

The role of test centres in supporting innovation & technology development

Caron Oag
Hydrogen Development Manager

MISSION: reduce the **time, cost, and risk** to progress **innovative sustainable technologies** to market

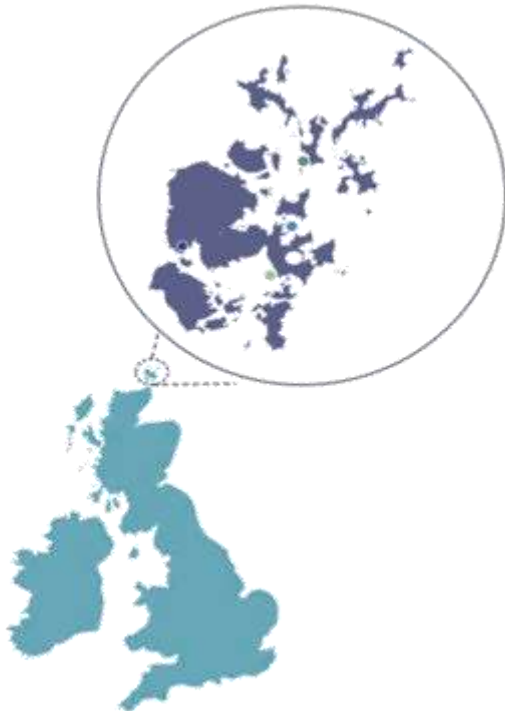
Purpose-built, open-sea performance testing facilities for ORE technologies

First in the world, est. 2003

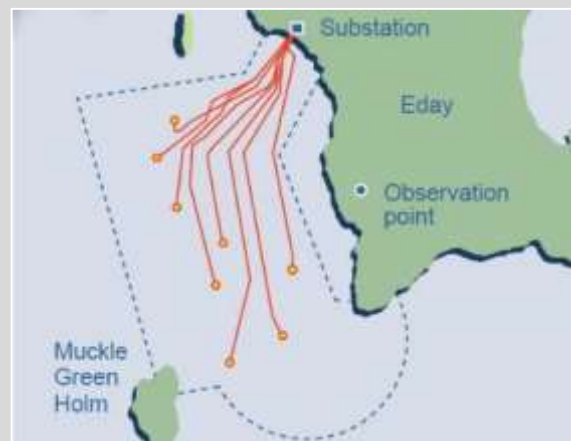
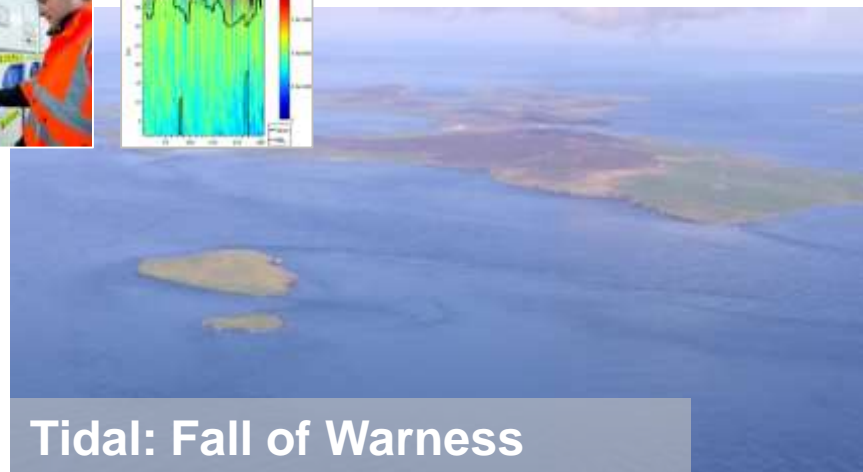
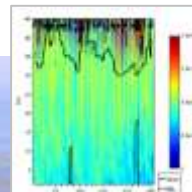
£36m public funding > £230m GVA to Scotland

Only IEC designated marine energy test centre in the world

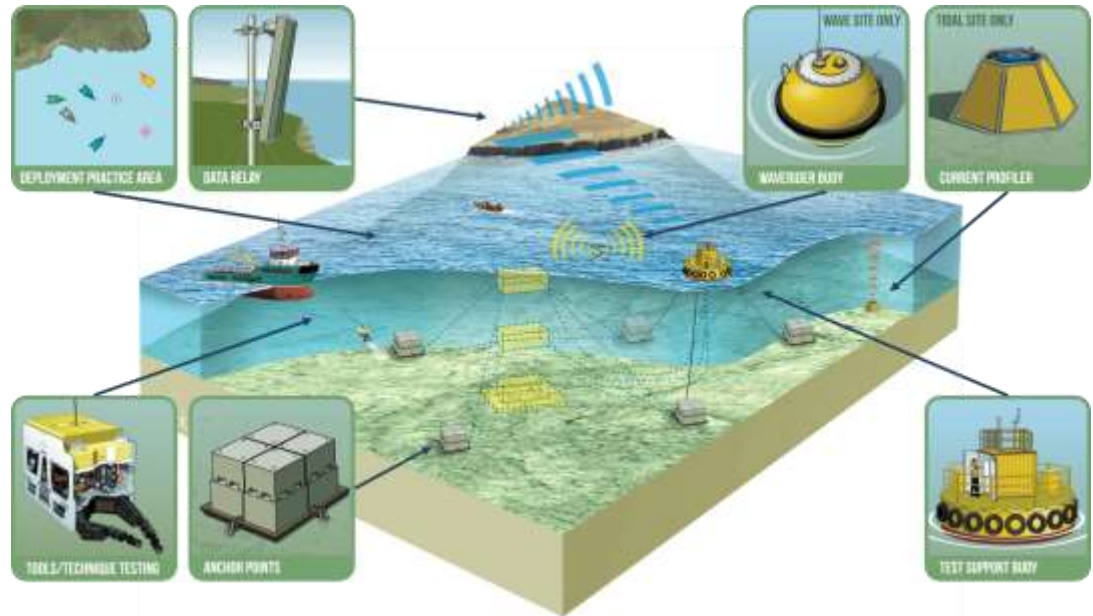
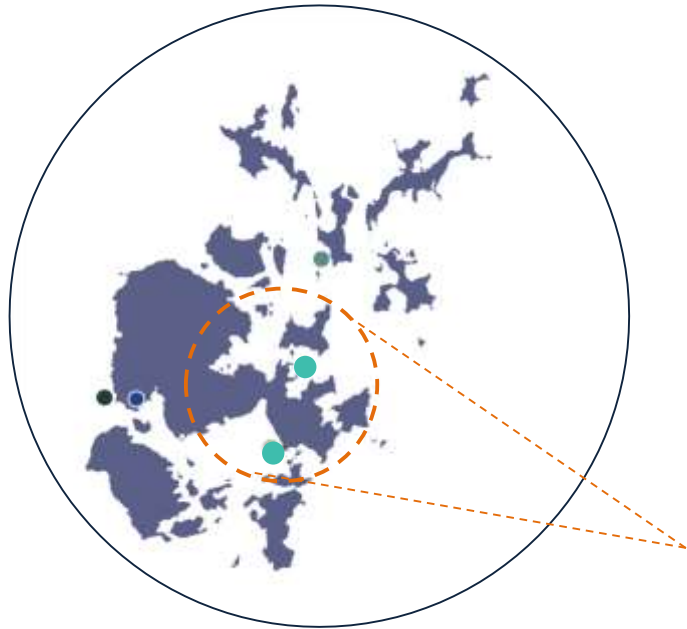
One of the harshest marine environments



Grid-connected test sites



Scale test sites



Scale Wave Test Site
Scapa Flow

Scale Tidal Test Site
Shapinsay Sound

The numbers



35

devices



22

developers



11

countries



In Orkney now

TIDAL



ORBITAL
MARINE POWER

Magallanes
Renovables

WAVE



Orbital Marine Power

EMEC
THE EUROPEAN MARINE ENERGY CENTRE LTD



1. 2010 | 1/5th scale tests



2. 2011-2013 | SR250 deployment (250kW)



3. 2016-2018 | SR1-2000 deployment



4. 2021 | Orbital O2 (2MW)

Real-sea learning

Installability

+

Survivability

+

Reliability

+

Maintainability

+

Operability

=

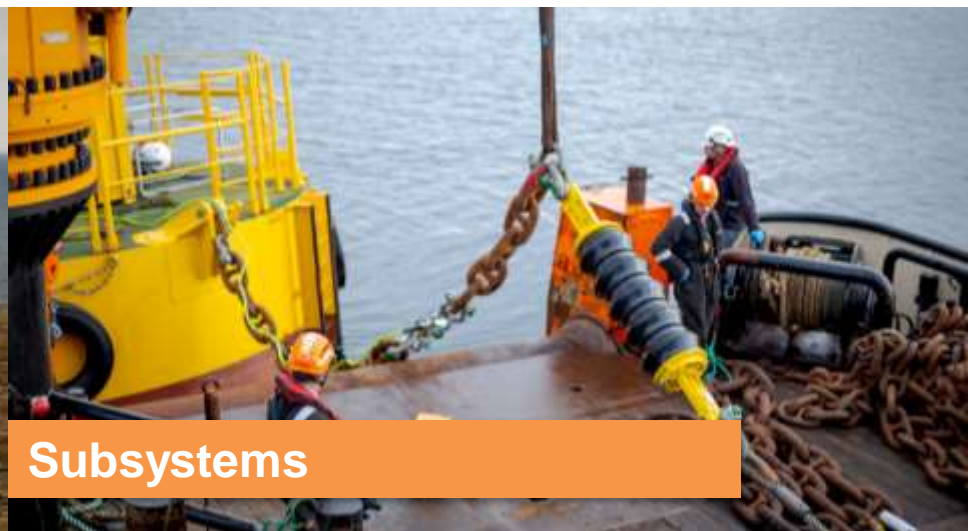
Cost effectiveness



R&D projects



Environmental monitoring



Subsystems



Tool development



Components

Policy influence



GOV.UK

Home > Environment > Climate change and energy

Collection

Contracts for Difference (CfD): Allocation Round 5

Documents and guidance related to the Contracts for Difference fifth allocation round (AR5).

From: [Department for Energy Security and Net Zero](#)
Published 4 February 2022
Last updated 16 March 2023 — [See all updates](#)

The Contracts for Difference (CfD) scheme is the government's main mechanism for supporting low-carbon electricity generation.

Draft Energy Strategy and Just Transition Plan – delivering a fair and secure zero carbon energy system for Scotland

RECORD NUMBER OF TIDAL ENERGY PROJECTS AWARDED CFD REVENUE SUPPORT

Posted by EMEC on Friday, September 8, 2023

The fifth round of the UK government's flagship renewable energy auction scheme has secured 3.7 GW of clean energy projects, enough to power the equivalent of 2 million homes.

ish Government
raitas na h-Alba

International collaboration



Standards development and testing:

- Testing consistency
- Complementary research agendas

Environmental monitoring:

- Resource characterisation
- Data analysis

Operational procedures:

- Governance, consent and managing



Hydrogen integration

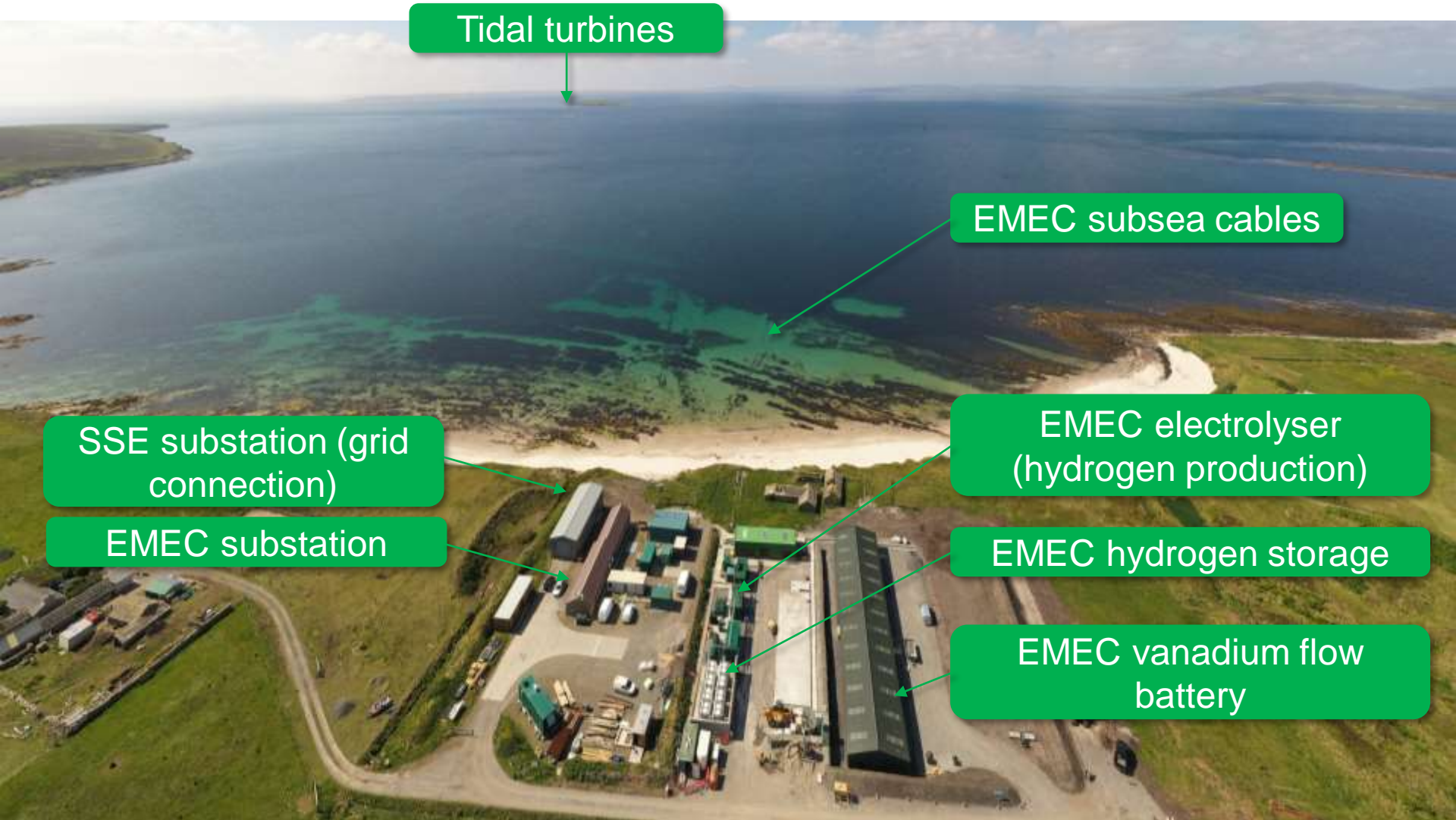
- Hydrogen activity initiated to deal with grid constraints
- Interests became broader as the sector grew
- Practical experience and infrastructure gave EMEC tangible advantages

Three priority R&D themes:

1. Renewable integration
2. Maritime decarbonisation
3. Aviation decarbonisation



Hydrogen R&D site



Tidal turbines

EMEC subsea cables

SSE substation (grid connection)

EMEC electrolyser (hydrogen production)

EMEC substation

EMEC hydrogen storage

EMEC vanadium flow battery

H2 R&D – end use



Power



Refuelling



Heating



Maritime facilities

Further diversification



Hydrogen based e-fuels



Net Zero



Floating Offshore Wind



Energy Systems: Project Natick

20 years of impact



Shopping local

97%
EMEC SPEND
IN UK

67%
EMEC SPEND
IN SCOTLAND

50%
OVER £30
MILLION
EMEC SPEND
IN ORKNEY



Top 20 EMPLOYER IN ORKNEY



R&d focus

365
R&D PROJECTS
OVER 20 YEARS

EMEC INVOLVED IN
£538 million
R&D PROJECTS SINCE 2016

£49.5
SECURED DIRECTLY
BY EMEC
million

A just transition | FAIR • INCLUSIVE • LEAVE NO ONE BEHIND

What next?

Tidal arrays

ORBITAL MULTI-TURBINE TIDAL ARRAY TO BE DELIVERED IN NEW EU PROJECT

Posted by EMEC on Wednesday, October 25, 2023



Orbital O2 at EMEC tidal

9.6 MW tidal turbine array to be connected

Orbital, along with sector leading project partners, has secured funding from the Horizon Europe Programme to deliver a multi-turbine tidal energy project.

NOVA INNOVATION 4 MW TIDAL ARRAY BOUND FOR EMEC

Posted by EMEC on Wednesday, November 29, 2023



Nova WT100 tidal turbine

Nova Innovation has won EU funding for a 4 MW, 16 turbine, tidal energy farm that will be home to the largest number of tidal turbines anywhere in the world.

The tidal energy array will be deployed at the European Marine Energy Centre's (EMEC's) Fall of Warness tidal test site in Orkney, Scotland.

More progress of prototype deployment in wave

MOCEAN ENERGY SECURES EUROPEWAVE FUNDING FOR WAVE ENERGY DEMO AT EMEC

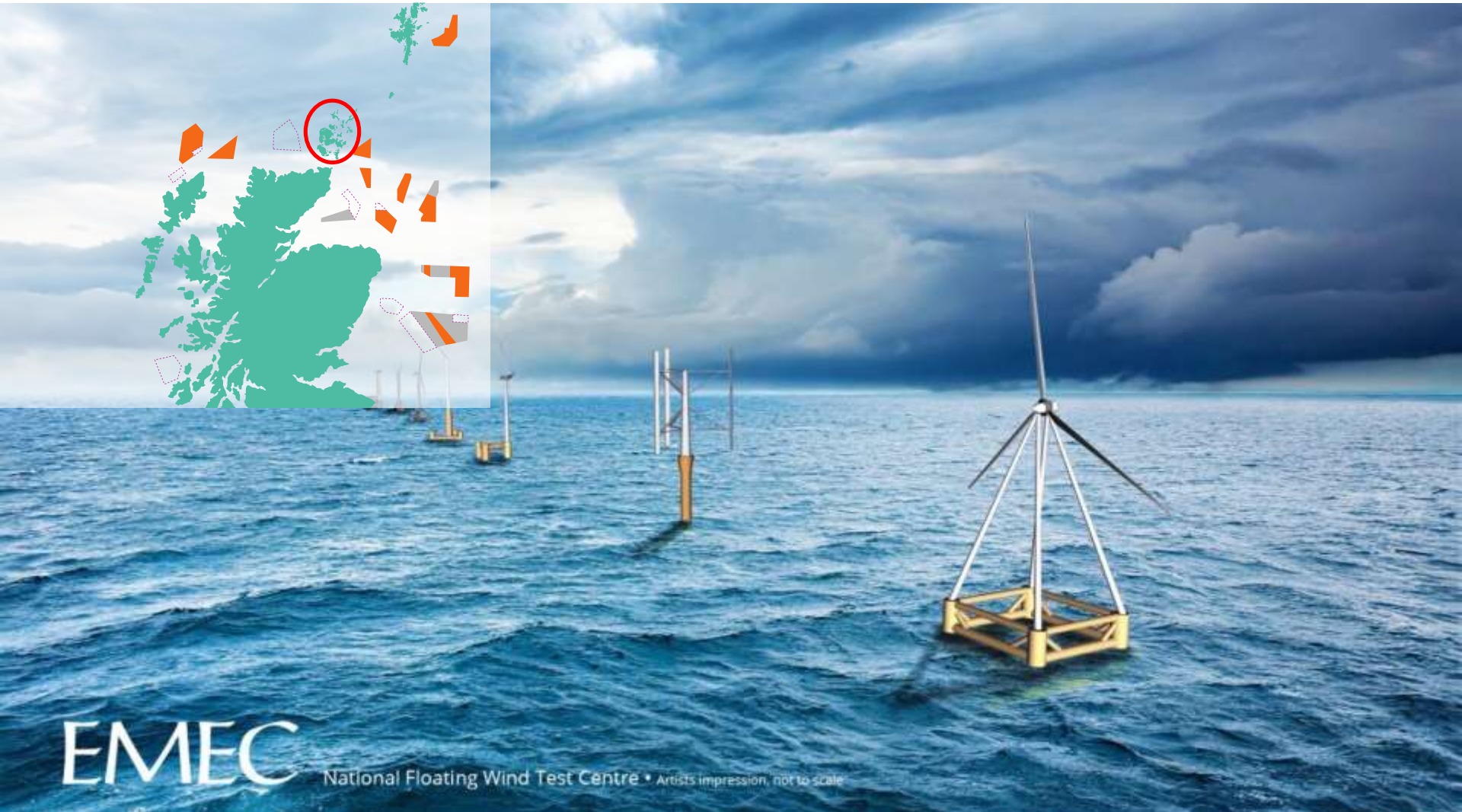
Posted by EMEC on Tuesday, September 5, 2023



Mocean Energy Blue X in Orkney (Credit Colin Keldie)

Wave energy developer Mocean Energy have secured over £3 million EU funding to develop and deploy a 250kW wave machine at the European Marine Energy Centre (EMEC)'s Billia Croo wave test site in Orkney.

What next?



EMEC

National Floating Wind Test Centre • Artists impression, not to scale



Thank you

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