

# 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

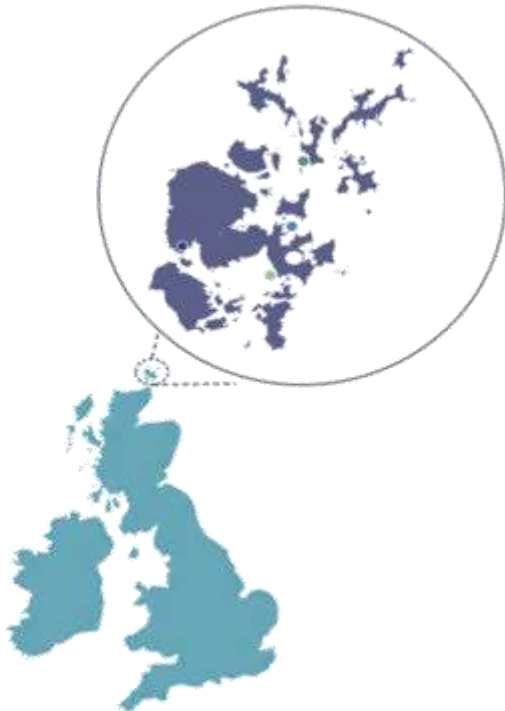
**Purpose-built, open-sea performance testing facilities** for ORE technologies

**First in the world, est. 2003**

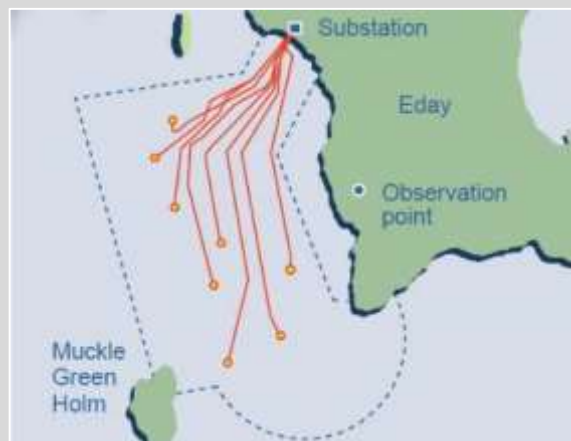
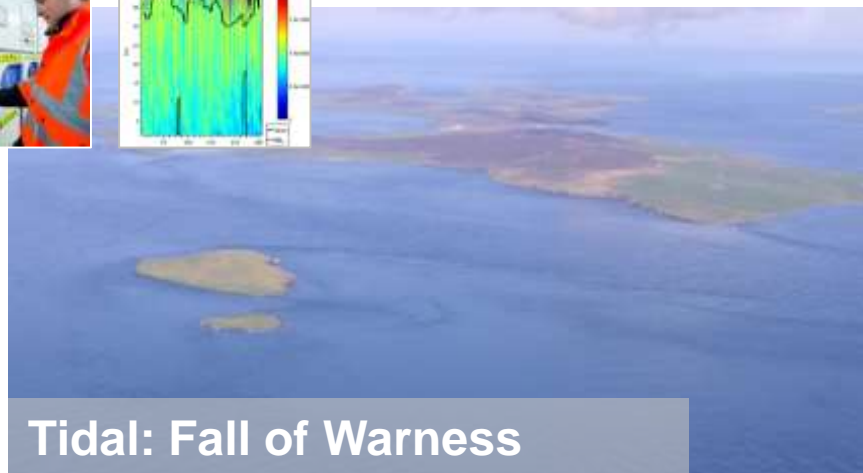
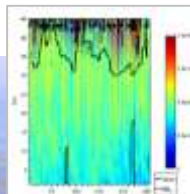
**£36m public funding > £230m GVA to Scotland**

**Only IEC designated marine energy test centre in the world**

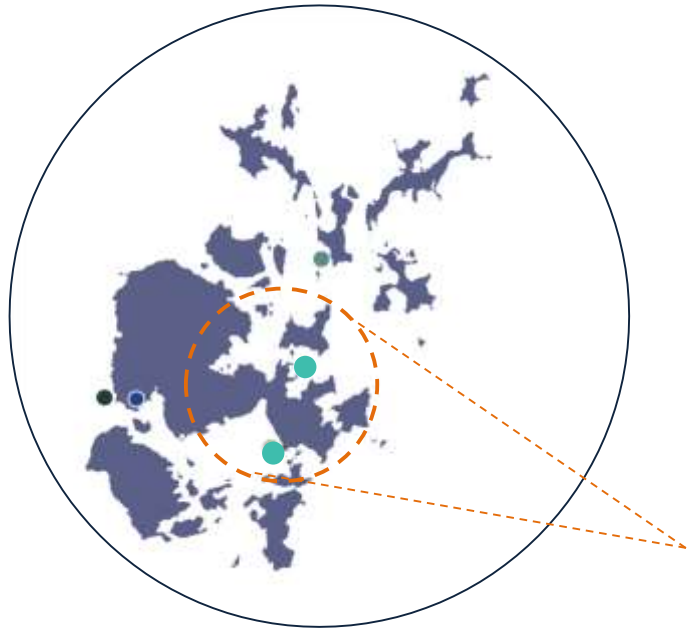
**One of the harshest marine environments**



# Grid-connected test sites

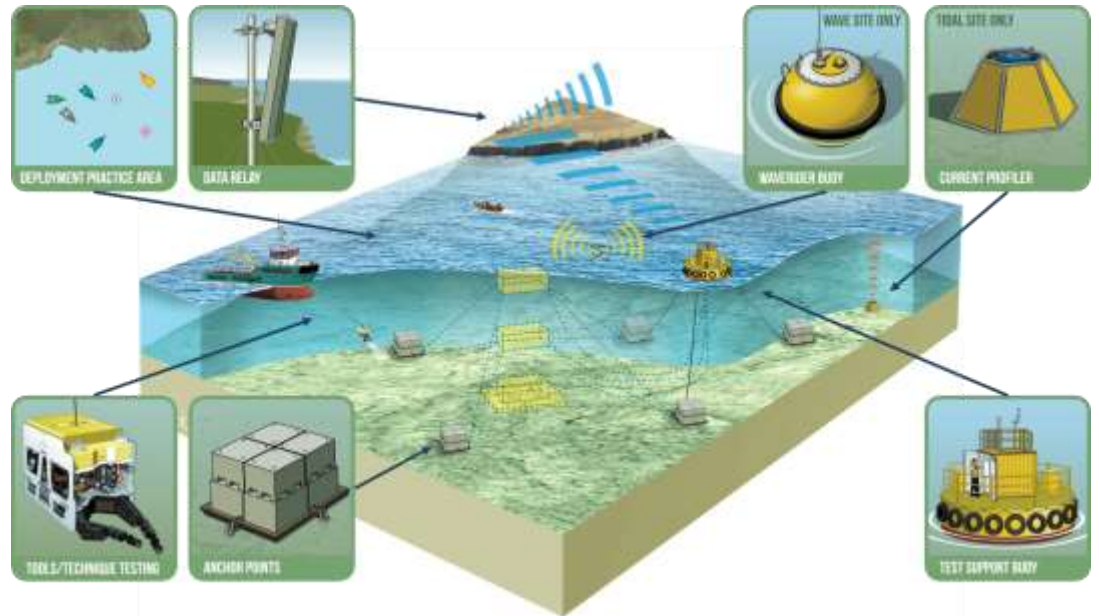


# Scale test sites



**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 | 1/5<sup>th</sup> 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

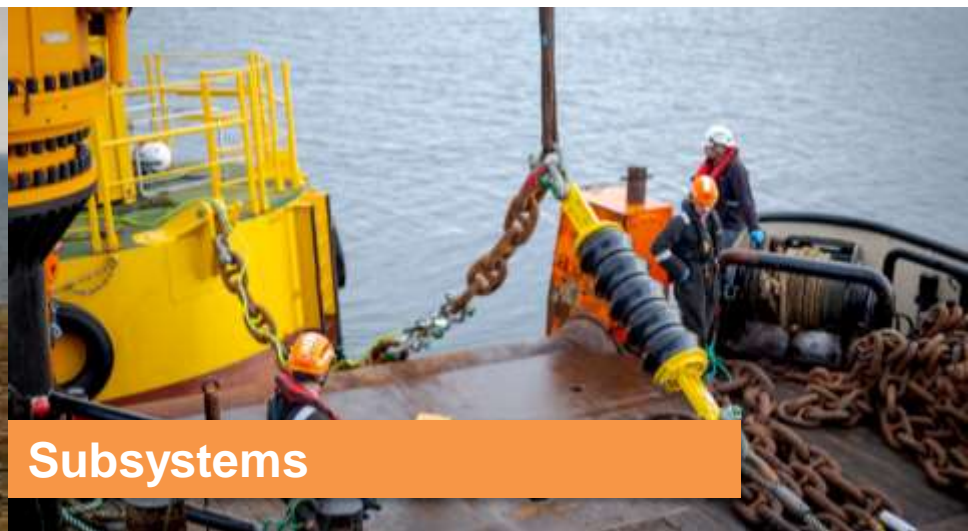




# R&D projects



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.

### 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.



# 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

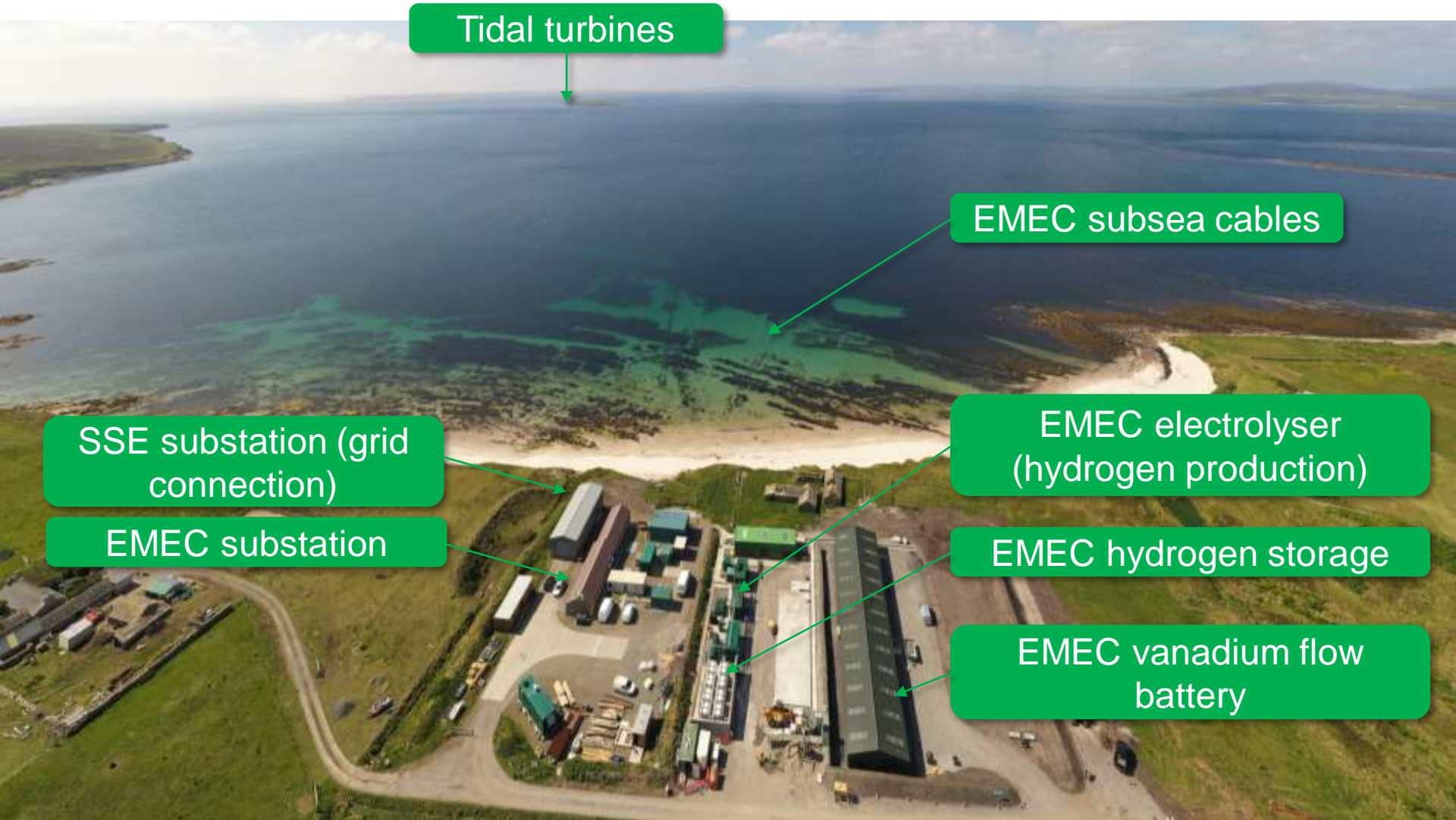
- Hydrogen activity initiated to deal with grid constraints
- Interests became broader as the sector grew
- Practical experience and infrastructure gave EMEC tangible advantages

## 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



# 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 Innovation 4 MW tidal turbine array

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

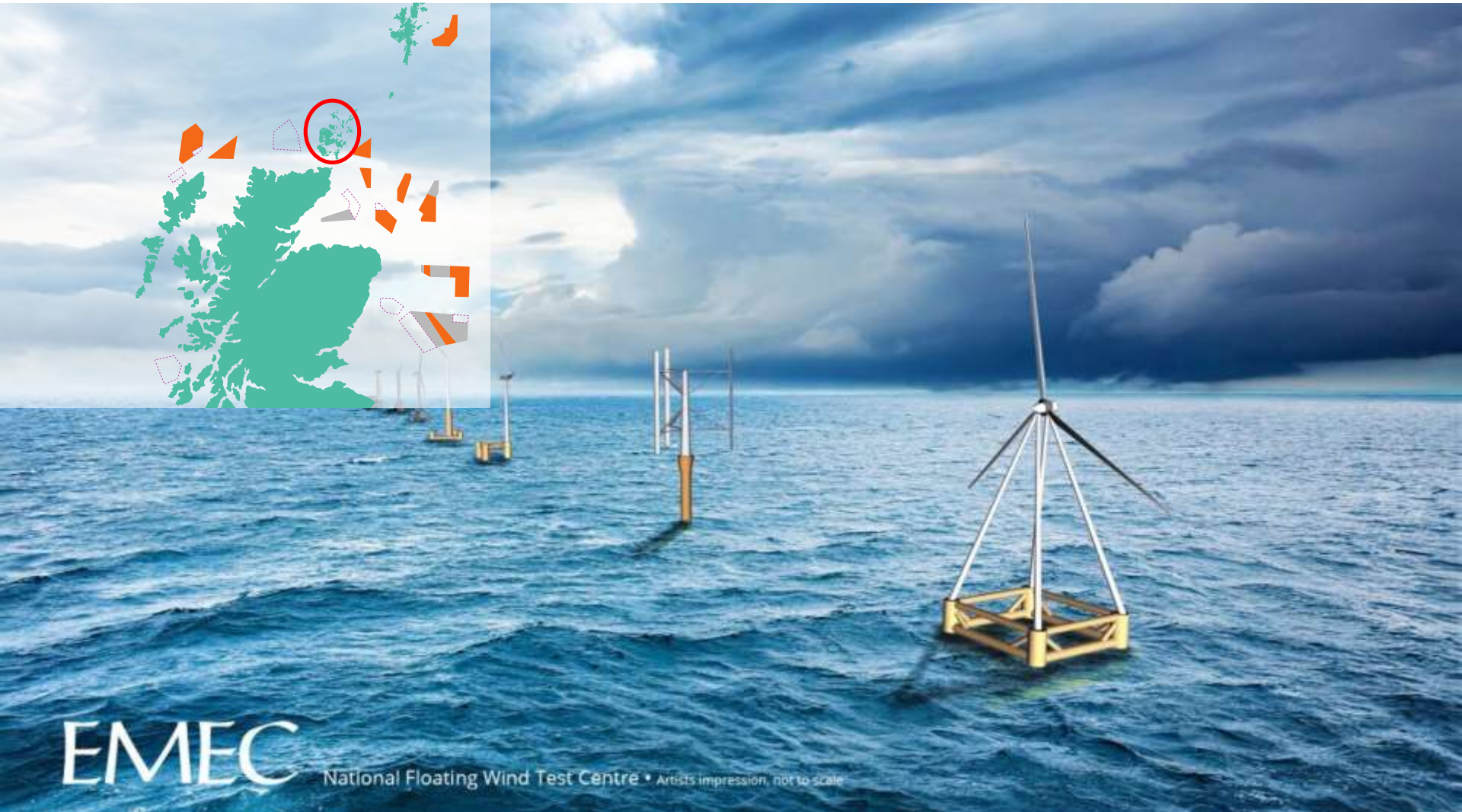


Mocean Energy Blue X in Orkney (Credit Colin Keldie)

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

**Email:** [caron.oag@emec.org.uk](mailto:caron.oag@emec.org.uk)

Follow us:    