



The role of Hydrogen in an Island environment

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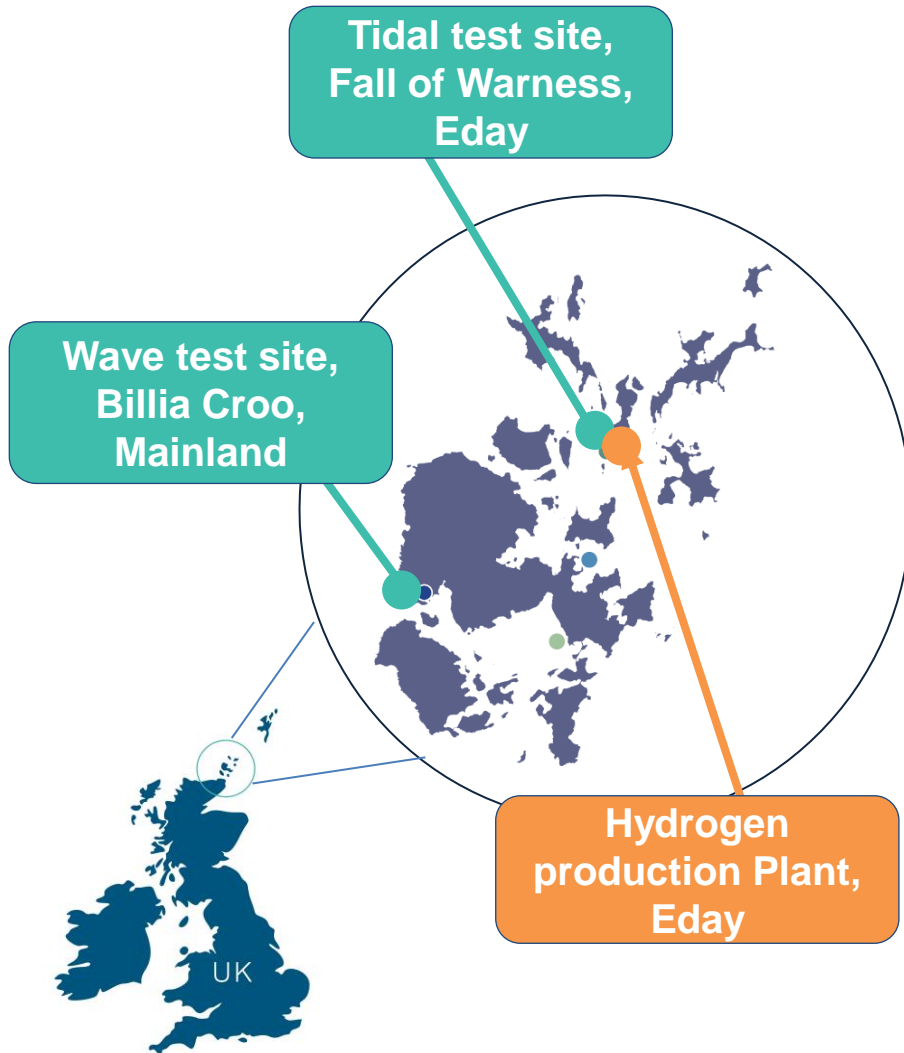
- EMEC - Introduction
- Green hydrogen in Orkney
 - Production
 - Transport
 - Use
- Island replication
- Conclusion



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Introducing EMEC

EMEC HYDROGEN



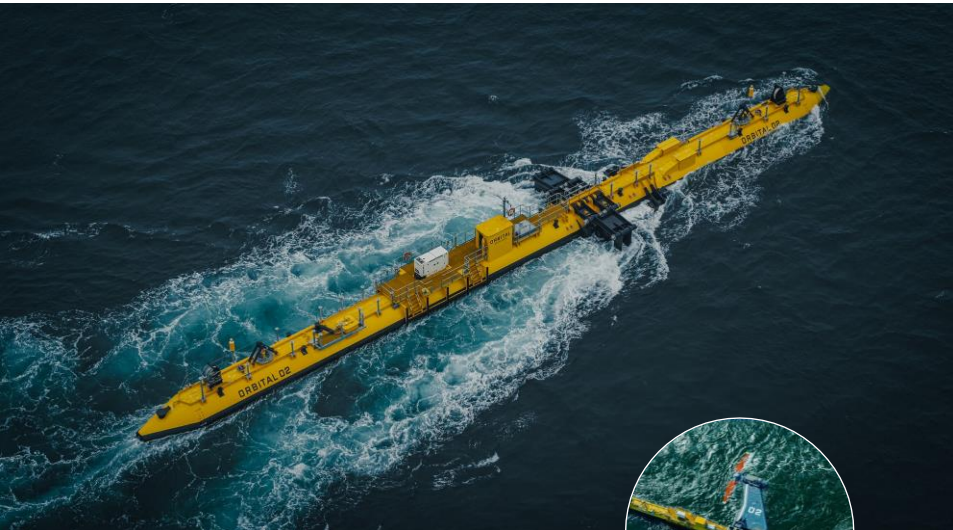
Billia Croo



Eday

Wave and Tidal

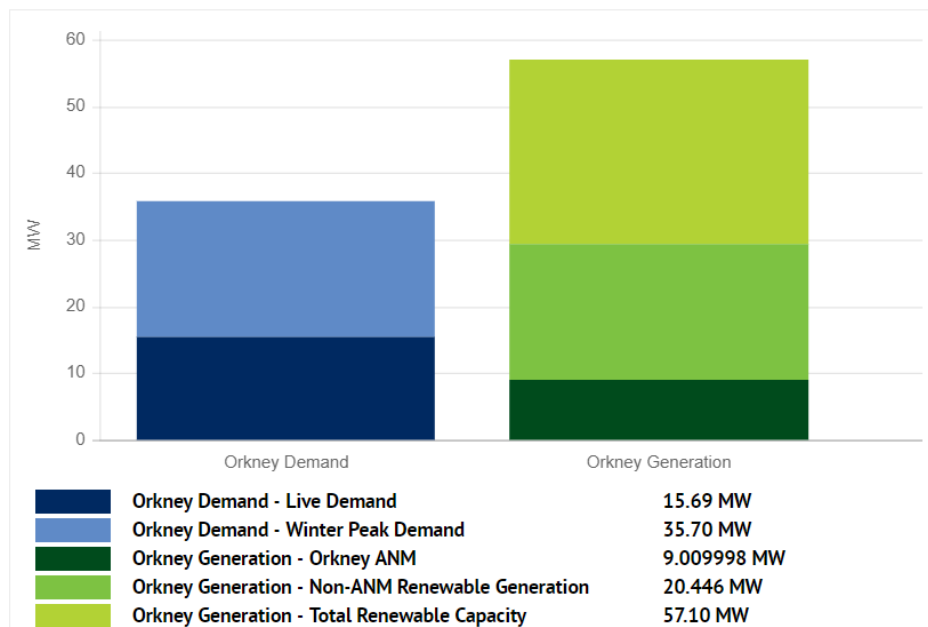
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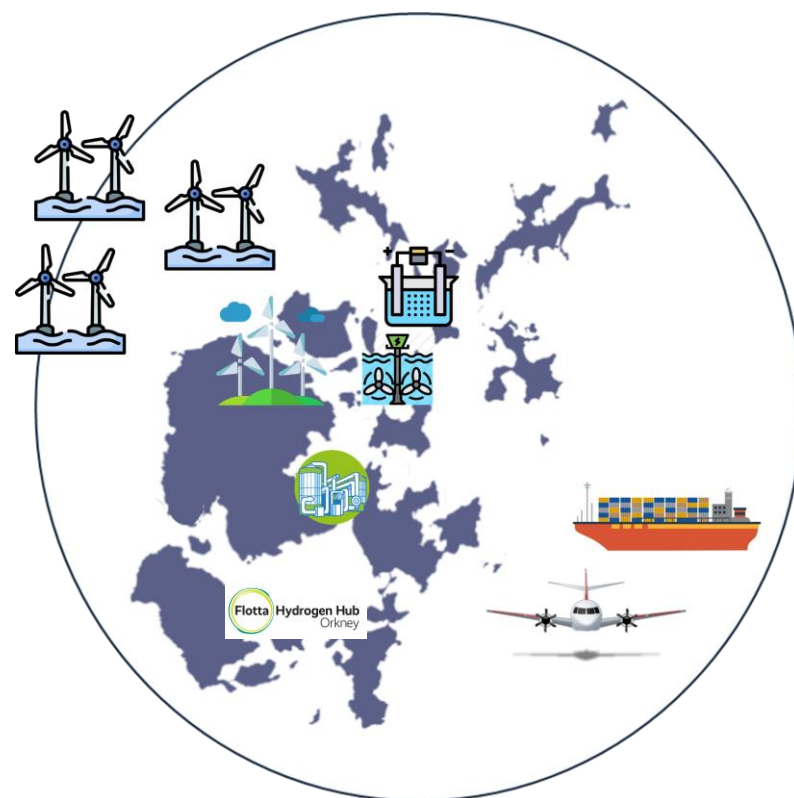
Green hydrogen in Orkney

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 electrolyser
- 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



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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

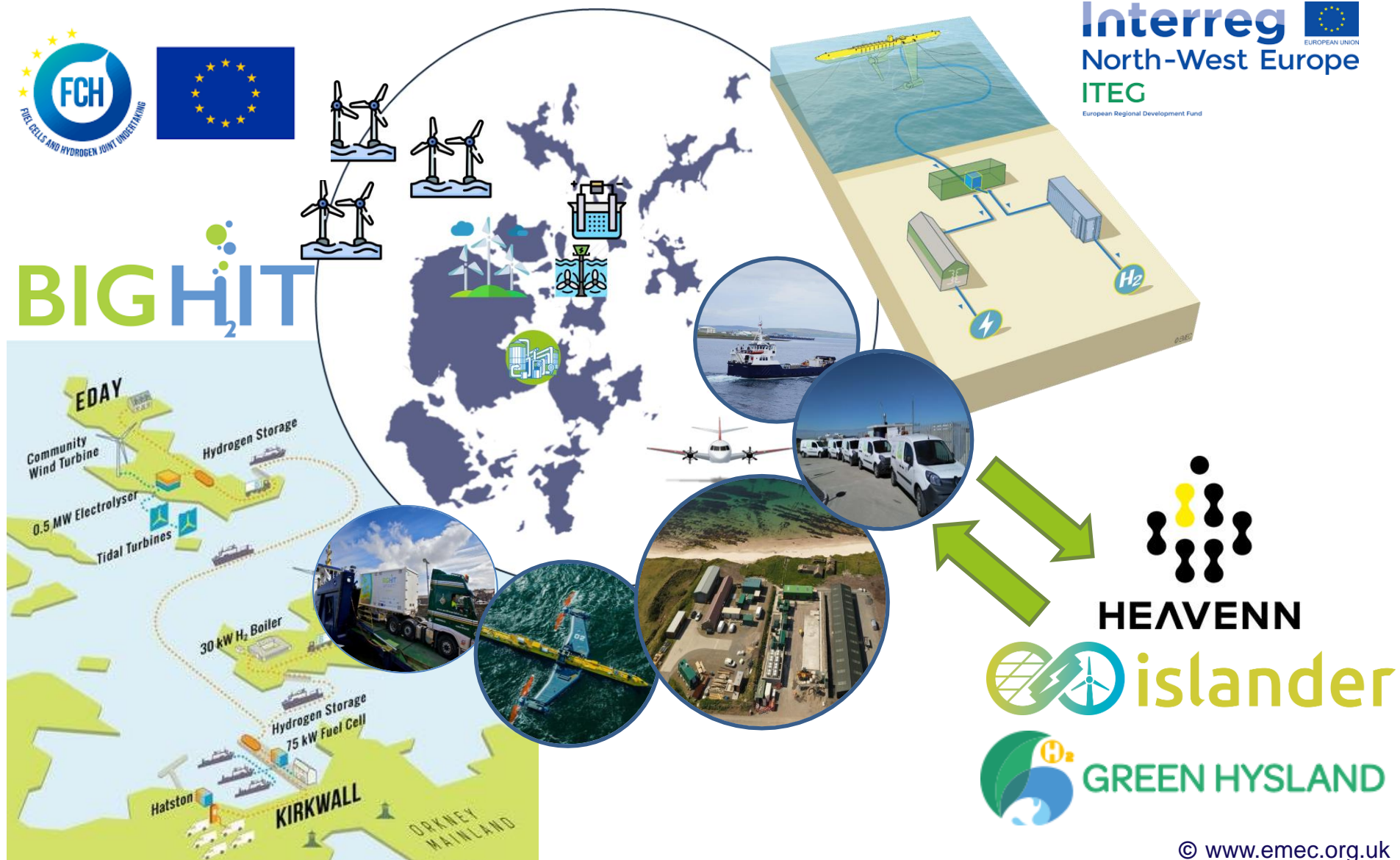
Replication studies

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Interreg
North-West Europe
ITEC
European Regional Development Fund



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Collaboration is key

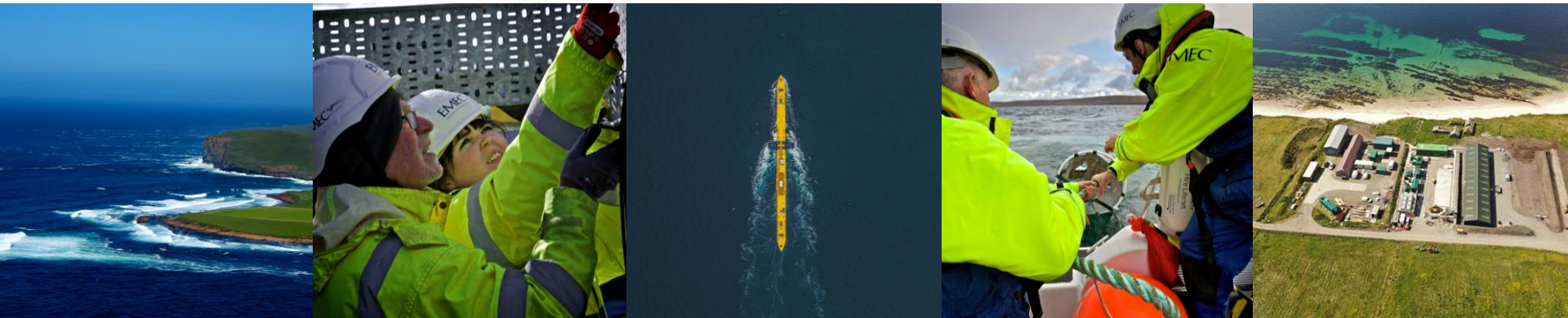


All of our work is rooted in partnership



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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