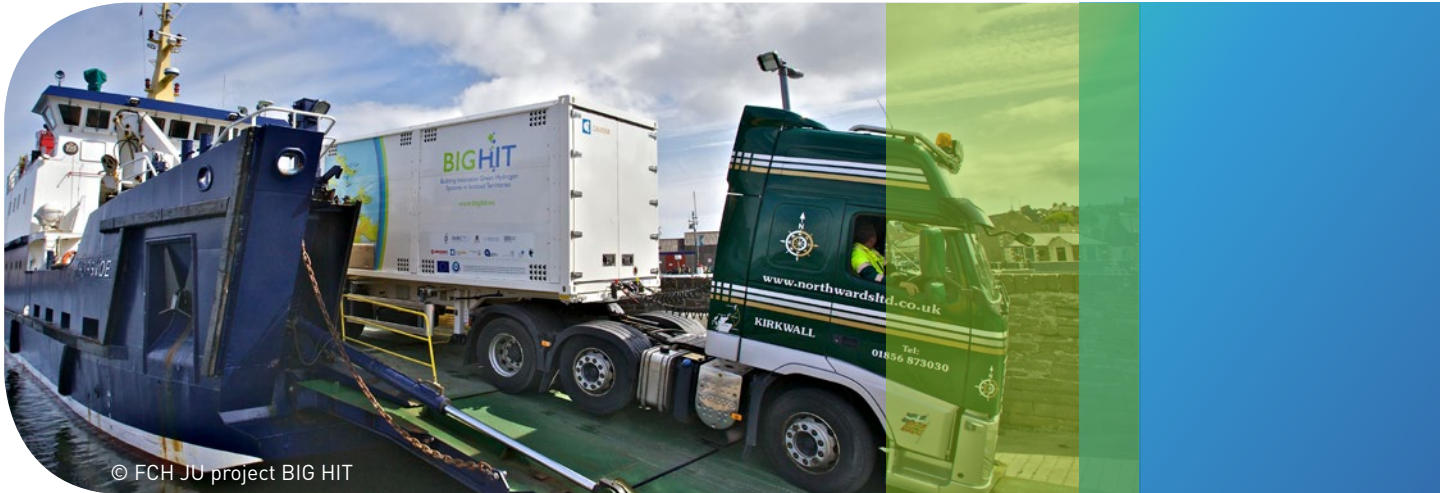




**Making an impact
on the clean
energy transition**

ENERGY

HYDROGEN AND RENEWABLES: A MODEL FOR DECARBONISATION



© FCH JU project BIG HIT

Zero-waste energy

With more than 1 000 wind, wave and tidal energy installations serving 10 000 households, the Orkney Islands have one of Europe's highest levels of renewable energy use. In fact, so much renewable energy is generated that it can exceed the capacity of the electricity grid: over 30 % of the potential annual output of wind turbines on the islands of Shapinsay and Eday is being lost. The FCH JU-funded BIG HIT project is implementing an innovative solution. Renewable energy is powering electrolyzers to generate hydrogen. This green hydrogen fuels vehicles, powers ferries while docked and heats buildings, including a school and community centre.

Sharing and inspiring

The project's ultimate goal is to create the world's first replicable 'hydrogen territory' whereby low-carbon energy solutions are enabled by renewable power sources resulting in a fully integrated model of hydrogen production, storage, transportation and utilisation for heat, power and mobility. The model's replication potential for isolated territories will be key. Dissemination and knowledge sharing will be achieved through a 'remote territories platform' to showcase and support upscaling this solution for larger territories. Thus, the project's impacts will go far beyond the Orkney Islands, inspiring other regions to transition to a low-carbon future powered by renewables and supported by hydrogen.

Scotland's Orkney Islands are a test case for a low-carbon future. An FCH JU project is converting excess electricity from renewables in the remote archipelago into clean hydrogen to power vehicles, buildings and ships, demonstrating a realistic alternative to fossil fuels and inspiring other European regions.



KEY ACHIEVEMENTS

50 TONNES

of hydrogen will be produced each year using excess energy from renewables

1 MW

electrolyser installed on Shapinsay Island to convert excess electricity into hydrogen

0.5 MW

electrolyser installed on Eday Island to convert excess electricity into hydrogen

75 kW

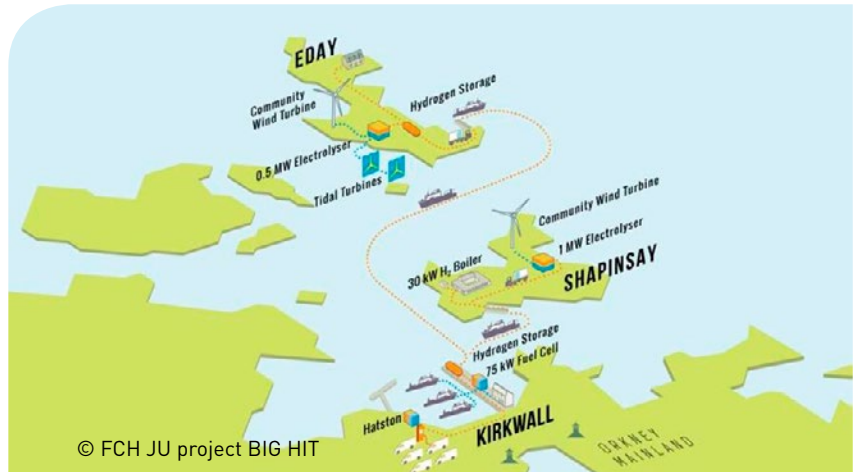
hydrogen fuel cell in Kirkwall to supply heat and power for several harbour buildings, a marina and three ferries, when docked

5

hydrogen fuel-cell vehicles operated by the Orkney Islands Council

30 kW

hydrogen catalytic boiler installed at a primary school on Shapinsay Island



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OVERCOMING GRID-CAPACITY CONSTRAINTS

By harnessing excess renewable energy that would otherwise be wasted due to grid constraints to generate green hydrogen for heating buildings and fuelling vehicles, a hydrogen territory is being created in the Orkney Islands which can be replicated elsewhere.

A REPLICABLE ENERGY MODEL

The FCH JU collaborative project BIG HIT brings together 12 European partners aiming to learn from the results and apply a similar energy model locally. **The goal?** To create the world’s first replicable hydrogen territory that demonstrates the feasibility of using excess renewable energy to generate hydrogen for other applications. **Key results?** A novel low-carbon energy solution enabled by renewable power sources and a fully integrated model of hydrogen production, storage, transportation and utilisation applicable to other regions worldwide. Locally produced hydrogen can contribute to a region’s energy independence, and boost local skills, jobs and economic growth, while reducing pollution and improving quality of life.

IMPACT

2.7 GWh / YEAR

conversion of curtailed wind and tidal energy into hydrogen

330 TONNES/YEAR

reduction of CO₂-equivalent emissions

EUR 2.5-3 / kg

forecast cost of green hydrogen under optimised conditions

12

partners from across Europe participating in BIG HIT



www.fch.europa.eu/page/fch-ju-projects
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A partnership dedicated to clean energy and transport in Europe