



The role of Hydrogen in an Island environment

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EMEC

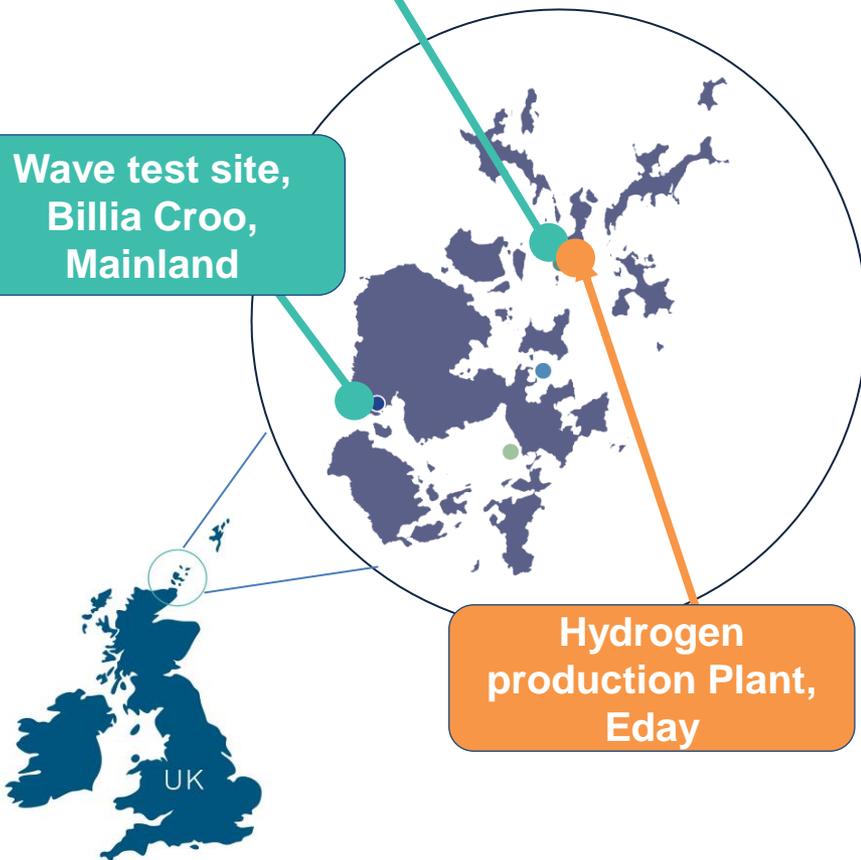
Introducing EMEC



Tidal test site,
Fall of Warness,
Eday

Wave test site,
Billia Croo,
Mainland

Hydrogen
production Plant,
Eday



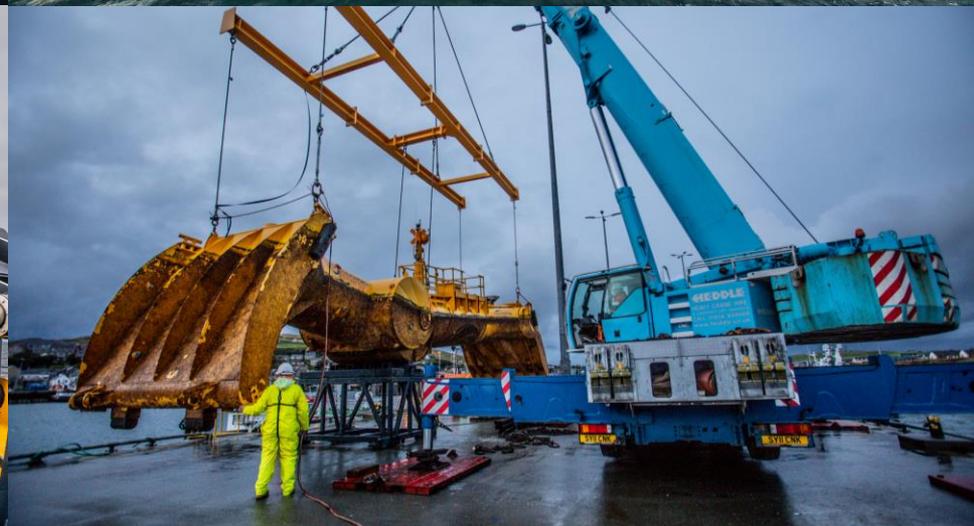
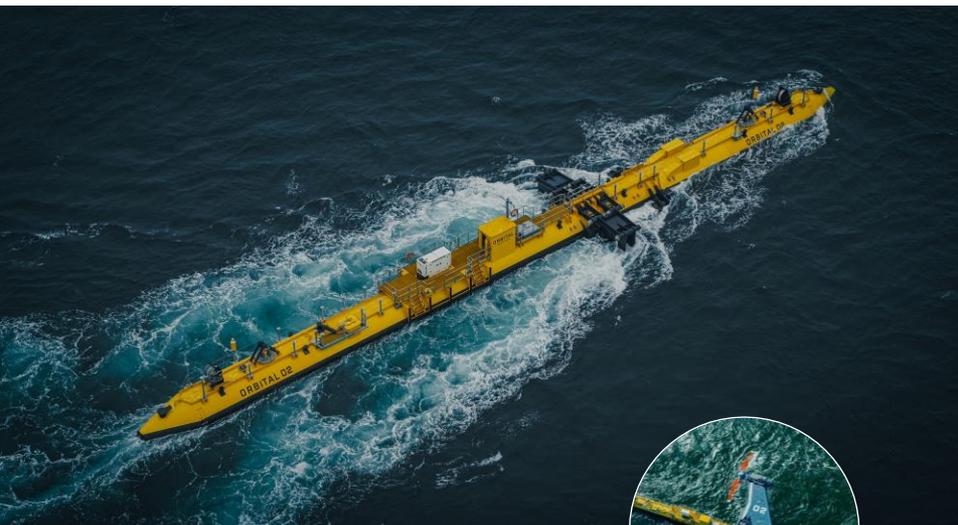
Billia Croo



Eday

Wave and Tidal

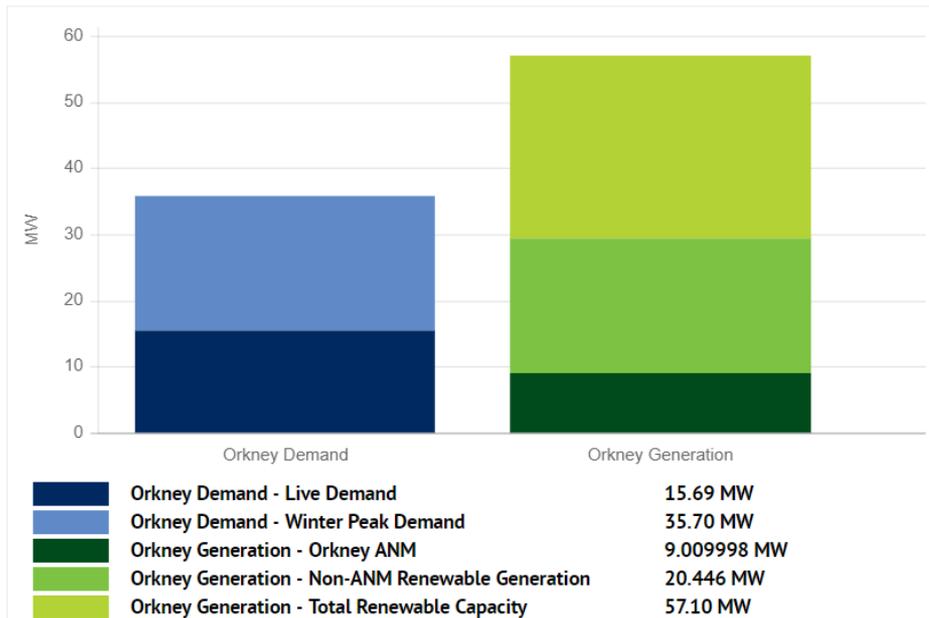
EMEC HYDROGEN





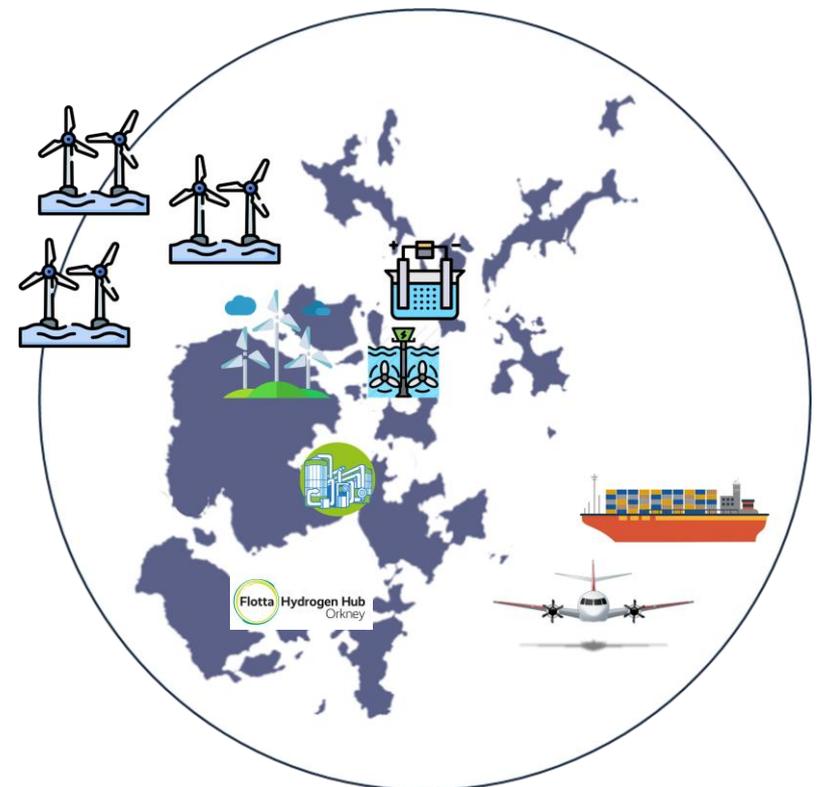
Green hydrogen in Orkney

Why hydrogen?



- Hydrogen first gained traction as a means of storing renewable **power** which would otherwise be **curtailed**
- Once produced, hydrogen can be used to tackle **decarbonising energy intensive applications**

- Heavy duty **transport** (ferries, aviation) and renewable **power** integration are particularly relevant applications in islanded contexts



Hydrogen R&D Programme



1. Producing hydrogen via electrolysis

We power our electrolyzers using **tidal and wind** generation co-located at our test sites



2. Storing and handling hydrogen

We have demonstrated inter-island transport of hydrogen, and developed **state-of-the-art mobile refuelling** equipment



3. Developing hydrogen use cases to support decarbonisation activities

Our projects have tested new ways of using hydrogen, including in **transport**, in **vans, ferries and aeroplanes**, in industrial **heat**, investigating feasibility for use in **distilling**, and in providing auxiliary **power** to **ferries** while quayside



1. Hydrogen production



- On our Eday site we operate with both tidal and wind power inputs, and will shortly integrate a flow battery system, alongside two electrolyzers
- We are showing the way forward in *actually* operating an **integrated**, and **decentralised** energy system, and in the role for hydrogen production in this

2. Hydrogen transport

- **Inter-island** transport of hydrogen
- Safety training course for Crew
 - Orkney College UHI's Maritime Studies, supported by Orkney Ferries and EMEC



3. Hydrogen use



- **Maritime**

Inter-island fleet - 9 vessels = 2,800,000 litres of Gas Oil per year

- **HyDIME**
- **HIMET**



- **Aviation**

- **HyFlyer I and II**
- **SATE 1 and SATE 2**





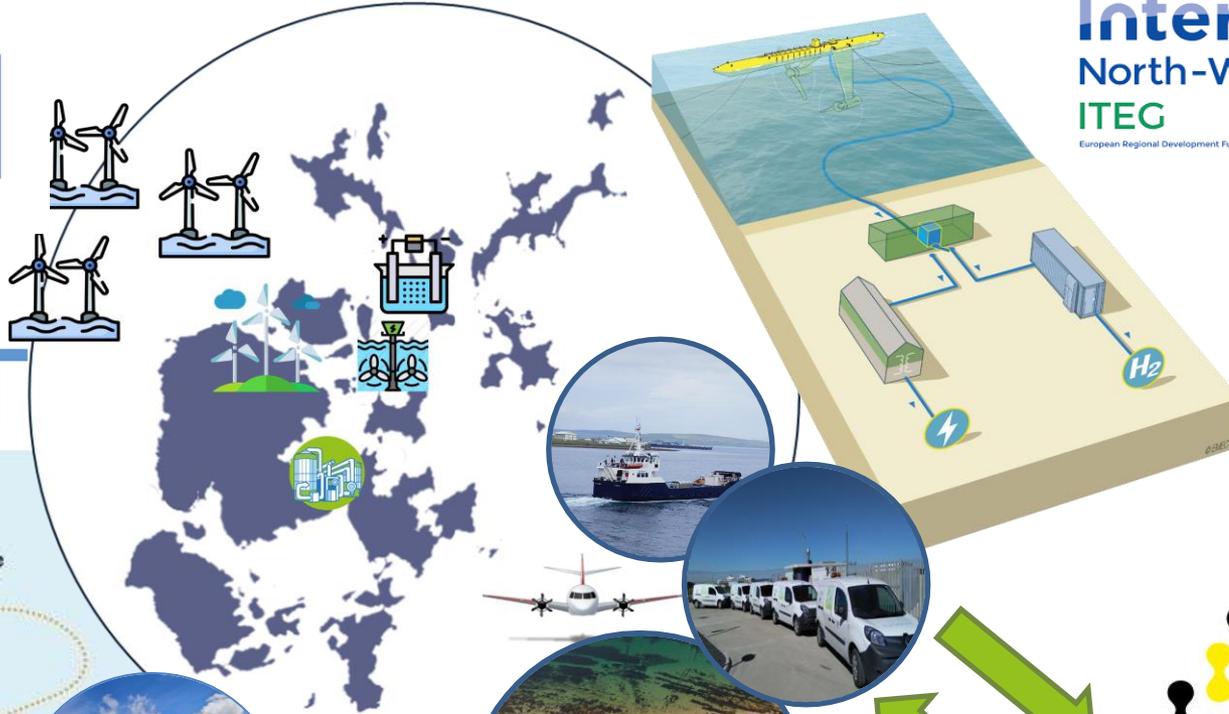
Island replication

Replication studies

EMEC

HYDROGEN

Interreg
North-West Europe
ITEG
European Regional Development Fund



BIGHIT



Collaboration is key



All of our work is rooted in partnership



Offshore renewables and hydrogen

- **Green hydrogen** from tidal energy
- **A building block** to decarbonisation
- **Collaboration** and **demonstration** are key
- Ready to **support innovation**: ‘the creation and application of new knowledge to improve the world’ [3]



Thank you for listening!

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