

EMEC

Marine Energy

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Managing Director
European Marine Energy Centre

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Is it worth it?

20% of UK's electricity from Marine Energy

Develop technology for export

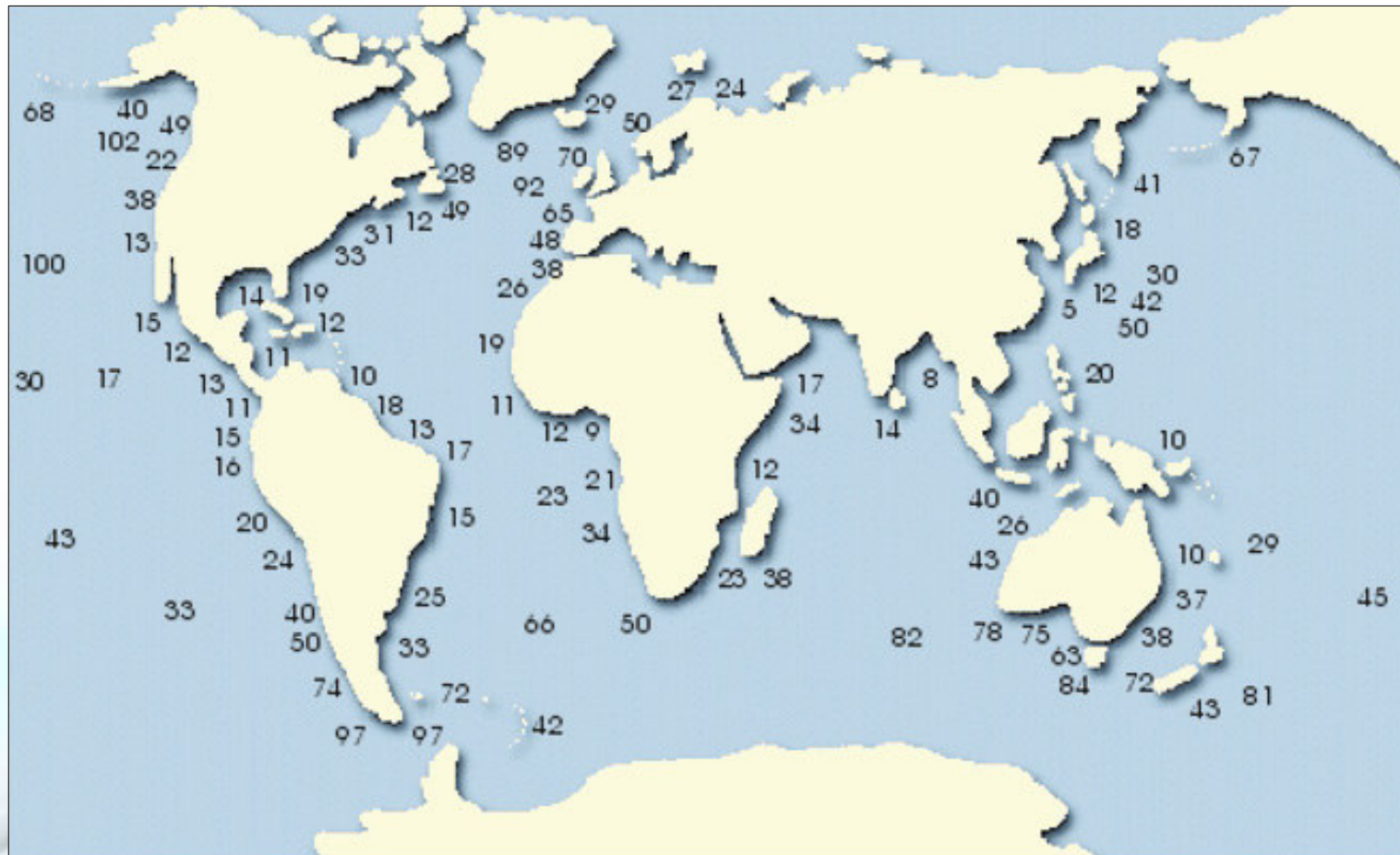
Transition to post-carbon

Security of fuel supply

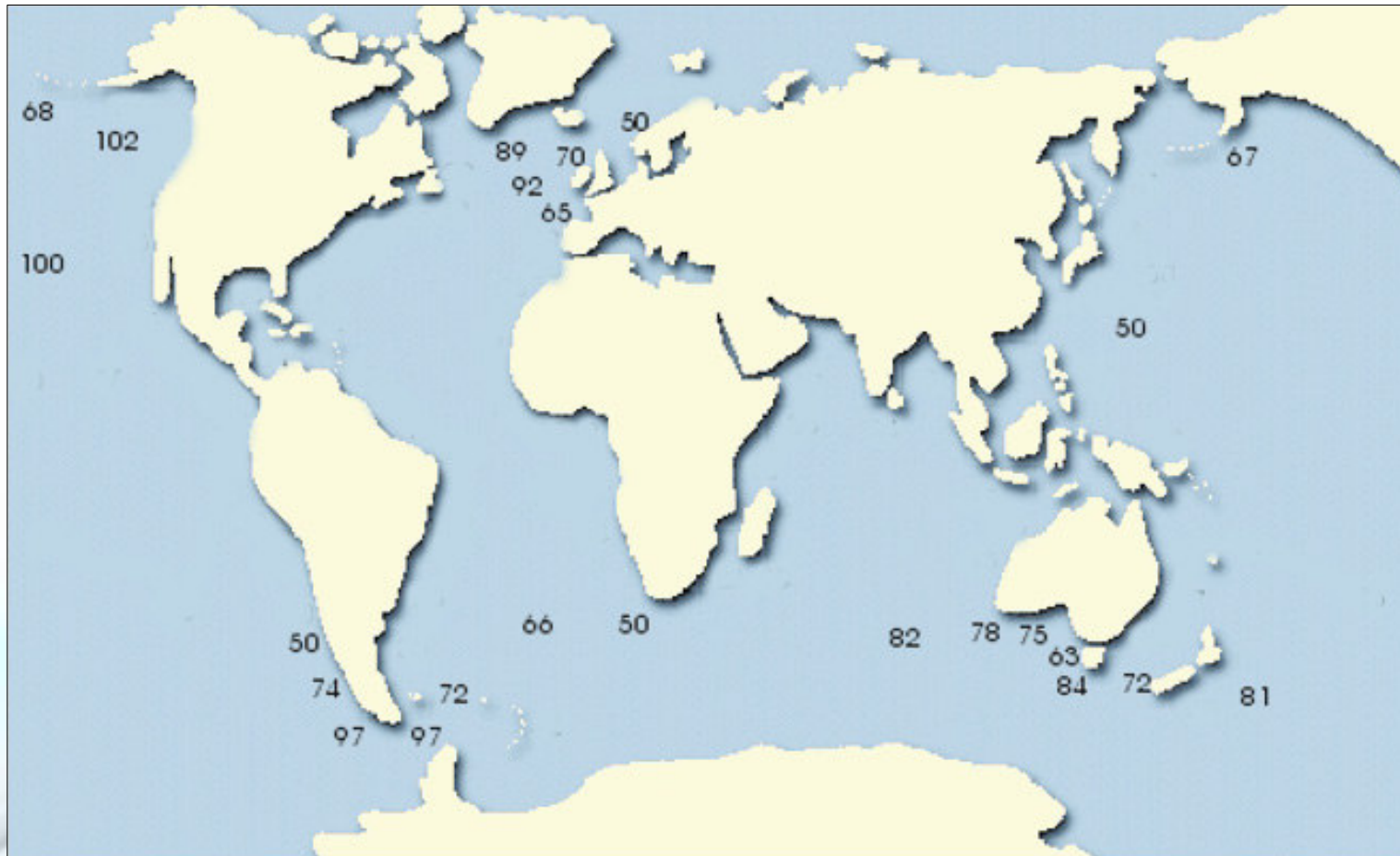
Local industry

Jobs

Wave Resource

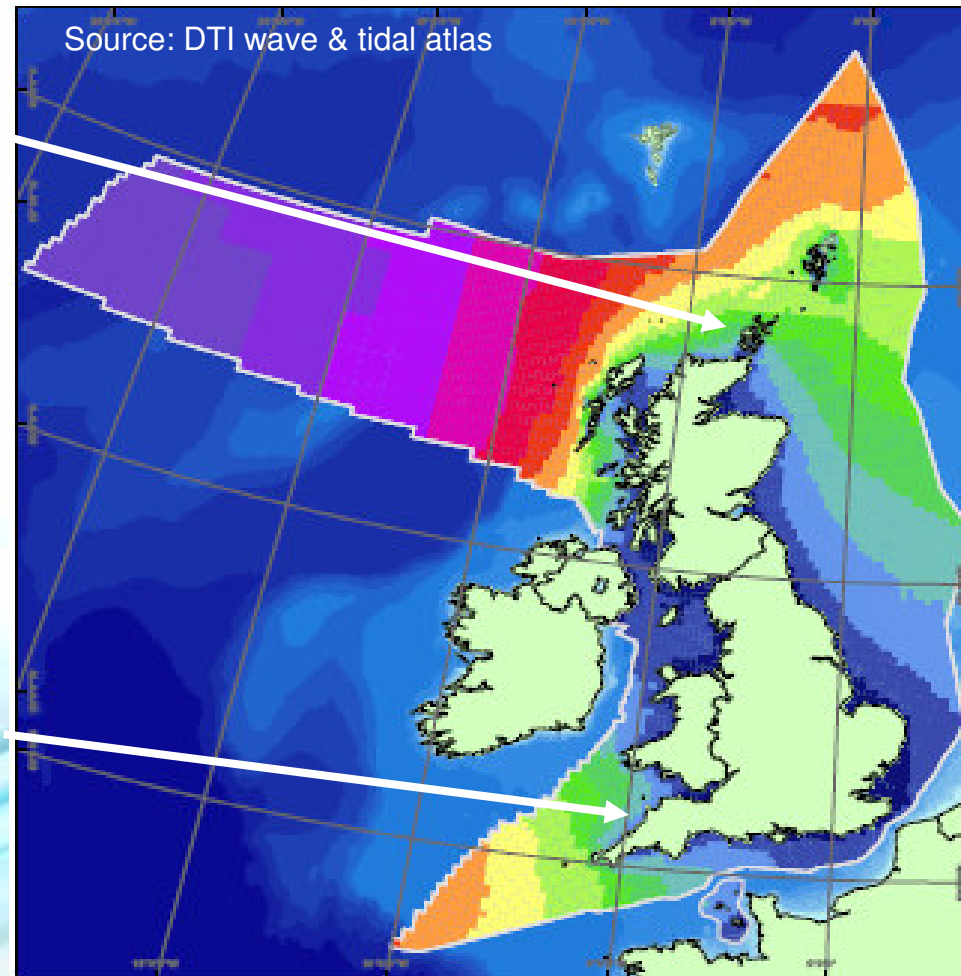


Wave Resource



EMEC

Wavehub



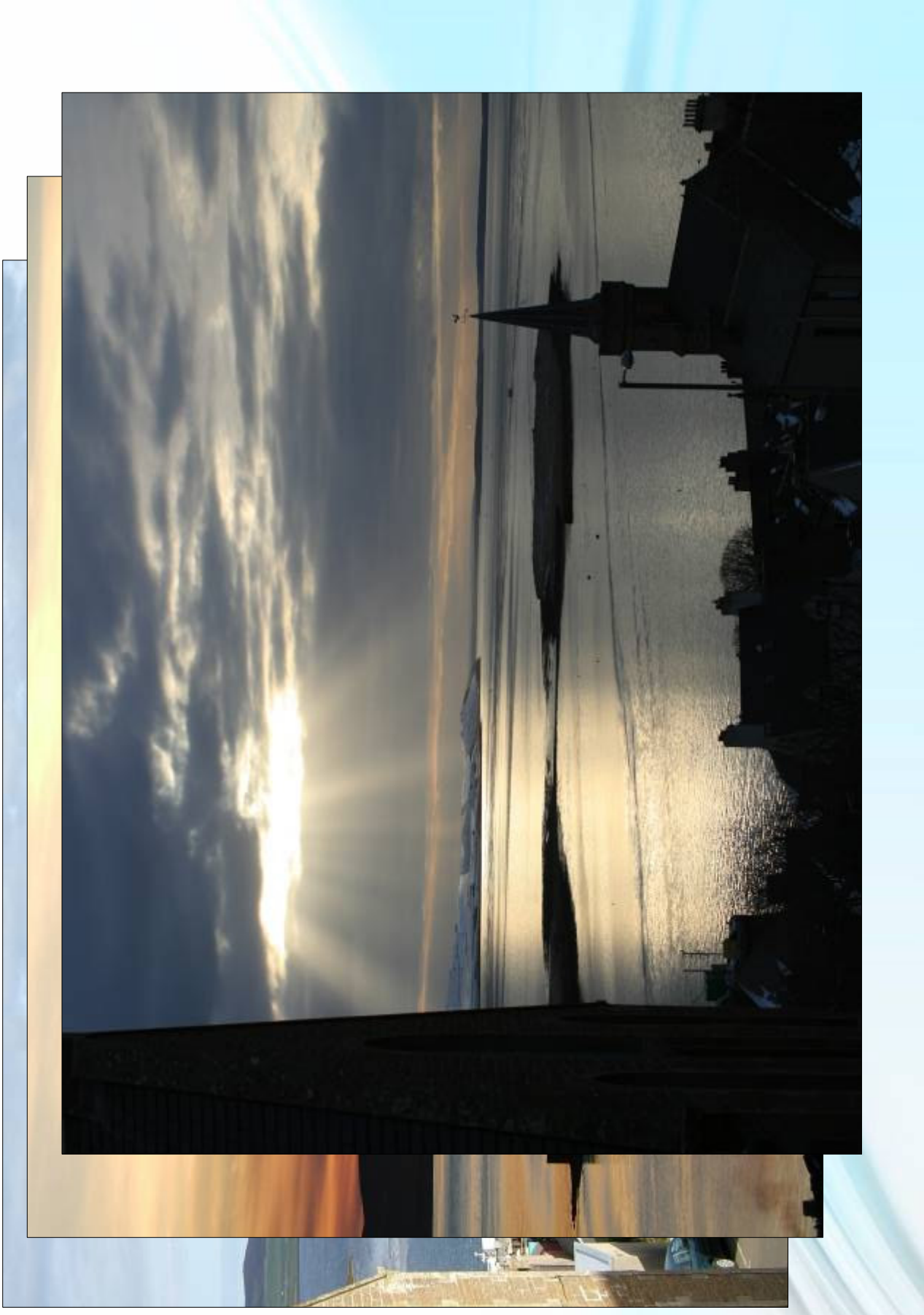
EMEC's Mission:



To be the internationally acknowledged leading test and certification centre for marine energy converters.

Test site to lead to:

- Local design
- Deployment
- Export of IP

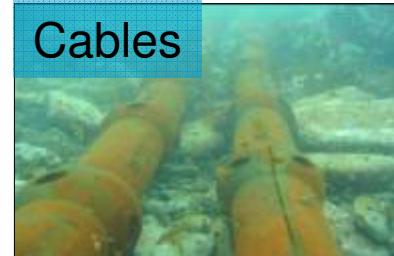


EMEC's Facilities

Wave Site – Billia Croo

Tidal Site – Fall of Warness, Eday

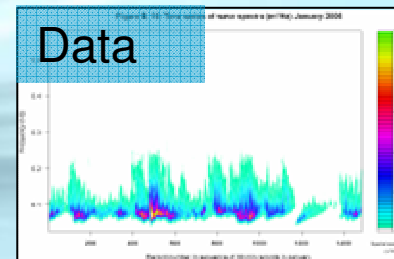
Cables



Grid



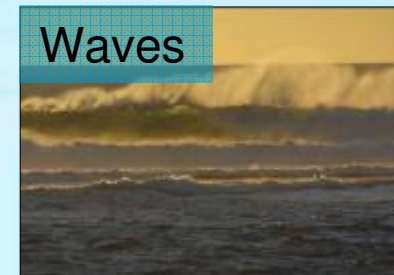
Data



Tides

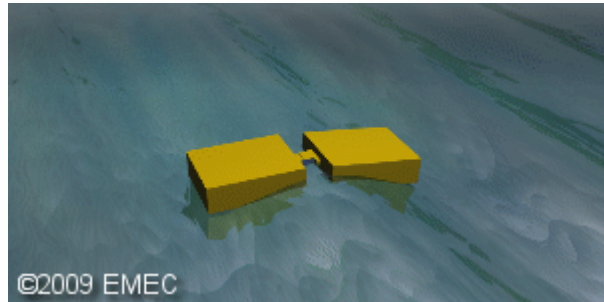


Waves

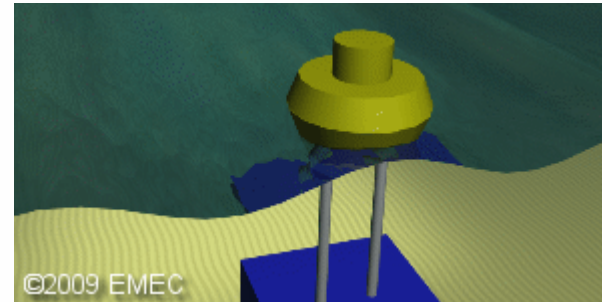


Wave devices

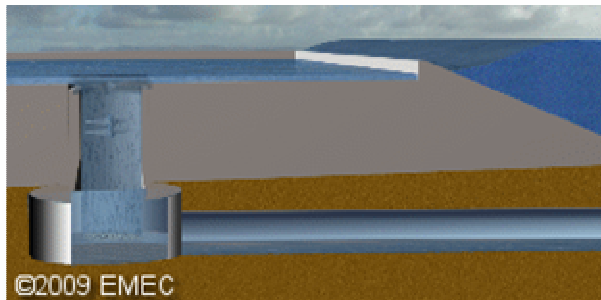
Attenuator



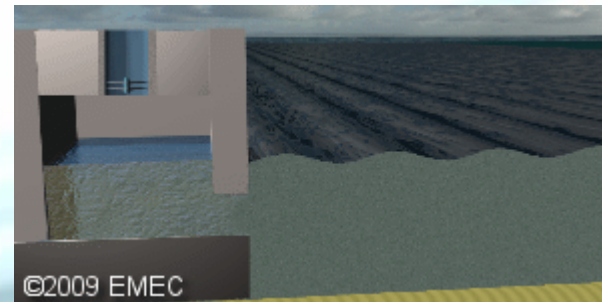
Point Absorber



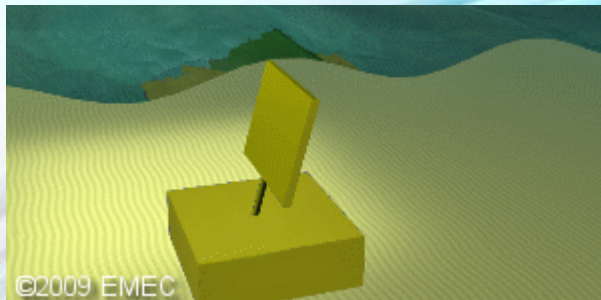
Overtopping



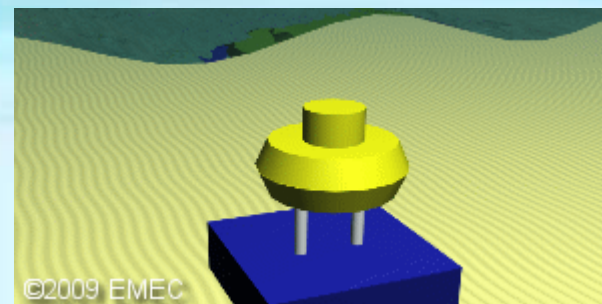
Oscillating Water Column



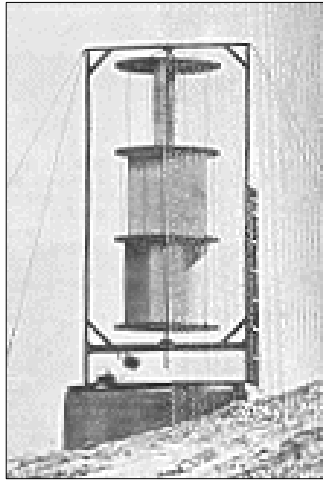
Wave Surge



Pressure Differential



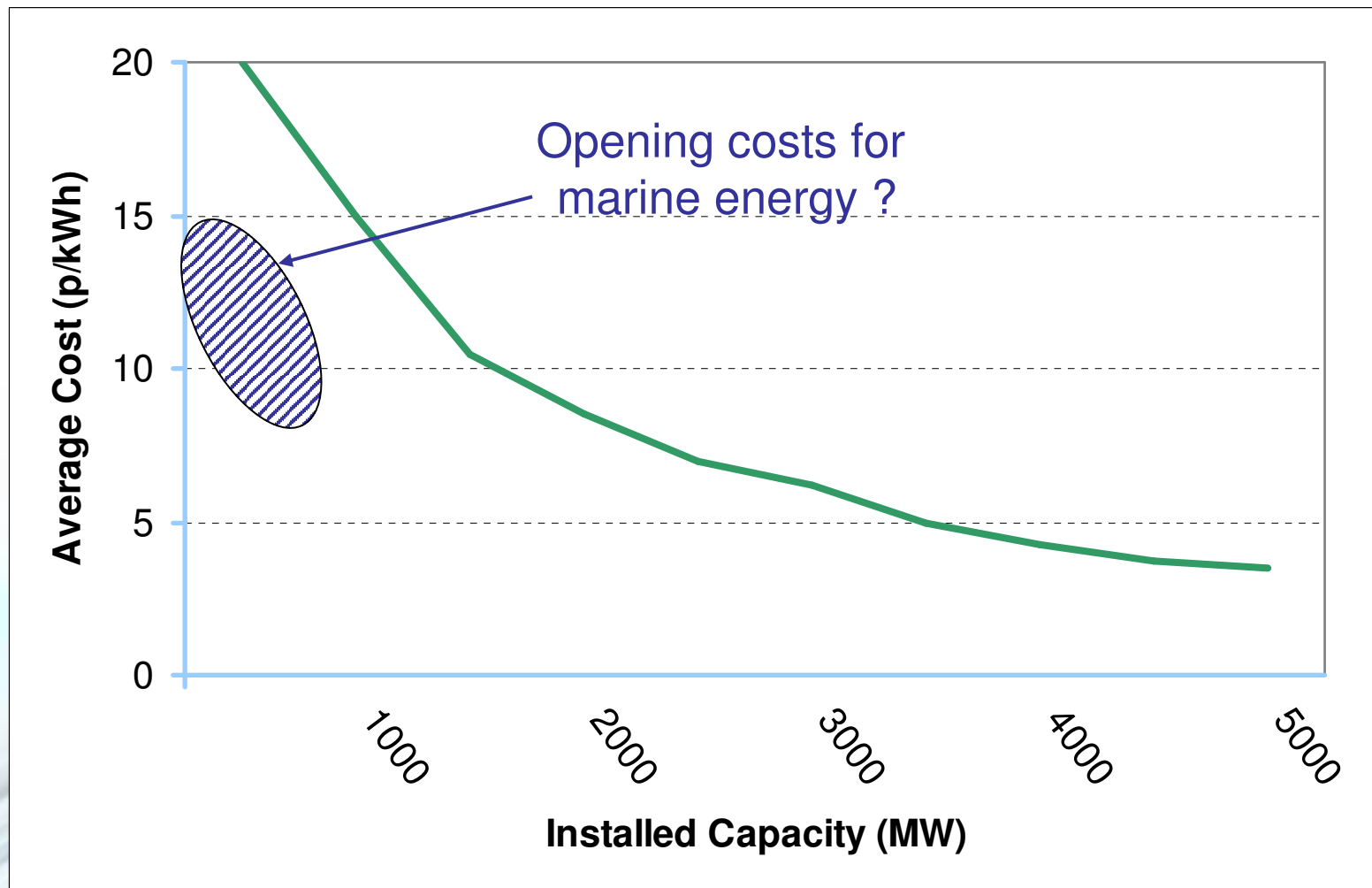
Wind turbine



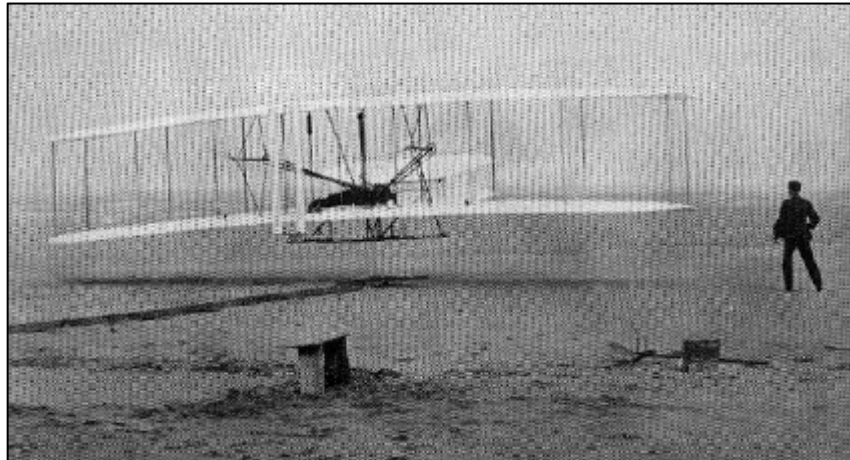
Wind turbine



Learning by Doing



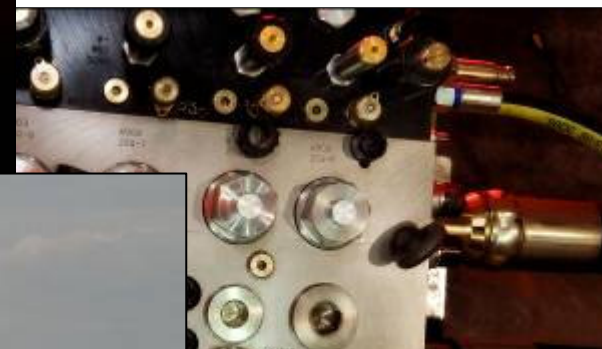
Where are we now?

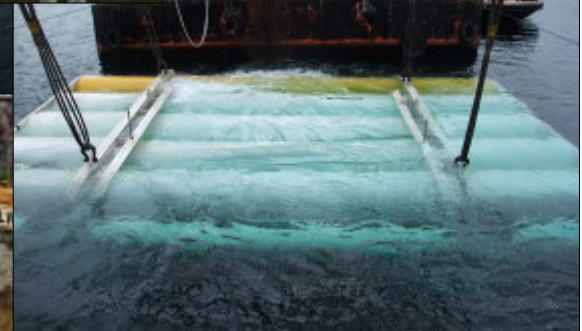
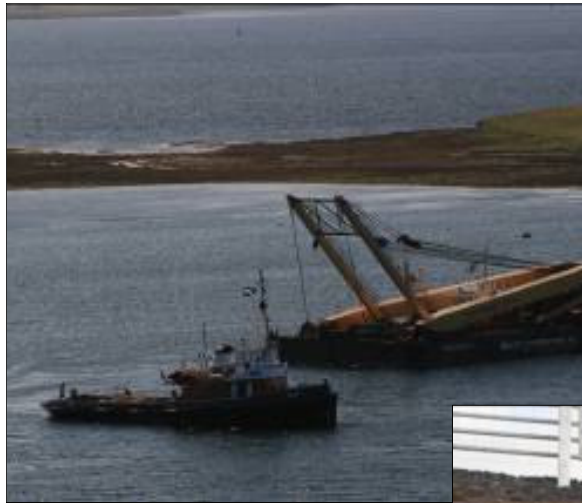


1903

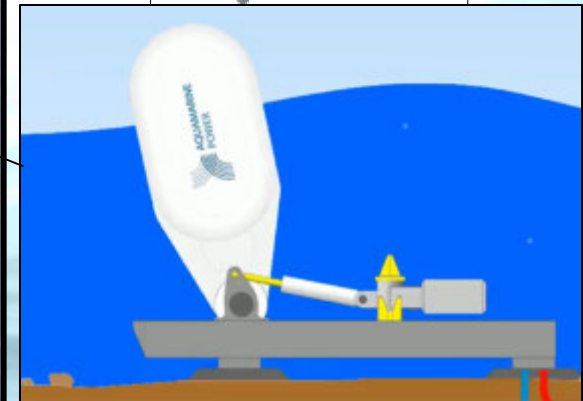


2006



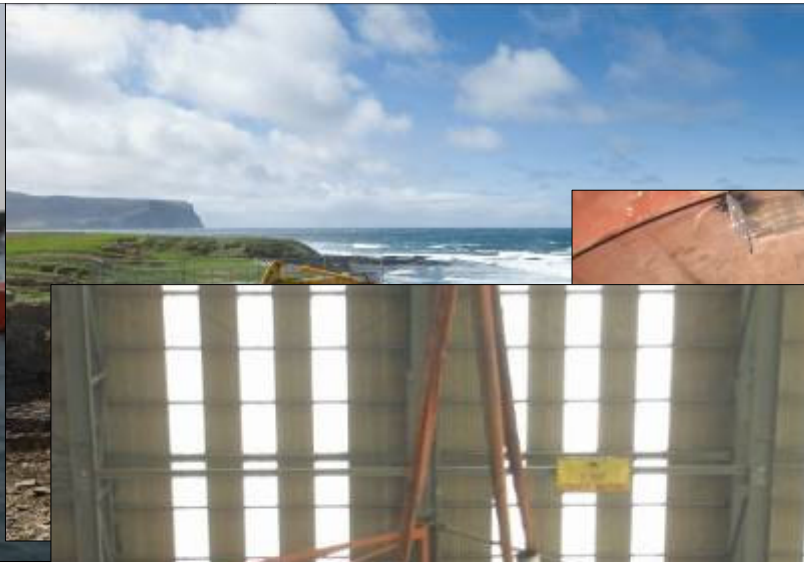


Wave Site – Billia Croo

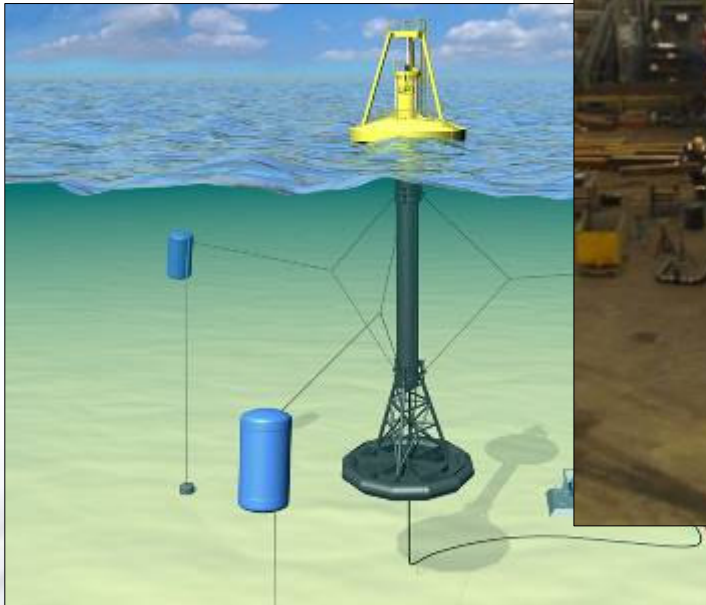
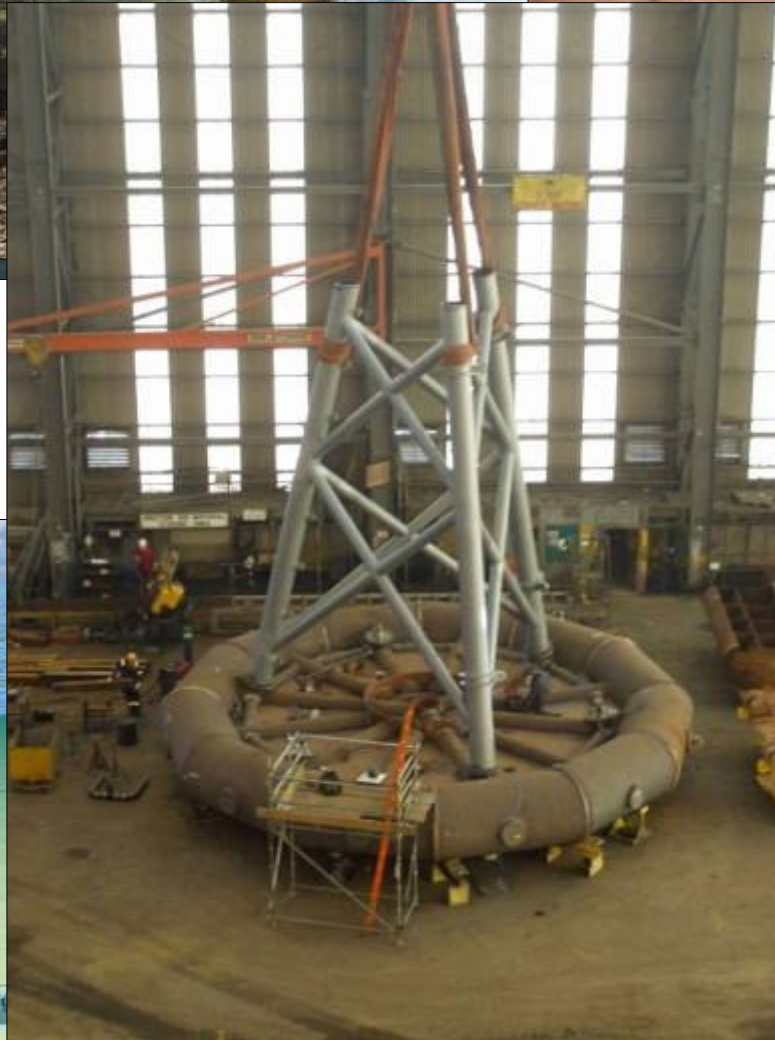


**Wello
Oy**



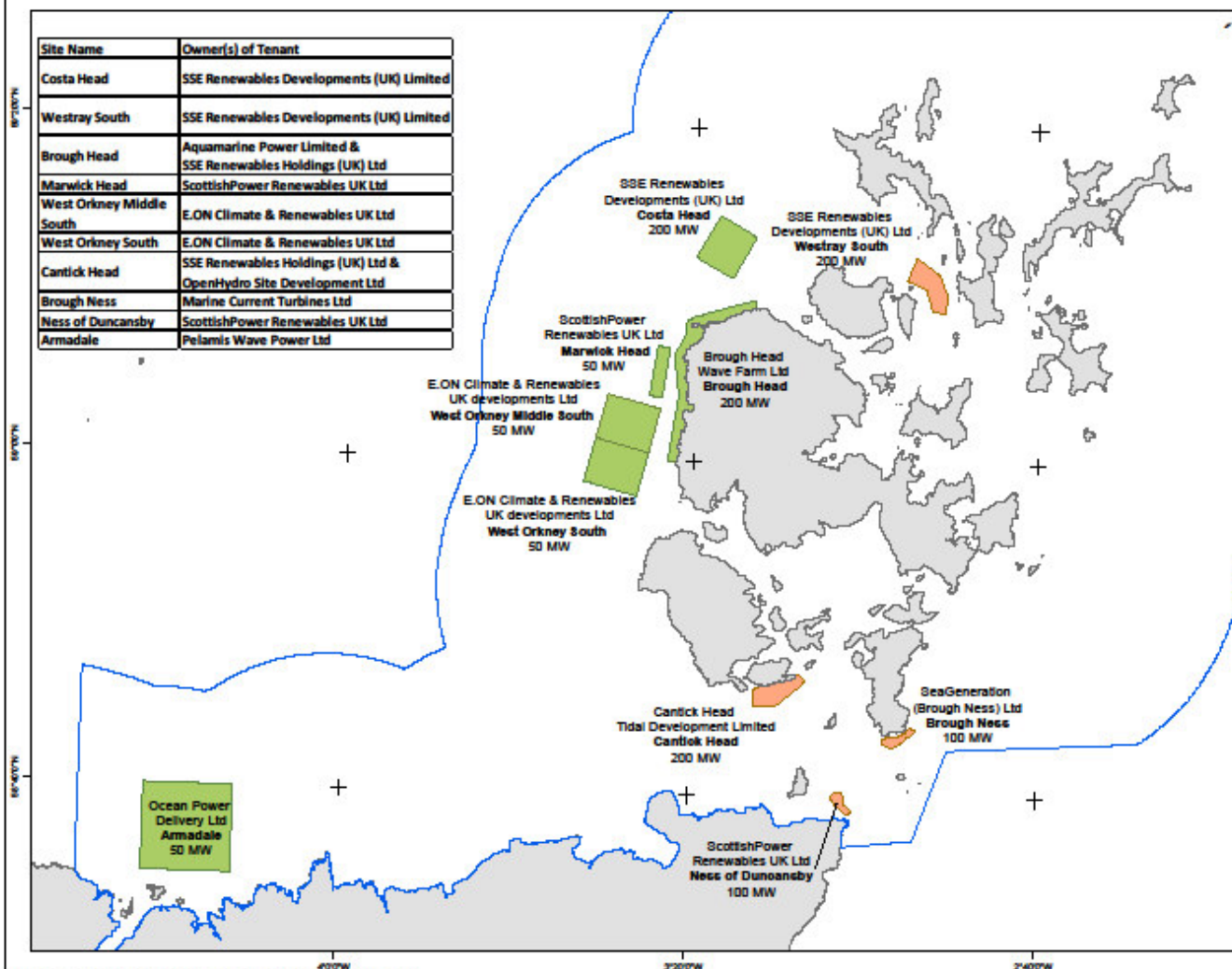


EMEC ORKNEY
The European Marine Energy Centre Ltd



Pentland Firth and Orkney Waters Round 1 Development Sites

Site Name	Owner(s) of Tenant
Costa Head	SSE Renewables Developments (UK) Limited
Westray South	SSE Renewables Developments (UK) Limited
Brough Head	Aquamarine Power Limited & SSE Renewables Holdings (UK) Ltd
Marwick Head	ScottishPower Renewables UK Ltd
West Orkney Middle South	E.ON Climate & Renewables UK Ltd
West Orkney South	E.ON Climate & Renewables UK Ltd
Cantick Head	SSE Renewables Holdings (UK) Ltd & OpenHydro Site Development Ltd
Brough Ness	Marine Current Turbines Ltd
Ness of Duncansby	ScottishPower Renewables UK Ltd
Armadale	Pelamis Wave Power Ltd



Development Sites
 Tidal
 Wave
 Strategic Area
 United Kingdom
 Europe

MaRS
 Marine Resource System
 Round 1 Development Sites
 05 March 2010

0 4 8 16 Kilometres

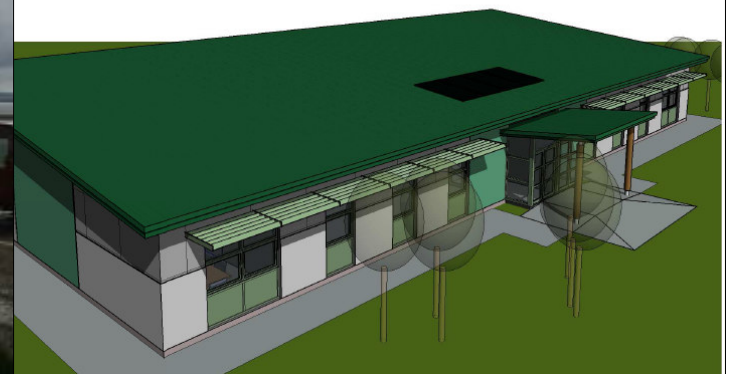
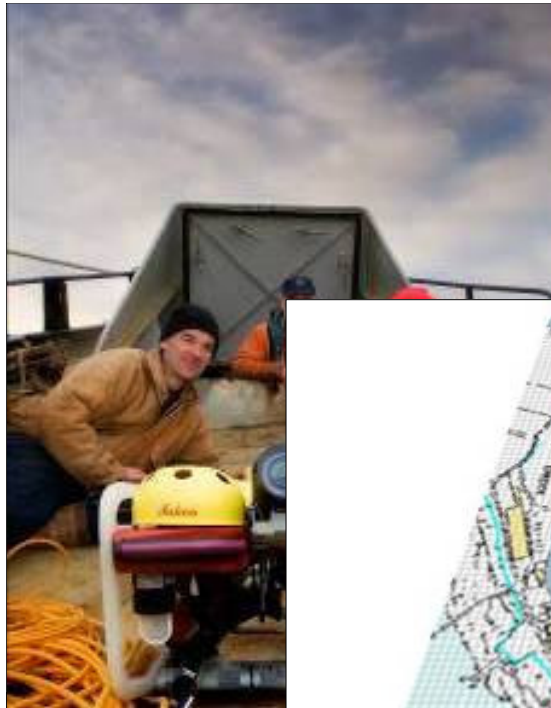
1:580,000 Author: KR
 Size: A4 QA: JM

Positions shown relative to WGS 84
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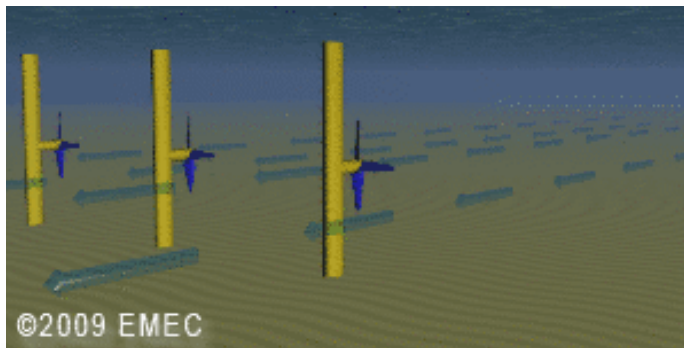
EMEC's Timeline

- **1999** DTI Foresight
- **2001** DTI & HIE Studies
- **2002** design & contract definition
- **2003** construction
- **2004** opening & 1st wave device
- **2005** tidal site commenced
- **2006** 1st tidal device
- **2007** Cable connection
- **2008** 1st tidal generation to grid
- **2009** 2nd tidal turbine, 2nd wave device
- **2010** 2 further wave devices & 2 further tidal devices

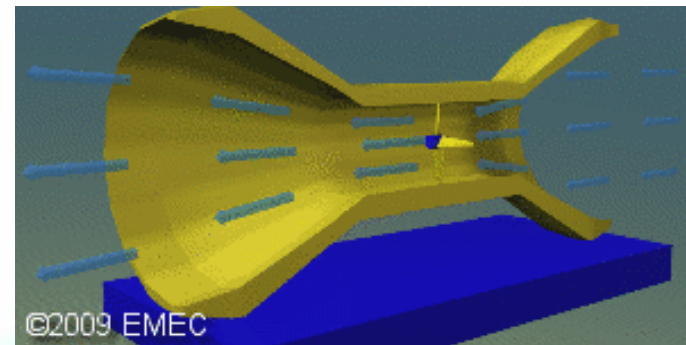


Tidal devices

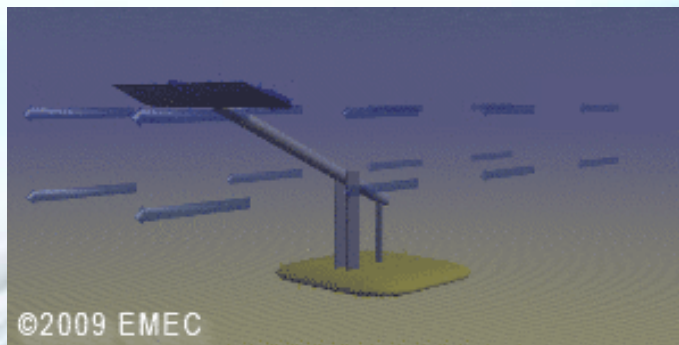
Horizontal axial-flow



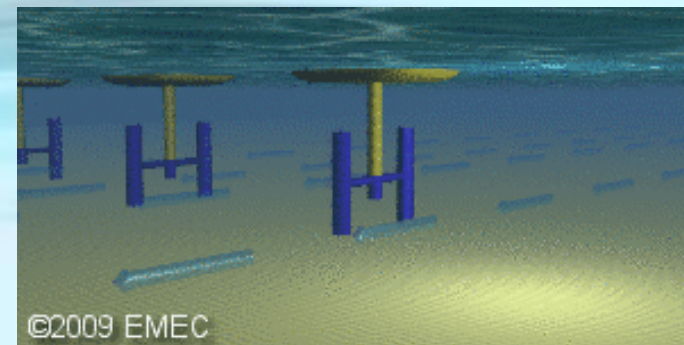
Venturi Effect



Oscillating Hydrofoil



Vertical axis





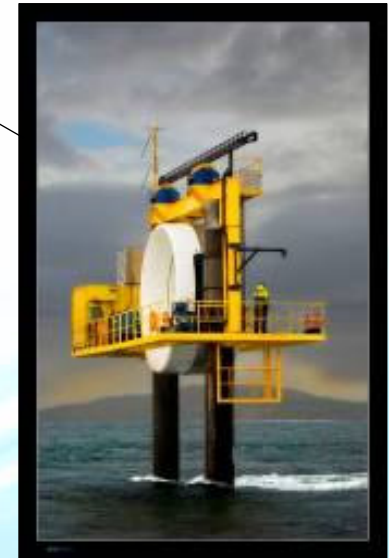
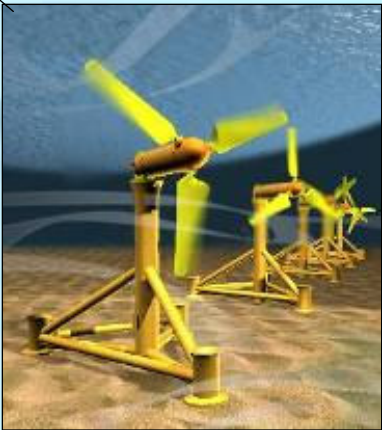


openhydro
tidal technology

- 1MW barge deployment, Nova Scotia



Tidal Site – Fall of Warness, Eday



Next Steps

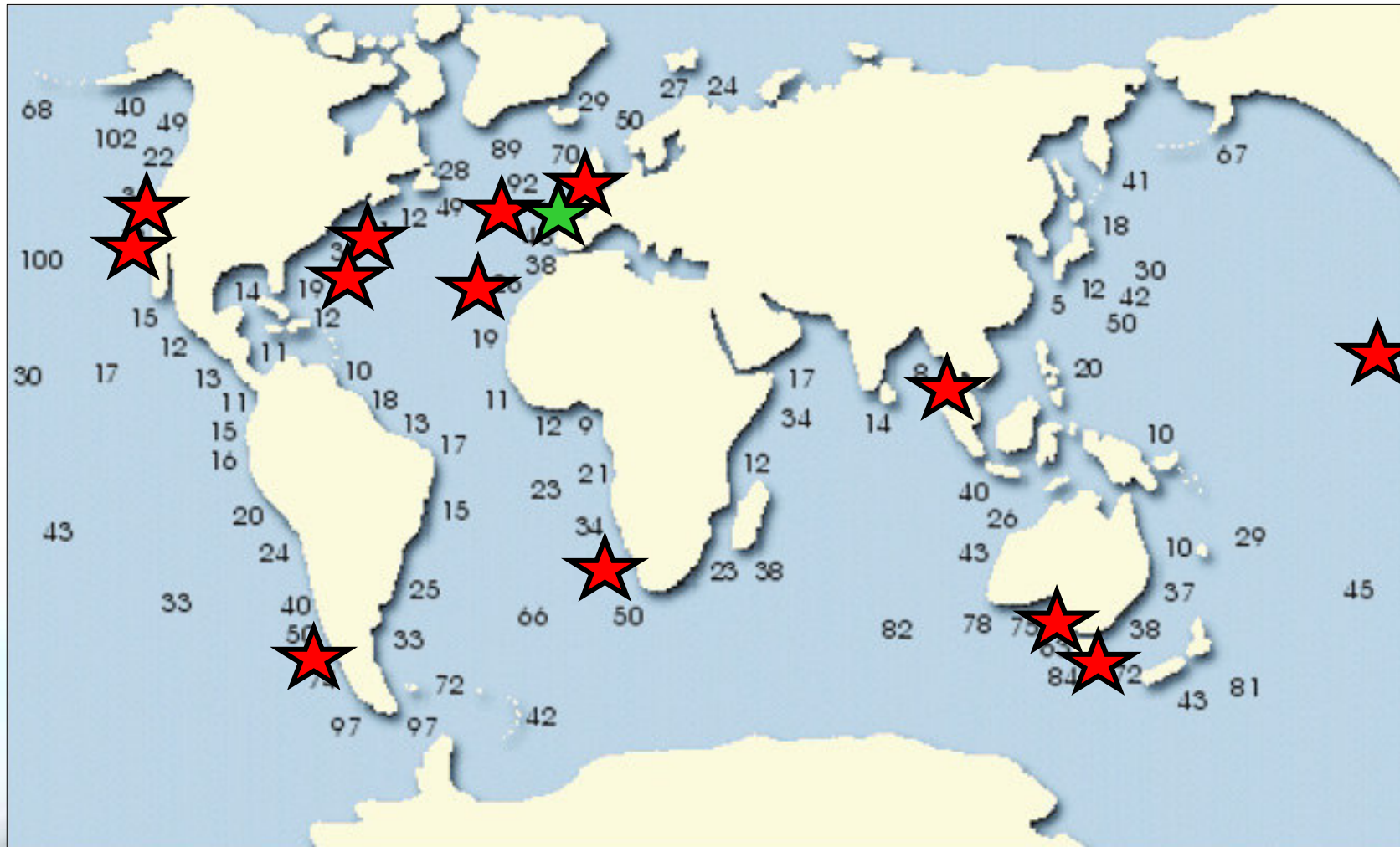
Priority:

- Get Metal Wet
- Find out what works (and for how long)
- Get ready to build it out.

What have we learned?

- There is an appetite to make this work
- Regulatory inertia can be avoided
- It is slower than you want
- It is hard out there!
- It is achievable

We are not alone



European Marine Energy Centre

www.emec.org.uk

