

Just Transition to Net Zero Wales: Call for Evidence

Marine Energy Council Response

Introduction

The Marine Energy Council (MEC) welcomes the opportunity to respond to the Just Transition to Net Zero Wales consultation.

The MEC is the voice of the UK's tidal stream (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 great British innovation, and levelling up with employment opportunities across the UK.

Wales is strongly positioned to benefit from its rich wave and tidal resource, with 456MW of marine energy sites already leased, and an additional 3.4GW of additional sites already identified for further development. This natural potential is combined with leading marine energy developers that call Wales home, including Minesto, Marine Power Systems and Bombora, and key sites including Morlais and the Pembrokeshire Demonstration Zone.

Marine energy can play an important role in Wales' net zero future:

- **TSE** is entirely predictable and can provide 11%¹ of the UK's electricity demand. The predictability can reduce supply/demand mismatch in the energy system and directly displace dependence on imports. TSE can be deployed rapidly, with the construction time of a consented farm being less than three years.
- **Wave energy** is more consistent and predictable than solar or wind and could provide up to 20%² of electricity demand. In addition, its harmonious relationship with wind means that wave energy will support a more cost-effective and efficient energy system.³

As Wales' energy system becomes increasingly dependent on intermittent renewable energy sources, TSE and wave energy will play key roles in maintaining energy security and delivering a just transition for coastal communities and beyond.

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.

Executive Summary

The MEC welcomes the Welsh Government's net zero ambitions, and commitment to managing the transition in a fair and just manner. The net zero transition has the potential to create significant opportunities, attracting investment, creating, and sustaining green jobs, and bolstering energy security. Marine energy can have a key role in delivering these aims.

Wales has the potential to be a world-leader in marine energy. This can be achieved by the Welsh Government taking the following actions:

Prioritise increasing the amount of eligible capacity for future Contract for Difference rounds.

- The £20m TSE ringfence⁴ in the previous renewable auction secured the world's largest tidal stream project (outside of Scotland) in Anglesey. Delivering successful projects in Wales, requires a rapid increase in eligible capacity that can bid into the auction process. The Welsh Government can support this process by providing clear direction and capacity to Natural Resource Wales (NRW) to expediate the consent applications and process.

Introduce a revenue support mechanism for wave and TSE.

- It is understandable that due to budgetary pressures the revenue support mechanism announced by the Welsh Government has not yet been introduced. The MEC believes strongly that this is a missed opportunity to create supply chains, green jobs and develop the marine energy industry in Wales. For example, Nova Innovation's Shetland Tidal Array was delivered with over 90% of its supply chain spend with UK SMEs. TSE alone will create over 4,000 jobs in the UK by 2030 with a significant amount of the economic benefit expected to be generated in coastal areas (50-60%).⁵ The Welsh Government should seek to ensure as much as that potential is realised in Wales.

Make Wales an attractive location for investment in research and development, and innovation.

- The Welsh Government should consider replicating the Wave Energy Scotland (WES) model in Wales. WES is a technology development body that has facilitates the development of wave energy to commercial readiness in a manner that retains and maximises the benefit for Scotland. Replicating this model will support the Welsh Government's just transition ambitions, and create opportunities for communities across Wales.

Commit to deliver a co-located offshore wind and wave pilot.

- There is a significant opportunity to support colocation of offshore wind and wave energy converters. Wales-based Marine Power Systems is one of the leaders in developing innovative colocation platforms. The Welsh Government should seize the opportunity to fund and support the development of colocation solutions, which has significant international export potential.
- Waves provide a more consistent generation profile than wind and can be harnessed 3-8 hours after the energy is initially harnessed by wind farms. By committing to a pilot project as a step toward commercialisation will position Wales to be a world-leader in innovative offshore renewable deployment.

⁴ This was set by the then Energy Secretary Kwasi Kwarteng in November 2020. The ringfence created a pot that only TSE projects could bid into and compete against each other rather than more established renewable technologies.

⁵ Catapult ORE (2018) *Tidal Stream and Wave Energy Cost Reduction and Industrial Benefit*. Available [online](#)

Work with the UK Government to provide clarity to the marine energy sector, by setting a 1GW by 2035 target, and ongoing support for deployment through maintaining a ringfence for TSE and introducing a wave energy ringfence.

- An ongoing ringfence will deliver multiple projects in Wales, provide a clear investment pathway to drive down costs for consumers, and support the industrialisation of the UK TSE sector.
- A ringfence for wave energy should be introduced from Allocation Round 6 (expected to be held in 2024) onwards. Wales is home to key wave energy sites and our members are in the process of making capacity eligible to prepare for AR6.
- 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.'⁶ Investment in wave and tidal technologies in less innovation-intense regions generate strong returns.

Establish a strategic taskforce to explore and address barriers to marine energy deployment.

- The Welsh Government should create a strategic taskforce with the industry to unlock barriers to marine energy deployment. This has been successful in the offshore wind industry and the establishment of the Offshore Wind Industry Council.
- Marine energy is of strategic importance not only to Wales but the entire UK energy system. Research by the University of Edinburgh has found that deployment of just under 13GW of marine energy will reduce annual dispatch cost from £13.54bn to £12.51bn. This is a saving of £1.03bn annually for UK and Welsh 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.⁷

Ensure that electricity networks are prepared for a rapid increase in renewable deployment.

- Electricity networks and Ofgem should be supported to increase capacity by setting a clear capacity target for marine energy. This will assist National Grid, Western Power Distribution, and Scottish Power Energy Networks preparing accordingly for the necessary increase in electricity being generated by tidal stream and wave energy projects.

⁶ Resolution Foundation (2022) *The Economy 2030 Inquiry*. Available [online](#).

⁷ Supergen (2023) *What are the UK power system benefits from deployments of wave and tidal stream generation?* Available [online](#).

Impacts and Opportunities

Question 4. What evidence do you have on the main impacts and opportunities associated with meeting Wales' transition to net zero? Please provide evidence (or identify evidence gaps) for the short (2022 to 2025), medium (2026 to 2035) and long term (2036 to 2050).

The transition to net zero will create significant opportunities to develop green industries and sectors. Countries that act and support technologies to develop will benefit from first-mover advantage in growing export markets. 90% of global GDP is now covered by net-zero targets. Therefore, the demand for predictable, renewable firm power as provided by TSE, or an abundant energy generation source like wave, will only increase.

Wales is strongly positioned to be a world-leader in marine energy, provided the Welsh and UK governments work with industry to create an enabling environment, with clear and consistent routes to market, whilst supporting investment in R&D and innovation to de-risk deployments.

Short-term 2022-2025

Tidal stream

The TSE ringfence in Allocation Round 4 secured a 5.5MW project to be delivered by Magallanes in Anglesey. Depending on progression this could be generating by 2025 and would be the largest operational tidal stream project ever deployed outside of Scotland.

In March 2023 the Department for Energy Security and Net Zero (DESNZ) will announce whether the ringfence will continue. Maintaining a clear route to market to allow the TSE industry to develop is imperative to the journey down the cost reduction curve, and for Wales to seize the opportunity to be a world-leader. If the ringfence continues we would expect more Welsh projects to be competitive and successful in future auctions. As the CfD auction rounds are now annual there will be four (AR4-AR7) opportunities to increase awarded TSE capacity prior to 2025.

To position Wales to succeed in future CfD auctions it is critical that the Welsh Government provides clarity and direction to Natural Resource Wales to expediate decision making. Industry has faced unnecessary delays in making capacity eligible for future Auction Rounds.

The MEC would strongly support the Welsh Government ensuring NRW takes a pragmatic approach on consenting and post-deployment monitoring, ensure that it is adequately resourced, and introduce an eligible capacity target for 2030 and work with industry to achieve this. This will make Wales more competitive with England and Scotland in securing TSE projects in future auction rounds.

Wave

Bombora will be imminently piloting its 1.5MW pilot project in Pembrokeshire. This is the world's most powerful wave energy converter and will be a significant step for harnessing what the Intergovernmental Panel on Climate Change (IPCC) define as the world's largest untapped source of energy.

Wave energy has a potential annual global production of 29,500 TWh, equivalent to providing electricity for over 500 million homes. This is the market Wales could be a world-leader in, provided the Welsh and UK Governments take action now.

The Scottish Government's innovative and world-leading Wave Energy Scotland (WES) provides a template that the Welsh Government should follow. WES has been successful in attracting technology

developers, supporting innovation, and progressing WECs to near commercialisation. This scheme should be introduced prior to 2025 so Wales can compete with Scotland and attract increased investment in innovation.

In AR4 wave energy converters were required to compete with other emerging technologies in Pot 2 of the CfD scheme. The MEC is calling for the UK Government to establish a ringfence as part of AR6 in 2024 to provide a clear route to market as has been provided to TSE. The Welsh Government's support in delivering that will be essential.

For both wave and TSE, it is critical that the amount of eligible capacity that can bid into the CfD scheme is increased rapidly.

Medium term 2026-2035

Provided the Welsh Government acts and supports wave and TSE the period between 2026 – 2035 should see significant growth of marine energy supply chains, the creation of green jobs and investment in coastal communities.

Unlike other renewables TSE and wave projects will be delivered with very high UK supply chain spend. Nova Innovation's Shetland Tidal Array was delivered with over 90% of its supply chain spend with UK SMEs. The Offshore Renewable Energy Catapult forecast that in TSE the UK has an opportunity to create over 4,000 jobs by 2030 with a significant amount of the economic benefit expected to be generated in coastal areas (50-60%).⁸

The Welsh Government's Just Transition Strategy should be strategic and identify where Wales may have a competitive advantage and an ability to create and sustain renewable industries. This will position its communities to benefit from growing export markets and attract significant investment. 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.'⁹ Investments in wave and tidal technologies in less innovation-intense regions generate strong returns for those regions.

During this period, and at 1GW of deployment, the ORE Catapult forecast that TSE will become cheaper than new nuclear and below £80MWh.¹⁰

Long Term 2035-2050

By 2050 TSE will have reached below £50MWh. 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. This global market share will not be realised without clear and maintained support. The aim of the Welsh Government should be to seize as much of this potential as possible.¹¹

During this period marine energy will play an increasingly important role in Wales' and the UK's energy security. The UK has 11+GW TSE potential which equates to around 11% of current electricity demand. Modelling carried out by Imperial College London shows that TSE alone could reduce CCGT capacity by 40%: from 8.1GW to 4.9GW.¹² As more than half of UK gas is imported, firm power renewable energy resources like tidal stream will be key in supporting the UK's energy security, a cost-effective transition to net zero that protects UK households from international gas price shocks.

⁸ ORE Catapult (2018) *Tidal Stream and Wave Energy Cost Reduction and Industrial Benefit*. Available [online](#)

⁹ Resolution Foundation (2022) *The Economy 2030 Inquiry*. Available [online](#).

¹⁰ ORE Catapult (2022) *Cost reduction pathway of tidal stream energy in the UK and France*. Available [online](#).

¹¹ ORE Catapult (2022) *Cost reduction pathway of tidal stream energy in the UK and France*. Available [online](#).

¹² D. Pudjianto, G. Strbac (2022) *Role and Value of Tidal Stream Generation in the Future UK Energy Mix*. Available [online](#).

The realisation of marine energy's potential will support a cost-effective transition to net zero for Welsh households. Research by the University of Edinburgh has found that deployment of just under 13GW of marine energy will reduce annual dispatch cost from £13.54bn to £12.51bn. This is a saving of £1.03bn annually for UK and Welsh 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

Question 6. What evidence do you have on how the transition in one sector may either accentuate or diminish a risk or opportunity in another sector?

It is imperative that workers in offshore industries are supported to make the transition to renewables. The UK has a rich maritime heritage and engineering expertise in oil and gas will be a vital tool to utilise in the UK's net zero transition. The Climate Change Committee supports a tighter limit on the production of oil and gas in the North Sea, with stringent tests and a presumption against exploration.¹⁴ The MEC would welcome the opportunity to work with the Welsh Government on developing a plan to bring in the skills that made the North Sea O&G industry a success, to Wales, and to the coastal communities that will be at the forefront of delivering a thriving renewable sector.

As noted in response to Question 4, there is a significant opportunity to grow Welsh supply chains, and create green jobs. The risk to Wales is if this opportunity is not taken, and jobs that could have been created here are instead offshored.

In the 1980s Denmark invested heavily in wind, 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. By contrast the UK's wind sector, Europe's largest generator of wind energy, exports less than £0.5bn annually.¹⁵

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. However only 5.5MW of capacity was secured in Wales. There is a risk that Wales will be left behind and fail to grasp the opportunities that investment in marine energy will create on the transition to net zero.

Wales can benefit from offshore wind deployment everywhere through leading on colocation. Marine Power Systems is developing floating platform technology for wind that also acts as a wave energy converter. This represents an exciting development and could support decreased power variability as wave and wind generation work in a harmonious nature. This in turn will allow for a more efficient use of critical network infrastructure.

Co-location of wave and wind does not have to be on the same physical platform. Locating WECs with offshore wind will make better use of physical space. The installed capacity per km² for stand-alone point absorbers, such as CorPower Ocean, is 15MW/km² whereas offshore wind is 3-5MW/km².

¹³ Supergen (2023) *What are the UK power system benefits from deployments of wave and tidal stream generation?* Available [online](#).

¹⁴ Climate Change Committee (2022) Letter: Climate Compatibility of New Oil and Gas Fields. Available [online](#).

¹⁵ State of Green (2021) *The economic benefits of wind energy*. Available [online](#).

Waves provide a more consistent generation profile than wind and can be harnessed 3-8 hours after the energy is initially harnessed by wind farms. Wales should build on initial co-location developments and work with industry to provide a route to commercialisation.

Optimising sea area will leave to cost reductions in DEVEX, CAPEX and OPEX, as well as providing a more stable energy output from the same geographical area.

Question 10. Who are the key actors, governance, regulatory/policy, and technological drivers and inhibitors for transition of each sector?

Securing increased eligible capacity for future Allocation Rounds of the CfD scheme needs to be prioritised by the Welsh Government. Providing a clear steer, and the necessary resource, to Natural Resource Wales will support decisions being taken quicker, and the Welsh Government should provide a clear steer to NRW to approve applications as promptly as possible.

Ultimately the key driver, and its absence an immovable inhibitor, is providing a route to market. For TSE the ringfence has encouraged international investment into Wales. Ongoing uncertainty as to whether the ringfence will continue is damaging for investor confidence and the Welsh Government should advocate for the UK Government to provide clarity as soon as possible.

The MEC welcomed the First Minister's announcement at the 2021 Ocean Energy Europe conference, of the intention to introduce a revenue support mechanism for marine energy in Wales. To date this has not been introduced. It is understandable that with competing pressures and unforeseeable events, such as Russia's invasion of Ukraine, good intentions are on occasion deprioritised. However, an introduction of a support mechanism would send a strong message of the Welsh Government's intent, and commitment to realising its potential world-leading role in the transition to net zero.

Adequate grid infrastructure will in the future be imperative to support marine energy deployment. Supporting electricity networks strategically investing and increasing capacity in areas of strong wave and TSE resource is critical. The MEC welcomes the Welsh Government's support for improving network capacity and shares the view of Marine Energy Wales that this investment should be expediated as a priority.

The UK Government has been clear that they want to see marine energy progress down the cost reduction curve. TSE will be significantly cheaper than new nuclear at 1GW of deployment and could fall below £50/MWh according to research by the Offshore Renewable Energy (ORE) Catapult. Continued cost reduction is only possible if the sector is provided with clear and consistent support from the Government. This can be achieved through setting a 1GW target by 2035 and committing to ongoing ringfenced support.

Finally, the Crown Estate has played a constructive role in engaging with industry to lease areas for marine energy deployment. The process can be expensive and therefore without a clear and consistent route to market industry participants will not be incentivised to undertake this process. The UK Government maintaining ringfence support for TSE, and introducing a wave ringfence, combined with the Welsh Government introducing a revenue support mechanism will strongly position communities across Wales to benefit from a growing and global export market.