

Welsh Government Consultation: Review of Wales' Renewable Energy Targets

Marine Energy Council (MEC) response

Introduction

The Marine Energy Council (MEC) welcomes the opportunity to respond to the Welsh Government's review of its renewable energy targets.

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.

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.

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 fossil fuel and renewable imports. TSE can be deployed rapidly, with the 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

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

Wales, with a rich geographic resource and maritime expertise, could be a world-leader in marine energy. The Welsh Government's review of its renewable energy targets, and recent consultation on a just transition to net zero, provide it with an opportunity to set out how it will realise this potential.

Internationally Wales and the UK is at risk of being left behind as countries seek to establish first-mover advantage in emerging technologies. The United States' Inflation Reduction Act is already pulling investment and supply chains from the UK⁴ and is making over \$1.7bn available to marine projects.⁵

To realise Wales' marine energy potential, it is critical that the Welsh Government works with industry, and through its Renewable Energy Targets review and relevant strategy documents signals its intention to build on its strategic advantages.

The Marine Energy Council (MEC) recommends that the Welsh Government takes the following actions:

Set a technology-specific target for marine energy.

- The MEC understands the Welsh Government's preference to take a technology neutral approach in the transition to net zero. However, this may mean missing out on being a leader in the development of emerging technologies. Setting technology specific targets within marine, supported through an enabling policy environment, will support investor confidence, and could deliver multiple marine energy projects in Wales.
- The last renewable auction round (AR4) secured a 5.5MW project in Morlais, to be delivered by Spanish technology and project developer Magallanes Renovables. This demonstrates the international investment that can be unlocked in Wales through an enabling policy environment.
- A technology-specific target should include a range of enabling actions, including working with the UK Government to ensure the tidal stream ringfence continues in future CfD allocation rounds, and to introduce an additional ringfence for wave energy.

Establish a ministerial-led marine energy working group.

- A strategic taskforce with the industry will unlock barriers to marine energy deployment. This has been successful in the offshore wind industry and the establishment of the Offshore Wind Industry Council.

Commit to delivering a diverse energy generation portfolio as Wales transitions to net zero.

- A diverse renewable energy generation portfolio supports energy security, a cost-effective transition and will create green jobs in Wales' coastal communities and beyond.
- 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.
- 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

⁴ The Times (2023) *Biden's green subsidies could lure gigafactory away from Dundee*. Available [online](#).

⁵ US Government (2023) *Building a Clean Energy Economy: A guidebook to the inflation reduction act's investments in clean energy and climate action*. Available [online](#).

contribute to regionally balanced growth.⁶ Investment in wave and tidal technologies in less innovation-intense regions generate strong returns.

Introduce a revenue support mechanism for wave and TSE.

- It is understandable that due to budgetary pressures the revenue support mechanism previously 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%).⁷ 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 facilitated 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 delivering 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.

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

⁷ ORE Catapult (2018) *Tidal Stream and Wave Energy Cost Reduction and Industrial Benefit*. Available [online](#)

Questions

- 1. Do you agree with Proposal 1, to will retain the scope of the previous generation target, focussing on generating electricity to meet future demand? Please indicate Yes/No If no, what alternative target would you propose? Please provide evidence to support your statement.**

Yes, the MEC supports the focus on generating electricity to meet future demand. However, without technology-specific targets or direction provided the Welsh Government, the current market will favour technologies that may be cheaper today, but do not lead to the most cost-effective energy system in the future or develops and builds upon strategic advantages for Wales.

We strongly believe that the Welsh Government should target a diverse energy generation portfolio and look beyond merely a generation target. Diversity and developing a leadership position in emerging technologies will deliver significant benefits to energy system security, cost-effectiveness, and develop supply chains in Wales.

A diverse energy generation portfolio supports a cost-effective energy system.

Renewables are currently at different stages of development, maturity, and commercialisation and therefore there is not a level-playing field upon which they can compete. This is particularly problematic when the different services that renewables provide to the energy system are not understood or accurately valued. A completely predictable renewable resource like tidal stream is well suited to a role in the future energy system as it reduces curtailment, supply/demand mismatch and reserve capacity requirement. This ultimately reduces the cost of the whole energy system.⁸

The resource is also completely decoupled from wind and solar energy, with regular daily peaks. The recurring cyclical power generation profile gives tidal stream energy significant synergies with battery storage as the generation profile ensures batteries will stay topped up and mitigate against deep discharge.

Research by the University of Plymouth has shown that tidal stream can reduce the power rating and energy storage capacity of inter-seasonal energy storage which will be a key driver of cost in the future energy system.⁹

Diversity and innovative deployment of renewable technologies will be key in optimising how the energy system is utilised. For example, Wales could be a world leader in co-locating offshore wind and wave energy converters. Wales-based Marine Power Systems is developing innovative colocation platforms which will enable offshore sites to provide more consistent renewable energy.

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.

The Welsh Government should seize the opportunity to fund and support the development of colocation solutions, which has significant international export potential.

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 a saving of £1.03bn annually for UK and Welsh households. This cost reduction comes from a higher

⁸ ORE Catapult (2022) *Tidal Stream cost reduction pathway report*.

⁹ Coles et al (2022) *Impacts of tidal stream power on hybrid energy system performance: An Isle of Wight case study*. Available [online](#).

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.¹⁰

Currently neither the predictability of tidal nor the consistency of wave is properly valued in the UK energy system. The Welsh Government should provide direction to deliver a diverse supply of energy generation that reduces reliance on imports and recognises and rewards the different services that renewable technologies provide to the energy system.

A diverse renewable energy generation portfolio supports energy security.

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%.¹¹ As more than half of UK gas is imported, firmer 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.¹²

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, beating the 19.93GW record set in October 2022, which itself broke the 19.91 GW record set in May of last year.

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 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 than fossil fuels.

Wales has the potential to be a world leader in marine energy.

Taking a neutral approach to renewable deployment may risk the Welsh Government failing to seize the opportunity to be a world leader in technologies that will be key to the net zero transition. As over 90% of the world's economies are now covered by net zero target Wales could develop and benefit from growing export markets.

Tidal stream and wave energy projects are strongly positioned to support Wales becoming a world-leader in renewable deployment and development. Nova Innovation delivered its Shetland Array with over 90% of its supply chain spend with UK SMEs and Orbital Marine, which will deliver 2 of the projects from the latest renewable auction, built its O2 tidal stream device with over 80% of UK content. By comparison domestic content of early offshore wind has around 32%.¹³

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.'¹⁴ Investments in wave and tidal technologies in less innovation-intense regions generate strong returns for those regions.

The UK, and Wales, is in danger of replicating the cautious approach that was taken to the development of wind energy. Despite Britain being Europe's largest generator of wind energy in the 1980s, the Danish Government overtook and led the development of wind by investing heavily in stable longer

¹⁰ Supergen (2023) *What are the UK power system benefits from deployments of wave and tidal stream generation?* Available [online](#).

¹¹ Frost (2022) *Quantifying the benefits of tidal stream energy to the wider UK energy system*, available [online](#).

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

¹³ ORE Catapult (2017) *The Economic Value of Offshore Wind*, available [online](#).

¹⁴ Resolution Foundation (2022) *The Economy 2030 Inquiry*, available [online](#).

term revenue support, capturing a global market share of £7bn annually whereas the UK only exports less than £0.5bn annually.¹⁵

Wales should be seeking to grasp the opportunity of first mover advantage, work with industry to set ambitious marine energy targets, and position Welsh households and its economy to benefit from a growing export market.

- 2. Proposal 2 states: That Welsh Government use the CCC's Balanced Pathway as a basis for Wales' electricity demand projections when setting renewable energy targets. We will also incorporate 9% transmission losses into our projections. Do you agree with this proposal? Please indicate Yes/No If no, what alternative methodology and data source would you propose? Please provide evidence to support your statement.**

Yes. The Balanced Pathway provides a reasonable guide for changes in behaviour and demand in Wales. However, the text in the consultation prior to the second proposal states:

We have considered applying technology specific targets. However, given the scale of the challenge our preference is to remain flexible on the technologies to be deployed and at what scale. Our planning, consenting and licensing regimes provide a framework to determine whether individual project proposals are appropriate.

While the MEC agrees that planning for electricity demand to double and aiming to match this with renewable output is ambitious, we believe that identifying areas where Wales might have a strategic advantage and opportunity to develop industries of the future should be factored into decision-making.

The MEC strongly believes the Welsh Government should seek to be a world leader in marine energy, set up a strategic taskforce to work with industry to realise its potential, and set a target for deployment.

The consultation continues:

However, our aim is to secure an affordable system which delivers wider benefits to Wales and is not driven by specific technology preferences.

The MEC supports the Welsh Government's aim to secure an affordable system which delivers wider benefits to Wales. However, by not identifying where Wales may have a strategic advantage internationally it is unclear how the Welsh Government intends to secure and maximise wider benefits for Wales.

As noted in question 1, technologies at different stages of development are not competing on an even playing field, and benefits are not being accurately valued. The MEC believes Wales has the potential to lead the world in tidal stream, wave energy and co-location of wind and wave.

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

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

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.

- **Create green jobs and grow Welsh supply chains.**

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%).¹⁶ The Welsh Government should seek to ensure as much as that potential is realised in Wales.

- **Support marine energy down a clear cost-reduction trajectory.**

Without clear and consistent support, the marine energy will not grow in Wales. TSE is on a clear cost-reduction trajectory as taken by wind and solar. TSE is projected to reach £78/MWh by 2035 and 1GW of deployment, and below £50MWh by 2050 and 10GW of deployment.¹⁷

Cost reduction will be achieved through economies of scale, volume and accelerated learnings as more technology is deployed.

The trajectory set out by ORE Catapult means that TSE will be cheaper than new nuclear by 2035, whilst providing a unique service to a Wales' energy system.

- **Access growing export markets.**

As noted over 90% of the world's economies are now covered by net zero targets. TSE, as an entirely predictable and renewable energy resource will have an important role in support a secure transition not only for Wales but for countries around the world.

Rather than importing renewable technologies the UK has an opportunity to create over 4,000 jobs in tidal stream by 2030 with a significant amount of the economic benefit expected to be generated in coastal areas (50-60%).¹⁸

Companies will relocate to countries with the vision and foresight to develop its tidal stream industry. 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.¹⁹

- **Position Wales as a world leader in wave energy**

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) call the world's largest untapped source of energy.

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

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

¹⁶ ORE Catapult (2018) *Tidal Stream and Wave Energy Cost Reduction and Industrial Benefit*. Available [online](#)

¹⁷ ORE Catapult (2022) *Cost reduction pathway of tidal stream energy in the UK and France*. Available [online](#).

¹⁸ ORE Catapult (2018) *Tidal Stream and Wave Energy Cost Reduction and Industrial Benefit*. Available [online](#)

¹⁹ ORE Catapult (2022) *Cost reduction pathway of tidal stream energy in the UK and France*. Available [online](#).

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.

- **Position Wales at the forefront of innovative renewable deployment through developing co-location.**

Pembrokeshire-based 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.

Colocation 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.

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.

The Welsh Government should seize the opportunity to fund and support the development of colocation solutions, which has significant international export potential.

3. **Proposal 3 states: That Welsh Government set a target for us to meet the equivalent of 100% of our annual electricity consumption from renewable energy by 2035 and to continue to keep pace with consumption thereafter. Do you agree with this proposal? Please indicate Yes/No If no, please indicate how this target should be changed i.e. should the target date be changed, and to what; or should the percentage change, and to what? Please provide evidence to support your statement.**

Yes, this is an ambitious target and combined with a commitment to developing emerging technologies could support Wales being at the forefront, and benefiting from, the global transition to net zero.

4. **Proposal 4 states: That Welsh Government set a target for at least 1.5GW of renewable energy capacity to be locally owned by 2035, excluding heat pumps. Do you agree with this proposal? Please indicate Yes/No If no, what alternative target or targets would you propose? Please provide evidence to support your statement.**

Yes, although the MEC notes and agrees with the Marine Energy Wales position that the Welsh Government should acknowledge the distinction between local ownership and local benefit, and that different projects may not be appropriate for local ownership.

5. **Proposal 5 states: That Welsh Government a target of 5.5GW of renewable energy capacity to be produced by heat pumps by 2035, contingent on scaled up support from the UK Government and reductions in the cost of technology. Do you agree with this proposal? Please indicate Yes/No If no, what alternative target or targets would you propose? Please provide evidence to support your statement.**

Yes, heat pumps will have an important role in supporting a flexible energy system. Provided this increase in capacity is matched with renewable generation the MEC supports this target.

It is however unclear why setting a target for heat pumps is consistent with the Welsh Government's other position of not setting technology-specific targets.

6. **Proposal 6 states we intend to track the growth (turnover and employment) in the low carbon energy sector in Wales using the Low Carbon and Renewable Energy Economy Survey. We will supplement this data with information from industry leaders and representative organisations. We will use this data to measure the success of our implementation plans to upskill the workforce and support economic growth in Wales. Do you agree with this proposal? Please indicate Yes/No Is there any alternative source of data we should be considering?**

Yes.

7. **Can you explain whether any of the proposals could be altered to have positive effects or increased positive effects on: (a) opportunities for people to use the Welsh language; (b) treating the Welsh language no less favourably than the English language; (c) ensuring no adverse effects on opportunities for people to use the Welsh language; and (d) treating the Welsh language no less favourably than the English language. Please provide evidence to support your answer.**

As noted in the response to questions 1 and 2 support for marine energy will generate investment in coastal communities and support the growth of supply chains across Wales.

8. **We have asked a number of specific questions. Do you have any other issues that you wish to bring to our attention, which are not captured by the above questions? Please provide evidence to support your answer.**

MEC would welcome the opportunity to work with the Welsh Government remove non-financial barriers to renewable deployment. This includes making sure the consenting process is competitive and attractive for investors, and balances risk appropriately.

Net zero should be views as an opportunity to create a fairer Wales, supporting green jobs in coastal communities and beyond. Wales has a rich history through the industrial revolution and the development of coal in exporting energy across the world. The green industrial revolution provides an opportunity to support key emerging technologies. It is disappointing that the economic opportunity this will provide is not featured in this consultation.