Environmental Audit Committee: Enabling sustainable electrification of the UK Economy
Marine Energy Council Response

Introduction

The Marine Energy Council (MEC) welcomes that Environmental Audit Committee (EAC) is considering the measures required to deliver sustainable electrification of the UK economy.

The MEC is the voice of the UK's tidal stream energy (TSE) and wave energy industries. Established in 2018, the MEC's membership spans technology and project developers, consultants, associations, manufacturers, and small and medium sized enterprises working in the supply chain.

Our vision is for the marine energy sector to support a secure, cost-effective, and fair transition to net zero, enabling investment, exporting British innovation, and levelling up with employment opportunities across the UK. Electricity networks and the policy environment will have key roles in ensuring that these opportunities are secured in the UK.

The UK has significant marine energy potential:

- **TSE** is entirely predictable and could provide up to 11%[1] of the UK's current electricity demand. This predictability can help reduce supply/demand mismatch in the energy system and reduce dependence on fossil fuels and imports. TSE can be deployed rapidly, with the potential construction time of a consented farm being less than three years.
- **Wave energy** provides a more consistent generation profile than solar or wind and could provide up to 20%[2] of the UK's current electricity demand. In addition, its harmonious relationship with wind means it can be co-located at offshore sites supporting a more cost-effective and efficient energy system. [3]

Sustainable electrification requires consideration of what is currently working, what needs to be adjusted, and how the UK can align its policy, regulatory and investment environments to work together towards net zero. The MEC response sets out key considerations for the Committee, and the actions that the UK Government can take to enable marine renewables to play a key role in delivering its decarbonisation ambitions. These are:

- Commit to setting multi-year CfD budgets.
- Incentivise innovative deployment of renewables.
- Set a target for marine renewable deployment.
- Develop supply chains in areas where the UK has an existing strategic advantage.
- Aim for a cost-effective net zero energy system.
- Expediate the consenting process.

The MEC would welcome the opportunity to discuss these actions, and the UK's marine energy journey with the Committee. If you have any questions, please contact the MEC's Policy Director, Richard Arnold, via r.arnold@marineenergycouncil.co.uk.

[1] Coles et al (2021) *'A review of the UK and British Channel Islands practical tidal stream energy resource'*. Available online.
[2] Jin et al (2021) '*Wave energy in the UK: Status review and future perspectives'.* Available online.
[3] In this response 'marine energy' is used to refer to tidal stream and wave energy.

The way the Contracts for Difference (CfD) process is managed has a negative impact on investor confidence.

Emerging technologies will benefit from the Government setting multi-year CfD budgets, which will provide advanced sight years prior to allocation rounds.

Currently the Government announces the CfD budget, Administrative Strike Prices, and the inclusion of a ringfence months prior to the allocation round closing. Undertaking the leasing, consenting and network requirements to make capacity eligible for bidding in to the CfD takes multiple years. This means there is a disconnect between the processes industry must undertake and the policy environment which is not providing certainty that having been through the process to make capacity eligible for the CfD, that the ringfence or budget will exist.

The UK Government demonstrated welcome international leadership in setting a ringfence for tidal stream in Allocation Round 4 (AR4). This will deliver over 40MW of projects benefiting UK supply chains and energy security. The four projects will power the equivalent of over 40,000 homes and marks an important first step in delivering the 11GW of potential afforded by the UK's geography.

Advanced sight of budgets will help prime supply chains to maximise UK content for TSE and wave. Multi-year budgets would create the environment to attract technology agnostic developers to invest in new sites, obtain development rights and increase the amount of eligible capacity available to be bid into future rounds.

The Government needs to be responsive to external changes. In setting multi-year CfD budgets, or at least giving an indication of whether there will be a ringfence, would not preclude ongoing consultation or changes closer to the relevant allocation round. It would provide a signal of intent and create the environment for emerging technologies to secure investment and be supported down the cost reduction curve.

Innovative deployment of renewables is not encouraged or incentivised in the existing system.

The Review of Electricity Market Arrangements (REMA) consultation provides an opportunity to align market signals with desired policy outcomes. This could be achieved through optimising the use of existing assets and incentivising innovative deployment of renewables. Supporting this through either a CfD ringfence or a specific funding mechanism for innovative deployment will support a cost-effective transition, energy security and position the UK as an innovation leader.

Diversity and innovative deployment of renewable technologies will be key in optimising how the energy system is utilised. Waves are created by winds but provide a more consistent generation profile than wind and can be harnessed 3-8 hours after the energy is initially harnessed by wind farms. Co-locating offshore wind and wave energy converters allows technologies to share assets and can reduce costs for both the wind and wave site by 14%.[4]

The UK Government should initially support a pilot hybrid wind-wave project as a step toward commercialisation. This follows the example set by the Netherlands for floating solar power, where the next generation of offshore wind farms are expected to deploy 5MW of floating solar capacity. This requirement is set to ramp up to 100MW for the next leasing round, creating a long-term market that

[4] OWC (2023) *Wave and Floating Wind Energy, opportunities for sharing infrastructure services and supply chain.* Available online.

will attract investment into innovative technology. A similar approach could be used to support hybrid deployment of wave power in the UK.

The Government should set a target for marine renewable deployment.

TSE is on a clear cost-reduction trajectory, following the trajectories demonstrated by wind and solar energy, and is projected to reach £78/MWh by 2035 and 1GW of deployment, and below £50MWh by 2050 and 10GW of deployment.[5] [6] This means that by 2035 TSE is forecast to be cheaper than new nuclear.

The EAC has previously supported the MEC's call for the Government to set a clear target for the sector. By setting a target the Government will be providing clarity in terms of direction, and commitment to develop a key emerging technology.

The MEC would welcome support for a 1GW tidal stream target, and 200MW of wave energy capacity by 2035.

Creating and building supply chains should be central to sustainable electrification.

The current CfD mechanism awards contracts based on the lowest Levelised Cost of Energy (LCOE). This has been successful in increasing renewable capacity from 7% of the UK's electricity supply in 2010, to over 40% today. However, a great deal of the cost-reduction achieved was because of other countries supporting indigenous renewable manufacturing sectors and supply chains. These countries are now benefiting from thriving export markets.

In the 1980s Denmark invested early in their wind energy industry, delivering projects with high levels of local content, and developing its domestic market. In the process it gained first mover advantage and in exports alone its wind sector generates over £7bn annually for the Danish economy. In 2012, 88% of Denmark's exports were associated with tidal turbines and components.[7] By contrast the UK's wind sector, Europe's largest generator of wind energy, exports less than £0.5bn annually and is a net importer of wind technology, principally from Denmark.[8]

There is an aspirational target for wind projects to achieve 60% UK supply chain spend. Reaching this target will likely lead to the cost of the CfD increasing. The Government and the EAC should consider whether the CfD mechanism, and the manner that this is funded through household bills, is the right mechanism to support this growth.

For marine energy the potential to reinforce an established UK supply chain and lead the world is significant. Orbital Marine Power's O2 device was delivered with 80% UK supply chain spend. The O2 was conceived in Orkney, designed in Orkney and Edinburgh, built in Dundee with steel from Motherwell, blades from the Solent, anchors from Anglesey and hydraulics from the Midlands. In the first 18 months of operation of Nova Innovation's world-first offshore tidal array in Shetland, 98% of supply chain expenditure went to UK companies, with 60% going to companies in the Highlands and Islands region.

The Policy and Innovation Group from the University of Edinburgh recently estimated that TSE could provide between £5bn and £17bn GVA to the UK economy by 2050.[9] The objective of the UK

[5]ORE Catapult (2022) *Cost reduction pathway of tidal stream energy in the UK and France*. Available online.
[6] Figures provided are in 2012 currency, which is the current base year for CfD strike prices.
[7] Deloitte (2012) *Study of the macroeconomic impact of Wind Energy in Denmark*
[8] State of Green (2021) *The economic benefits of wind energy*. Available online.
[9] University of Edinburgh (2021) *What is the value of innovation ORE deployment to the UK economy?* Available online.

Government should be to seize as much of this potential as possible, and to embed supply chains in and across the UK. [10]

The UK has an opportunity to create over 4,000 jobs in tidal stream by 2030 with over 50% of the economic benefit expected to be generated in coastal areas.[11] By 2040, and including wave energy, the number of jobs supported could support more than 22,000 jobs.

Sustainable electrification requires sustainable growth and the spread of opportunities associated with net zero across UK communities. The Resolution Foundation in its Economy 2030 report notes that technologies like tidal 'are not only likely to generate relatively high national economic returns, but also have the potential to contribute to regionally balanced growth.'[12] Investment in wave and tidal technologies in less innovation-intensive regions generate strong returns, imperative for the net zero transition.

Sustainable electrification requires taking a systemwide view of the impact of the renewable mix.

Research by the University of Edinburgh through Project EVOLVE has found that deployment of just under 13GW of marine energy will reduce annual dispatch cost from £13.54bn to £12.51bn. This is an annual saving of over £1bn for UK households. This cost reduction comes from a higher dispatch of renewable energy – by up to 27 TWh (+6%), and thus a lower requirement for expensive peaking generation – by as much as 24 TWh (-16%) when wave and tidal generation are part of the electricity mix, compared with a scenario without marine energy generation.[13]

Energy storage will be a key driver of cost in the future energy system. Research by the University of Plymouth has shown that tidal stream can reduce the power rating and the energy storage capacity of inter-seasonal required. [14] A reduction in required storage will make the UK's energy system more cost-effective and potentially secure.

The positive system balancing effect is currently not valued within the CfD mechanism. To support a secure and cost-effective transition the market should be encouraging the delivery of low carbon electrons that can be dispatched at periods of low energy yield from wind farms or solar panels.

A diverse energy generation mix should be an explicit aim of the UK's energy policy, and the roles that different technologies will play understood and valued.

Modelling carried out by Research by Imperial College London shows that tidal stream can directly reduce natural gas capacity required to ensure energy security by about 40%.[15] As more than half of UK gas is imported, firmer power renewable energy resources like tidal stream will be key in supporting energy security, a cost-effective transition to net zero that protects households from international gas price shocks.[16]

The importance of a diverse generation mix was emphasised over a two-day period in 2022. The UK energy system saw a record-breaking day on 2 November as wind generation exceeded 20GW for the first time.

The following day wind generation fell below 2GW with the shortfall covered by interconnection and gas-fired power generation. Energy security in a net zero world requires a diverse energy generation

[10] ORE Catapult (2022) *Cost reduction pathway of tidal stream energy in the UK and France*. Available online.
[11] ORE Catapult (2018) Ibid.
[12] Resolution Foundation (2022) *The Economy 2030 Inquiry.* Available online.
[13] Supergen (2023) *What are the UK power system benefits from deployments of wave and tidal stream generation?* Available online.
[14] Coles et al (2022) *Impacts of tidal stream power on hybrid energy system performance: An Isle of Wight case study*. Available online.
[15] Frost (2022) *Quantifying the benefits of tidal stream energy to the wider UK energy system.* Available online.
[16] D. Pudjianto, G. Strbac (2022) *Role and Value of Tidal Stream Generation in the Future UK Energy Mix*.

portfolio, so when the wind isn't blowing, or the sun isn't shining the shortfall can be addressed by renewable and low-carbon options rather that fossil fuels.

Expediating the consenting process will be critical to achieving the UK's decarbonisation targets.

The UK Government should work with the devolved administrations to streamline regulation and enable synergies between marine energy and other developments. We recommend reducing consenting review approval times to three months, as is being pursued for offshore wind in the UK. This is in line with current proposals by the European Commission across Europe and will strengthen the project pipeline and ensure that the UK remains at the forefront of new project development.

MRE projects can be deployed within well under 3 years. However, due to current consenting constraints and the structure of the primary mechanism for supporting renewable projects, the CfD, development of a new, greenfield site takes upwards of 7 years – and potentially much longer. New site development is crucial to the future growth of the industry and the achievement of the goals set out above, but the extremely long timescales involved are a strong disincentive to investment.

The UK Government could explore aligning offshore consents with onshore consents: onshore, a Section 36 consent is required for projects over 50MW, while offshore projects require a Section 36 consent for projects over 1MW. A proportionate approach to consenting is also required, where relatively small-scale marine energy developments can be assessed more quickly than multi-GW offshore wind farms.

Consenting processes for MRE projects should recognise that the impact of failing to meet net zero goals will be catastrophic for society and biodiversity, whereas the effects of offshore renewables can be mitigated, or where necessary offset or compensated.