



Scotland

The Hydrogen Coast & Islands

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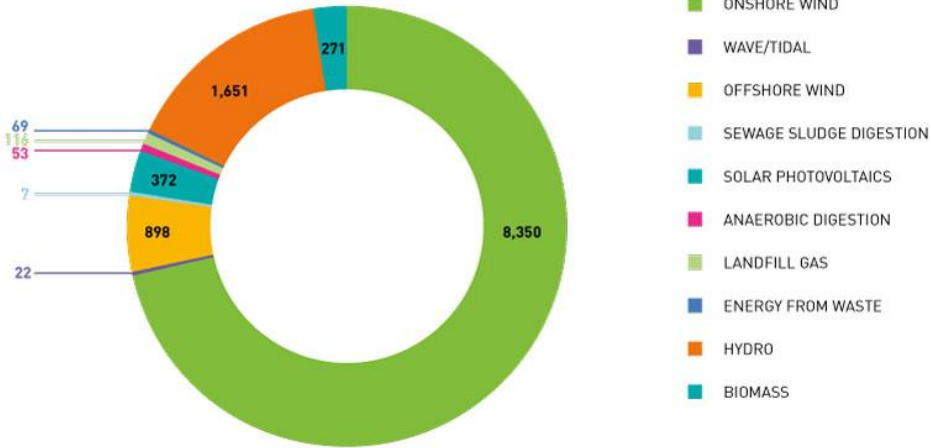
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University of Strathclyde (UK)

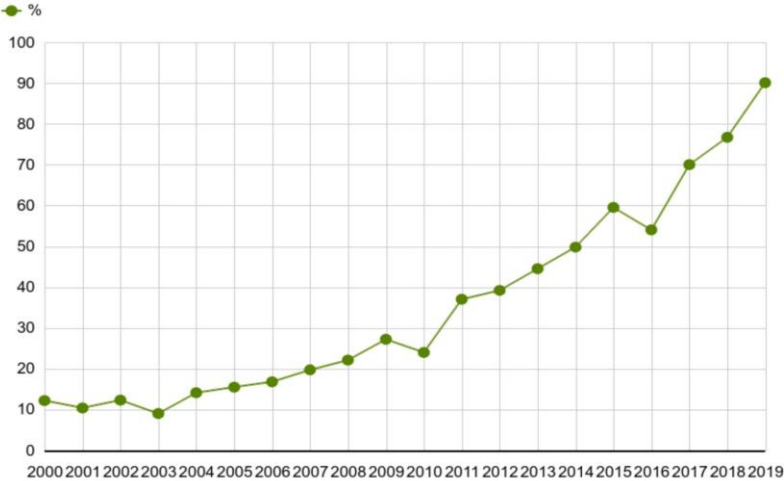
Scotland and Renewables

CURRENT INSTALLED CAPACITY BY TECHNOLOGY Q3 2020(MW)

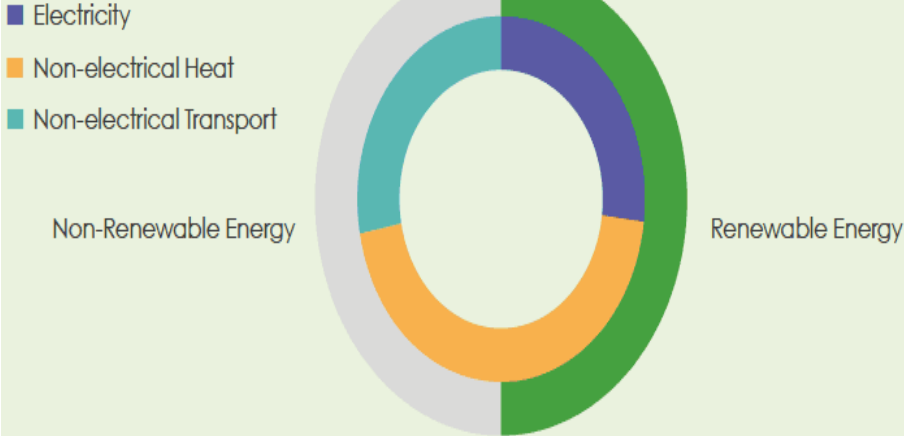
TOTAL = 11,814MW



Share of renewable electricity



Renewable Energy Demands:



Hydrogen Nation

- Scotland's island and rural locations have access to **vast renewable resources**. Despite this, they suffer from high fuel costs resulting in high levels of **fuel poverty**.
- The hydrogen sector will receive government funds of **£100 m** over the next five years to support a green recovery and Scotland's just transition to net zero emissions.
- Scotland is set to become a leading hydrogen nation, with an ambition to generate **5GW** of renewable and low-carbon hydrogen by 2030 – enough to power the equivalent of **1.8 m homes**. By 2045 this figure is estimated to 25GW.
- Economic impact research suggests the industry has the potential to be worth up to **£25 b** a year to the Scottish economy by 2045.
- Scotland aspiration is to become to become the producer of **lowest cost hydrogen** in Europe by 2045.

RENEWABLE GENERATION



STORAGE

A mix of storage is required to ensure demand is met with further storage at port facilities.



ELECTROLYSIS



All hydrogen is green, production is primarily from large offshore electrolyser platforms producing hydrogen from large offshore wind farms.

TRANSMISSION PIPELINES



A high pressure hydrogen transmission network transports hydrogen to distribution centres around Scotland and for export.

TANKER TRANSPORT



Hydrogen demand points are either directly connected to the network or are supplied by road tanker from regional distribution centres.

Hydrogen is used in industry as a feedstock and in industrial heating. It is used in a limited way in power generation.



Hydrogen becomes the primary fuel in the transport sector, hydrogen FCVs are the most common type of vehicle. EVs remain important for smaller vehicles.

A small amount of hydrogen is used in peaking plants.

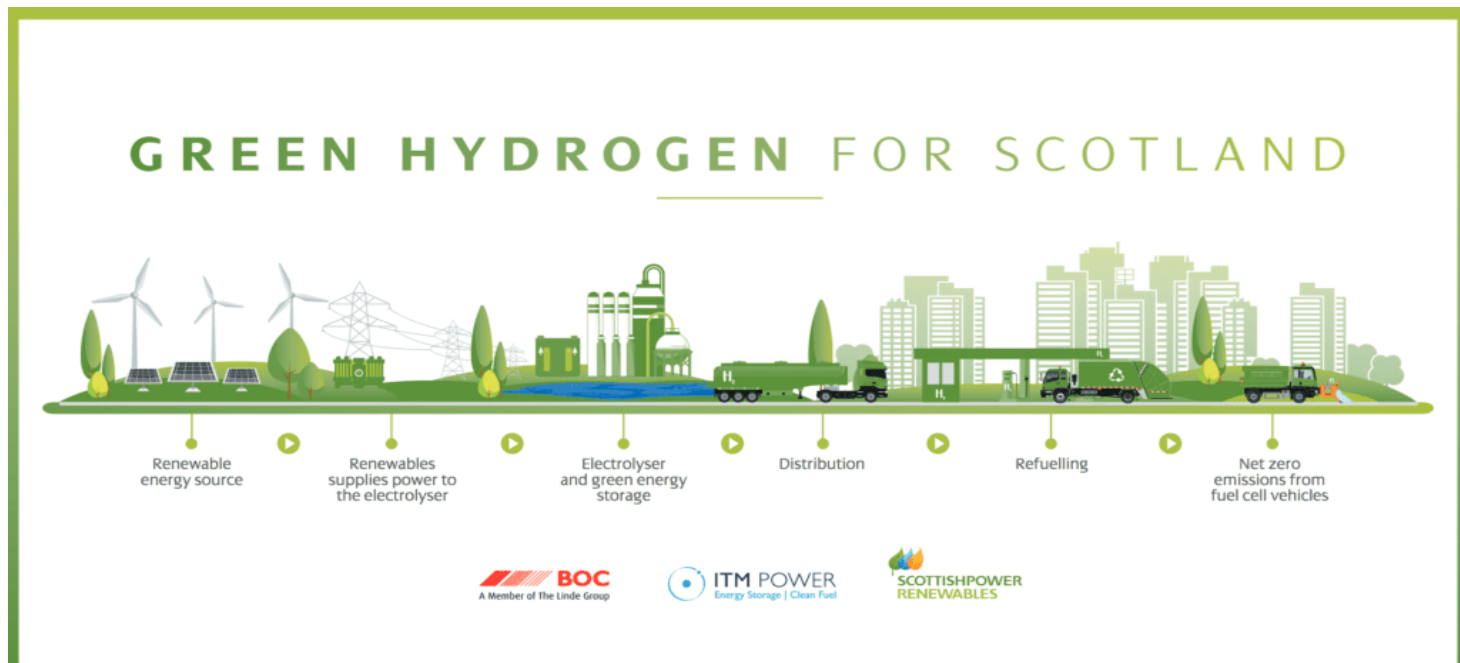
EXPORT TO EUROPE



94 TWh

Green Hydrogen for Glasgow

- A partnership of ScottishPower Renewables, BOC – a Linde company and ITM Power
- They offer an ‘end-to-end’ market solution for reducing vehicle emissions through the provision of green hydrogen (**wind** and **solar** power)
- The partnership’s first project, ‘Green Hydrogen for Glasgow’ (10 MW), is designed to provide **carbon-free transport** and clean air for communities across the city, which wants to become the **first net-zero city in the UK by 2030**.



Orkney

Population 22,100 (2017)



Aberdeen

Population: 207,932 (2011)

Fife

Population: 371,910 (2018)

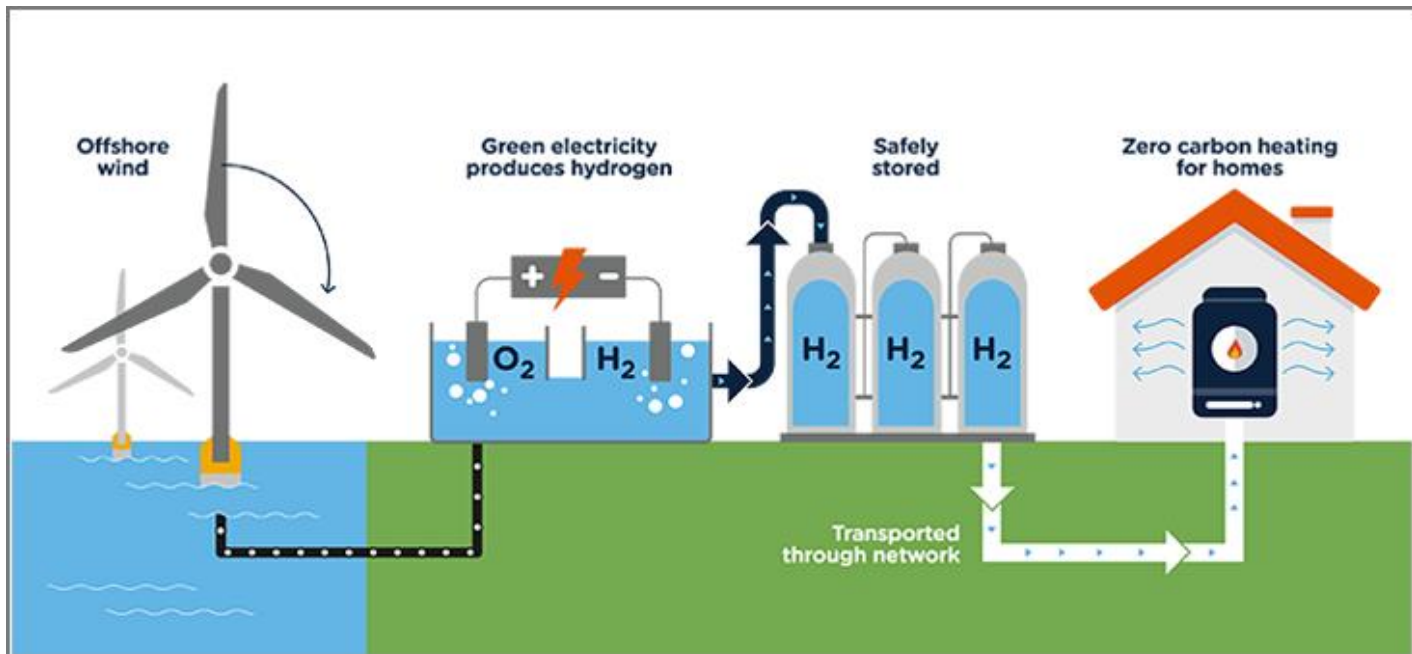


Aberdeen hydrogen projects

- The **£19 m** project deploys ten **fuel cell buses** on operational routes throughout the city. Currently conventional electricity is used but will be replaced by renewables.
- Aberdeen City Council is now seeking long-term investment and development partners for a **£250 m** hydrogen infrastructure development programme across **housing, heating and transport sectors**.
- Aberdeen has been selected as the home for the “**world’s first**” **offshore floating facility** to produce green hydrogen.
- The pioneering **Dolphyn project** will sit 15km off the coast
- **£3 m** UK Government funding, with a capacity of **4GW**, enough to sufficiently heat more than 1.5 million UK homes with no carbon emissions by 2034.

H100 Fife

- A **world-first** green hydrogen-to-homes heating network financed with **£25** public money
- This network in the coastal area will bring 100% renewable hydrogen into homes in **2022**, providing zero-carbon fuel for heating and cooking.
- The network will heat **1300** local homes using clean gas produced by a dedicated **electrolysis plant**, powered by a nearby **offshore wind turbine**.



Surf 'n' turf - Orkney

- On one of the islands electricity from **wind** and **tidal** turbines generates hydrogen.
- The gas is compressed and transported to fuel cell facility in the capital of the area to make electricity and heat.
- Surf 'n' Turf attracted **£1.46m** of support from Local Energy Scotland and the Scottish Government's Local Energy Challenge Fund.
- We work closely with the European Commission's Fuel Cell and Hydrogen Joint Undertaking, who have funded the **€10.9m** BIG HIT project to build upon Surf 'n' Turf's hydrogen network.
- BIG HIT: Building Innovative Green Hydrogen Systems in Isolated Territories - EU-funded (Horizon 2020)

BIG HIT PROJECT

- BIG HIT will create a hydrogen territory in the Orkney Islands of Scotland by implementing a fully integrated model of hydrogen production, storage, transportation and utilisation for heat, power and mobility.
- Renewable electricity generated on the islands is used by electrolyzers (**1.5 MW**) to produce hydrogen (**50 tn/y**), by electrolysis of water.
- This hydrogen is then stored as high pressure gas in the tube trailers, which can be transported to mainland Orkney.



Whisky gets into the spirit of building back greener

£10 m fund to help UK's world-famous distilleries go green by switching to low carbon fuels such as hydrogen.

