”Is there a future for wave and tidal in the UK?”
David Jones Project Director Marine Energy Wales – CF 2019 London

MARINE ENERGY WALES
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Is there a future for wave and tidal in the UK?

- Background
- Innovation and progress in the UK
- Fit into the UK policy landscape
- Impact in peripheral coastal communities
- Is there a future?

"Is it time to end subsidies for wave and tidal energy?

"Progress in wave and tidal energy hasn't been slow – its been non-existent"

"Been in the experimental phase since the 1800s"

"The 'science projects' have been done for decades…"

"Scotland has been throwing ***hundreds of millions of dollars*** *into testing and pre-commercial development…."*

- GreenTechMedia 2015

“Wave power is a really, really stupid idea.”

“That’s why it’s getting so much taxpayer subsidy. Civil servants think they can transform our clean energy prospects. The market doesn’t agree. But you’re paying for their hunch anyway.”

- The Spectator 2014


Fake news??

Fake news v facts

- DECC energy funding budget since 2010 marine energy <0.1%
- Every £1 of public funding has leveraged £7 of private investment
- High % was from overseas investment which would not have been spent in the UK
- Circa 80% captured in UK SC – Maritime nation
- Marine has been a net contributor to UK plc

Innovation & progress – Leading the world in marine energy

Nova Innovation tidal array with Tesla Powerpack successfully integrated into smart grid control system in 2018. Tidal cycle predictability with storage = worlds first "baseload' tidal power station. HIE 60% Scotland 84% UK 98%

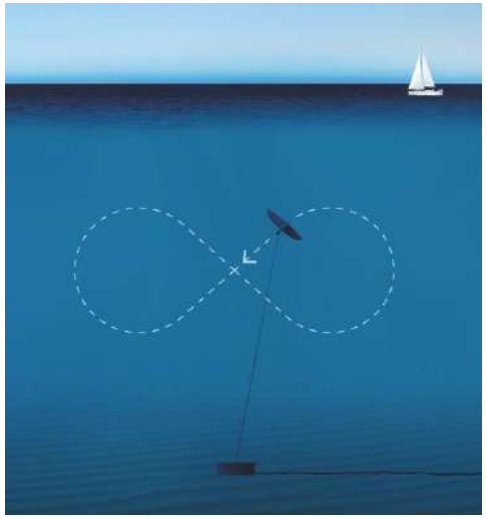
Innovation & progress – Leading the world in marine energy

Surf & Turf CES / EMEC – Hydrogen fuel cell and electrolyser to explore off grid use of energy & local ferry use. Produced worlds first tidal powered hydrogen in 2017

Innovation & progress – Leading the world in marine energy

Project Natick – EMEC deployed Microsoft underwater data center, powered by marine energy. Reduce energy needed to keep datacenters cool. Worlds first test at scale in 2018

Innovation & progress – Leading the world in marine energy



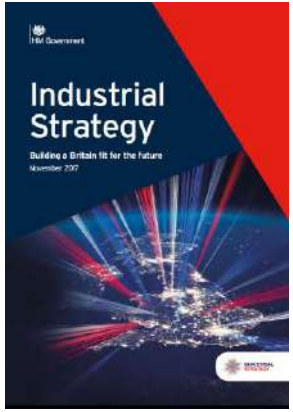
Minesto – Installed, commissioned and verified worlds first low speed tidal stream tech at commercial scale off Anglesey in N.Wales in 2018

Fitting into UK Policy

20 years of energy policy in the UK

- Four departments within which energy has been shuffled around: DTI, BERR, DECC, BEIS…
- 12 Secretaries of State
- 16 Energy Ministers, almost one every year…
- How is policy set?

Supporting Government Strategies v Gov Policy



Five Foundations
- Ideas ✓
- People ✓
- Infrastructure
- Business environment ✓
- Places ✓✓

Grand Challenges
- AI & Data Economy
- Future of Mobility
- Clean Growth ✓✓
- Ageing Society

Three tests
- Cost reduction ✓
- World leading ✓
- Carbon targets ✓

Innovation
- Industrial strategy
- Capex and tax support

UK government's clean growth strategy has set out three tests

Can we see a clear cost reduction pathway for this technology, so we can deliver low cost solutions?

Can the UK develop world-leading technology in a sizeable global market?

Does this deliver maximum carbon emission reduction?

Lessons from onshore wind: UK v Denmark

Market support

- **1980** – 30% capital grant support for wind projects
- **1984** – Fixed price tariffs for wind energy (combined with capital grants)
- **1990** – Feed-in tariffs for wind
- **1992** – 12,209 Danish turbines installed globally, 72% exports
- **2016** – 88% of €7.3bn wind sector exports associated with wind turbines and components

- **1990** – Non-Fossil Fuel Obligation
  - 6 years after Danish tariffs; auction not FIT
  - Seeking lowest cost; short-term deadlines; just 1 UK turbine supplier (WEG)

'it is doubtful that another mechanism could have been more successful in supporting a foreign industry than compelling all developments to occur within a short period of time when the domestic industry is in its infancy' (UK Gov, WASC)

- **1998** – Final UK large-scale wind turbine supplier WEG sold to Danish NEG Micon (now Vestas)

Lessons from onshore wind: UK v Denmark, 2016

NOVA INNOVATION

Country	Denmark	UK
Population	5.7 million	65.6 million
Installed wind capacity	5,476 MW	18,872 MW
Wind capacity per capita	1.0 kW/person	0.3 kW/person
Wind sector employment	32,898	14,000
Wind sector turnover	15.7 Billion EUR	7.8 Billion EUR
Wind sector exports	7.3 Billion EUR	0.3 Billion EUR
Wind exports per capita	**1,280 EUR**	**5 EUR**

UK arms exports 2016: 7.2 Billion EUR

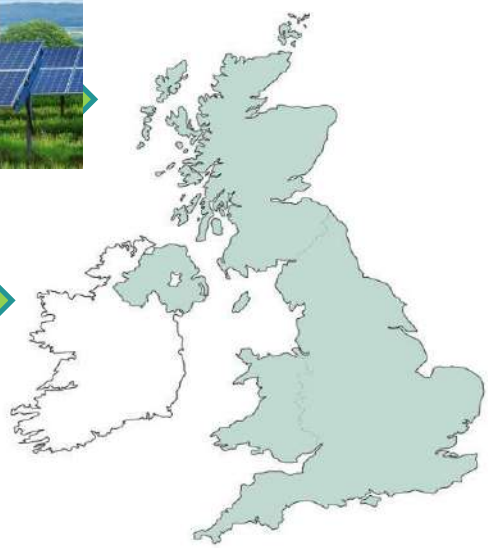
Graphical representation of wind exports per capita

Rundetaarn Copenhagen, 42 m

British Bulldog, 0.2 m

Not actual size

Policy = UK history of importing renewable technologies



Is there a future ?

- Low carbon maritime opportunity that supports SC reliance and clusters / peripheral economies / inward investment / global export potential / long term energy security
- The UK are world leaders at the moment EMEC (Orkney) / FABTEST (Falmouth) / Wave Hub (Cornwall) / NAREC (Northumberland) / Smart Bay (Ireland)
- Deployments in Australia/China/Denmark/Singapore/Hawaii/Italy/Netherlands/Norway/Peru/ Korea/Sweden/ Japan/ USA/Canada/France = £50-76 Billion worldwide by 2050
- Blue economy is a driver for Wales and UK devolved nations
- Planet Ocean, predictability Climate Change Mitigation
- Globally yes!
- UK Policy (CfD) will decide if the UK marine energy tech led export sector v project led import sector

"Marine energy technologies offer an energy opportunity where the UK can reasonably aspire to be the global leader, with some substantial supply chain opportunities to match it…The UK should be promoted as a centre of global excellence and opportunity for the development of all marine energy technologies…"

Charles Hendry, The Hendry Review of Tidal Lagoons