Wave Energy Road Mapping Workshop

Copthorne Hotel, Plymouth

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GVA and Systems Benefits

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Wave and Tidal Energy:

The Potential Economic Value

Wave Energy Plymouth 2020

THE UNIVERSITY of EDINBURGH
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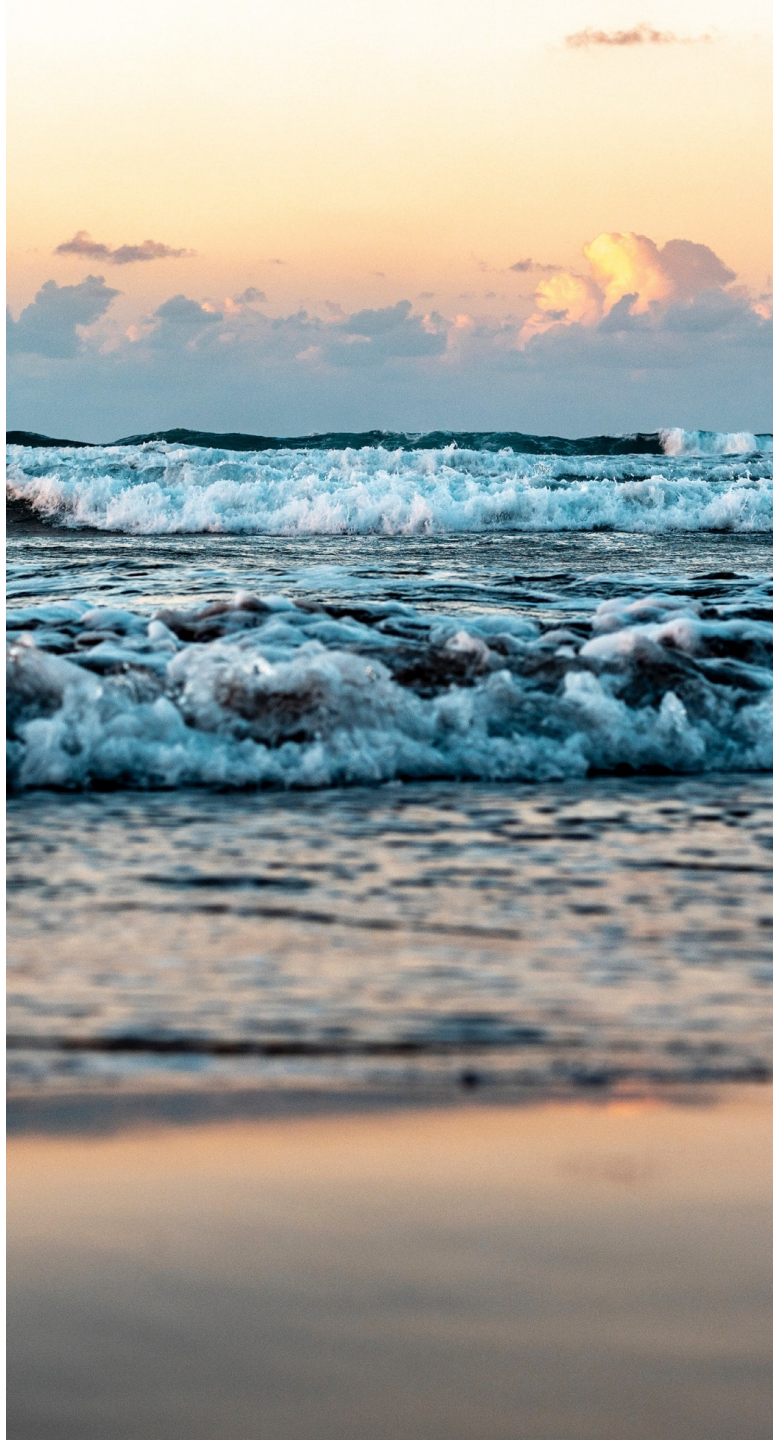
Setting
THE SCENE

This work analyses a hypothetical scenario - presenting the potential economic benefit of the wave and tidal sectors to the UK, **if we get everything right**.

The key assumption of this scenario: wave and tidal generation have **cost parity** with other sources of generation **by 2030**.

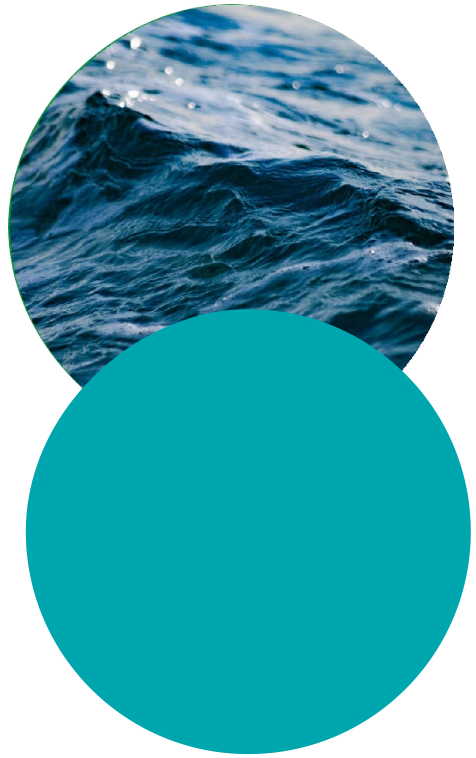
CAPEX and OPEX of Wave and Tidal Stream set to be comparable with other sources of generation at 2030 – resulting in a levelised cost of energy **of £90/MWh**.

The intention of the study is to present the prize, **not** specifically how to achieve it.



APPROACH

Two models were used to estimate the size of the domestic (UK) and global wave and tidal markets.



UK –ESME Energy System Modelling Environment

- ESME is a whole-systems model that deploys technologies for all parts of the energy system to produce a least-cost system capable of fulfilling demand subject to carbon targets and techno-economic assumptions.

ESME
Energy System Modelling Environment

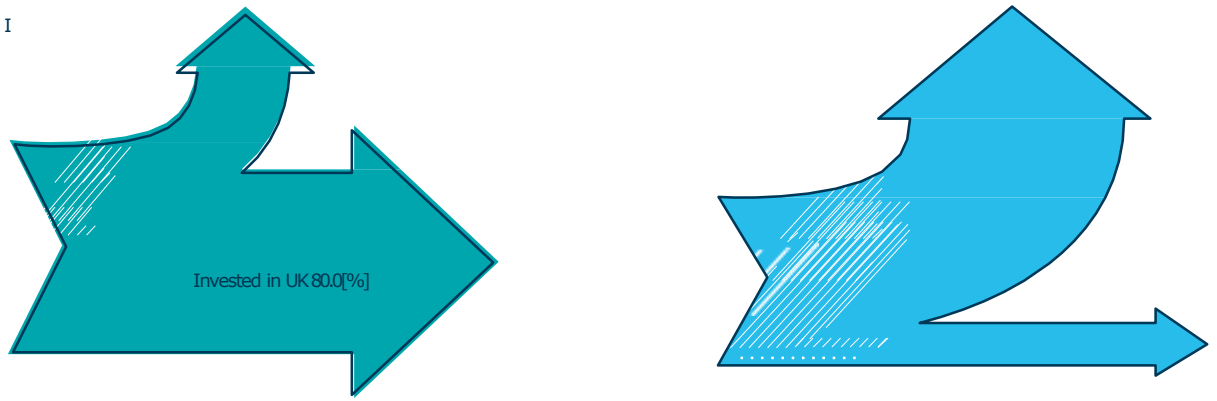
Global - IEA's TIMES Regional model

- Global deployment has been informed by the Energy Technology Perspectives 2012 (ETP2012) "High renewable variant of 2 degree scenario (= delayed CCS and low nuclear variant)".

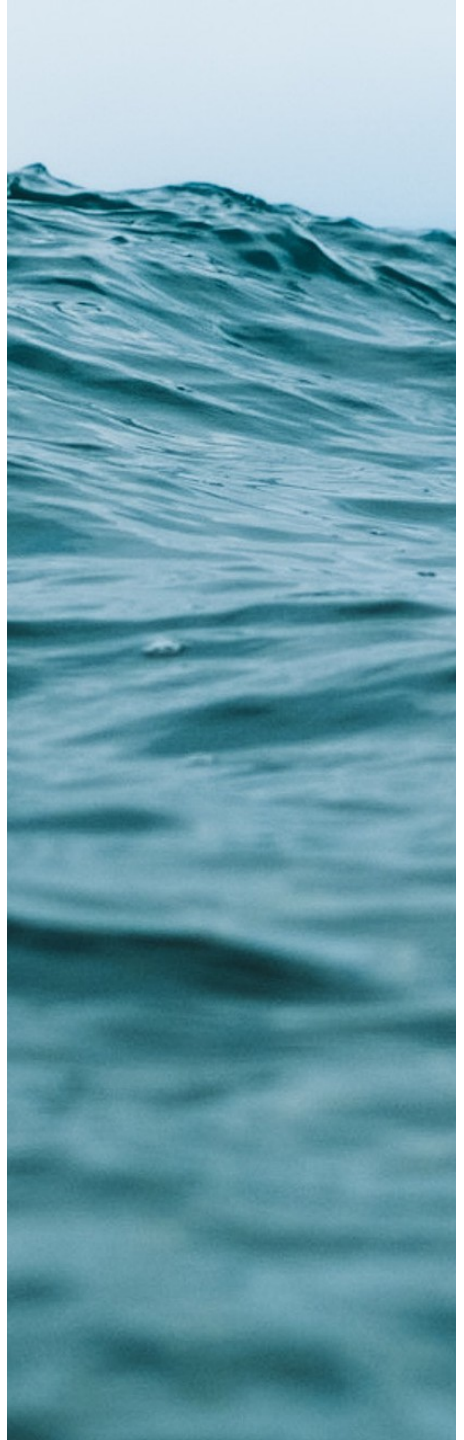
iea International Energy Agency

ASSUMPTIONS

- **Key assumption:** wave and tidal generation have **cost parity** with other sources of generation **by 2030**, achieving a levelised cost of energy **of £90/MWh**
- Assuming a global lead, **UK content in domestic projects** was **set to 80%**
- UK content in **global projects was set to 15% in 2030 reducing** to **5% by 2050**



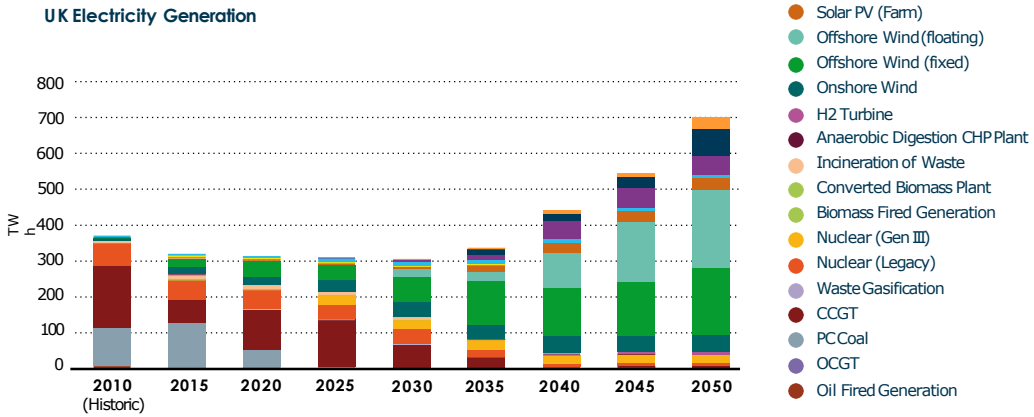
- A Department for Business, Innovation and Skills analysis of **Industry Input-Output tables**[1] used to estimate ratios of industry spend to Gross Value Added (GVA).



RESULTS

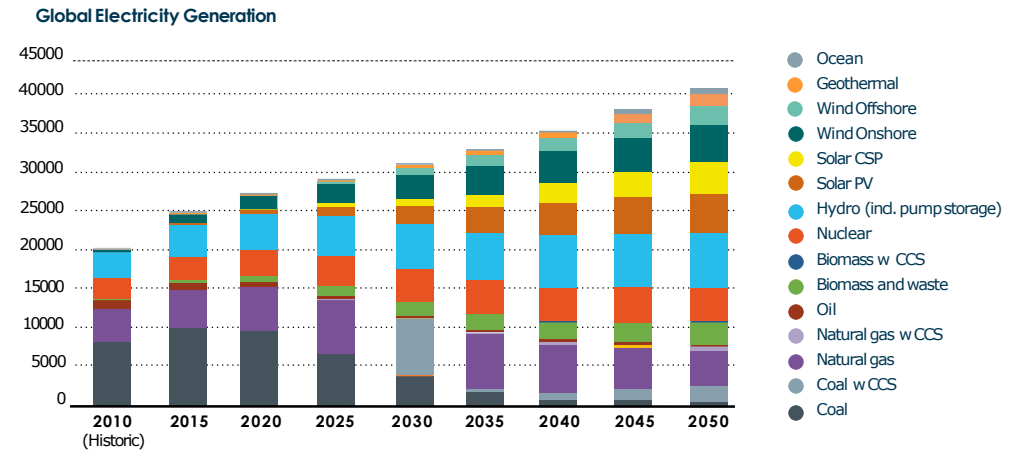
UK Deployment

ESME modelling results in ocean energy reaching a total of **37.7GW** installed capacity by 2050 (represents 14% of UK capacity).



Global Deployment

TIMES modelling results in ocean energy reaching a total of **337GW** installed global capacity by 2050 (represents 2-3% of global capacity).



Wave and Tidal GVA RESULTS

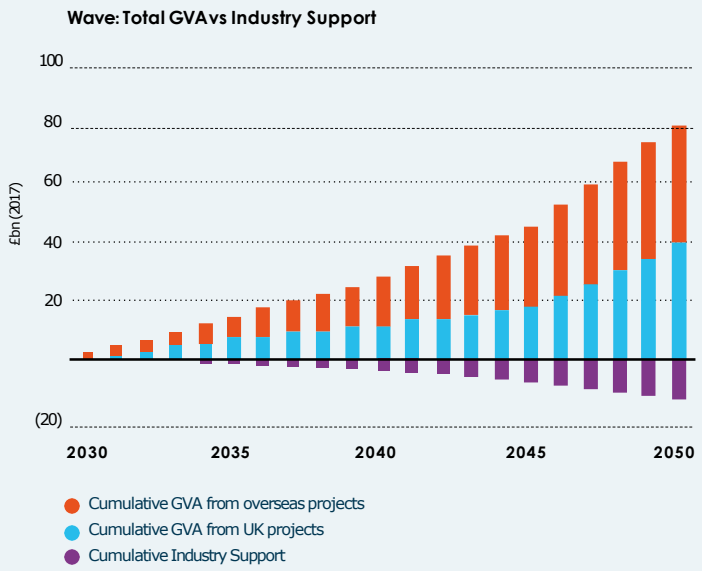
Presenting the potential economic benefit of the wave and tidal sectors to the UK, if by 2030 the sector achieves at least cost parity.

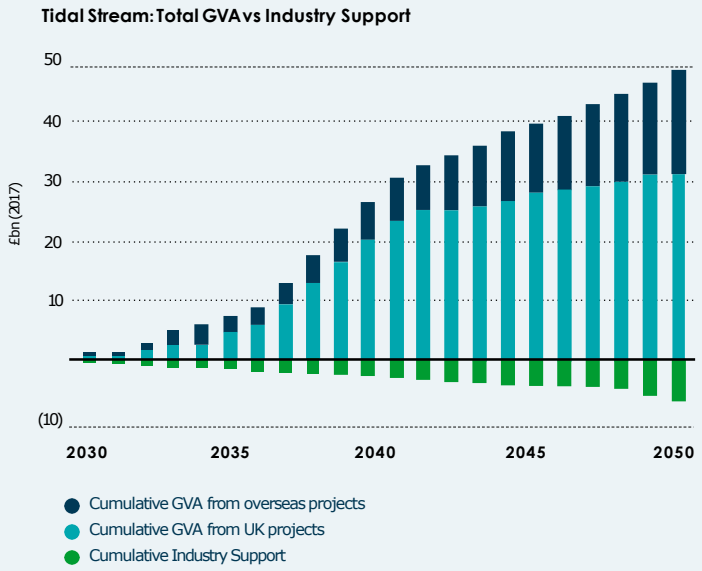
Wave Results (2030-2050)

Net **£64.6bn** GVA, 6:1 GVA to industry support ratio

Tidal Stream (2030-2050)

Net £**41.5bn** GVA, 7:1 GVA to industry support ratio

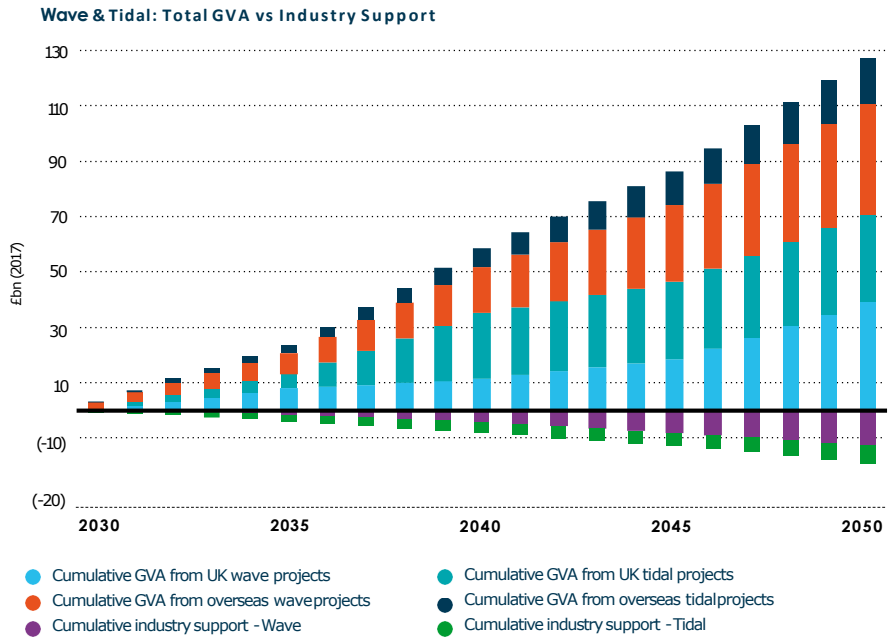




CONCLUSIONS

This work is a demonstration of how **significant technology breakthroughs** and the **proper support** to the wave and tidal industries through to 2030 can realise a large potential prize to 2050.

Based on the assumptions outlined, the UK could see over **1300TWh** of clean, secure, sustainable electricity produced and **£106.1bn net GVA** (2017 real) created by the marine energy sector from 2030 to 2050 – **over twice the value of the current UK automotive sector**[1].



THE UNIVERSITY of EDINBURGH
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Policy and Innovation Group

This work has been produced by the Policy and Innovation Group at the University of Edinburgh, with modelling support from the Energy Systems Catapult.

The Policy and Innovation Research Group is part of the Institute for Energy Systems (IES), which is one of the six research institutes within the School of Engineering at the University of Edinburgh.

The University of Edinburgh's School of Engineering is one of the largest, most innovative and highly-ranked Schools in the University and one of the leading centres of engineering in the world. The School of Engineering's vision is to advance and transmit the knowledge base of engineering to meet society's aspirations, creating and engineering the answers to global problems.

http://policyandinnovationedinburgh.org

CATAPULT
Energy Systems

The Energy Systems Catapult is part of a network of world-leading centres set up by the government to transform the UK's capability for innovation in specific sectors and help drive future economic growth.

By taking an independent, whole energy systems view, we work with stakeholders across the energy sector (consumers, industry, academia and government) to identify innovation priorities, gaps in the market and overcome barriers to accelerating the decarbonisation of the energy system at least cost.

In doing so, we seek to open up routes to market for innovators, as well as supporting them to understand how their products, services and value propositions fit into the transforming energy system.

http://es.catapult.org.uk