

The European Marine Energy Centre (EMEC)

EMEC is a not-for-profit innovation catalyst that facilitates a R&D ecosystem to demonstrate, test and deploy new sustainable technologies including green hydrogen. The organization has to date been involved in 18 hydrogen innovation projects in collaboration with companies working across production, storage, transportation and use in heat, power and transport. Notably, EMEC achieved the world's first tidal generated hydrogen plant in partnership with tidal energy firms, Orbital and Torcado.

Key Capabilities / Centres	Descriptions
Test and Demonstration Facilities	EMEC works with technology developers to test and demonstrate new technologies across the hydrogen value chain. The organization's hydrogen facilities include a fixed onshore hydrogen production plant in Eday, redeployable hydrogen production and storage assets, and mobile solutions for hydrogen transport and refuelling. In fulfilling a closed loop system to demonstrate hydrogen end use, EMEC also operates a fuel cell facility at Kirkwall Pier and has installed a combined heat and power unit at Kirkwall Airport intended to demonstrate the use of hydrogen in heat and power.
Technical and Business Services	EMEC works as a collaborator between project developers and regulators to support regulation and guidance development in the hydrogen space. The organization offers services in review and analysis of H&S regulation and regulatory feasibility assessments. In addition, EMEC also conducts technical feasibility studies, techno economic assessments and project impact assessments, with emphasis on socio-economic and environmental facets. EMEC can also offer technical advice and conceptual design for hydrogen demonstrators.
Collaboration Hub	EMEC aims to act as a focal point in the Orkney Islands to enable local stakeholder engagement, leveraging its network of private and public partners in the marine and hydrogen energy sectors.

Value Chain Areas	Testing & validation	Pilot manufacturing	Digital tools & simulation	Open innovation spaces	Skills development
Production	✓	✓	✓	○	○
Networks	○	○	✓	✓	○
Storage	✓	✓	✓	✓	✓
Transport	✓	✓	X	○	○
Industry	X	X	X	○	○
Power	✓	✓	X	○	X
Heat	X	X	X	X	X

*Tick = yes, ○ = potential, X = no

Collaboration opportunities

EMEC offers testing and demonstration facilities and various technical and business services in the hydrogen R&D ecosystem:

- Green hydrogen supply.
- A dedicated hydrogen plant and laydown area for equipment.
- Access to data interfacing with deployed technology.
- Hydrogen end use demonstration facilities (fuel cell and CHP).
- Technical, socio-economic and environmental impact assessments.
- Regulation development support services.
- Collaboration hub to enable stakeholder engagement.

Centre location



Hydrogen case studies

- **Surf n Turf (2015-2017) & BIG HIT:** Orkney's first project on hydrogen production from wind and tidal power using a 500kW electrolyzer. This pilot was followed by the project in Shapinsay, which demonstrated an integrated approach of hydrogen production by wind power, storage, transport and usage in heat and mobility.
- **SHYLo (2022-2024):** EMEC is supporting trials on demonstrating the effectiveness of H2GO Power's modular 1MWh solid state hydrogen storage system at utility scale using H2 produced at its Eday tidal test site.
- **CMDC Projects e.g SHYLO:** EMEC has lead and supported on a number of Maritime decarbonisation projects focused on the use of H2 and other low carbon alternatives to decarbonise the maritime sector.

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