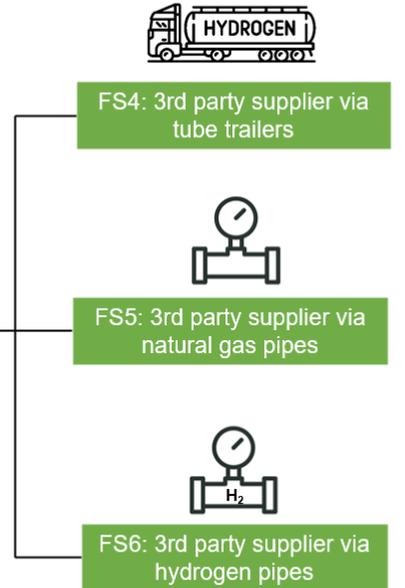
Challenges for offtakers - Distilleries

- Multiple decarbonisation options, some more established.
- Uncertainty on fuel costs
- Technology not yet as widely available
- Detailed studies required per site - 6 different supply archetypes
- New market = regulations can be unclear.
 - Safety, emissions reports, storage
- Funding currently more available for innovation & production than offtake

Onsite Hydrogen Production



3rd Party Hydrogen Supply



Addressing barriers

Uncertainty will decrease with UK hydrogen certification, new pilots and policy decisions (e.g. blending, Scottish Cluster)

Highlight production opportunities from curtailed energy

Hydrogen Hubs can create plans and use local powers

Incentivise the largest and most likely sectors to consider hydrogen via targeted Capex funding, tech innovation

Review regulations across value chain

Empower decision-makers and inform the market



Thank you