Scottish Government: Draft Energy Strategy and Just Transition Plan
Maine Energy Council response

Introduction

The Marine Energy Council (MEC) welcomes the opportunity to respond to the Scottish Government's Draft Energy Strategy and Just Transition Plan.

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 Scottish innovation, and levelling up with employment opportunities across Scotland.

Marine energy can play a key role in a just transition to Scotland's net zero future:

- **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]

As Scotland's energy system becomes increasingly dependent on intermittent renewable energy sources, TSE and wave energy will play key roles in maintaining energy security and creating jobs, investment and exports that will support 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

Scotland is a world-leader in marine energy, and it is welcome that in developing its *Draft Energy Strategy and Just Transition Plan*, a vision for maintaining this leadership is being considered. The MEC response to the proposed Strategy sets out ambitions that we would recommend this vision and actions that will put Scotland on the pathway to realising these ambitions.

TSE and wave energy technologies are distinct, and we recommend that as part of a finalised Strategy and Marine Vision, two distinct deployment pathways are set out. In response to Question 11, the MEC recommends that the Scottish Government adopts the below ambitions:

Recommended Scottish Government Ambitions for Marine Energy

TSE

- Working with the UK Government to deliver tidal stream capacity of 200MW in Scottish waters by 2030; and 700MW by 2035.
- Investing in Scottish project development to maintain Scotland's global lead.
- Investing in the Scottish supply chain to create export opportunities.
- Increase R&D spend in Scotland on TSE.

Wave energy

- 1MW to be deployed by 2027. Work with UK Government to secure 200MW deployment by 2035.
- Delivery of a co-location wave and wind pilot by 2030.
- Maintain support for WES.

These ambitions should be included in the marine vision and distinct deployment pathways.

In response to Question 12 we set out recommended actions to provide clarity to industry and investors, make Scotland the most attractive country in the world to invest in marine renewable energy, and critically make it easier to get technology in the water.

Provide clarity to industry and investors.

1. Set out two distinct deployment pathways for TSE and wave energy as part of the Strategy.
2. Demonstrate intent by setting achievable and impactful MRE deployment ambitions.
3. Engage with the UK Government on its non-price criteria consultation and the future of the CfD.
4. Drive this work forward through the Scottish Marine Energy Industry Working Group.

Make Scotland the most attractive country to invest in marine renewable energy.

5. Increase innovation, research and development support for MRE.
6. Introduce a support mechanism for direct to customer and off-grid markets.
7. Ensure infrastructure is prepared for renewable deployment.

Make it easier to get technology in the water.

8. Reduce the consent timescales to enable MRE deployment at pace.
9. Work to reduce the costs and liabilities associated with deploying MRE technologies.
10. Continue to provide cornerstone debt finance for MRE projects and investing in Scottish marine energy companies.

In undertaking these actions, the Scottish Government will enable marine energy to support a just, secure, and cost-effective transition to net zero, creating green jobs in coastal communities, whilst exporting Scottish innovation around the world.

Questions

Chapter 1- Introduction and Vision

Question 1 - What are your views on the vision set out for 2030 and 2045? Are there any changes you think should be made?

The Marine Energy Council (MEC) welcomes the Scottish Government's ambition to prepare Scotland for a just energy transition, and a system that provides maximum community and economic benefit. We agree with the position of Scottish Renewables that "maximum benefit" as a goal should be clearer in terms of the specific outcomes the Government wants to deliver.

MEC supports Scottish Renewables suggestion that this should be amended to "*We will maximise benefit for Scotland…*", and that projects or initiatives developed under this strategy should demonstrate how they will provide significant benefit to Scotland.

The MEC strongly supports the Scottish Government's expanding its Supply Chain Development Programme and seeking to create green jobs across Scotland.

The vision could include greater consideration about how the Scottish Government can support delivery of a cost-effective net-zero energy system, and how this can be achieved through a diverse mix of renewables. Research by the University of Edinburgh has found that deployment of just under 13GW of marine energy across the UK will reduce annual dispatch cost from £13.54bn to £12.51bn, an annual saving of over £1bn for UK and Scottish households.

The Scottish Government is right to note that net zero presents a significant opportunity to deliver benefits to Scotland's economy and communities. In response to questions 11 and 12 we note the role of marine energy in realising this vision. It would be welcome if the Scottish Government explicitly noted the role of marine energy in delivering this future in Figures 8 and 9 in the Strategy.

Finally, the MEC would support greater clarity on the benefits that the Government is trying to deliver as part of realising this vision, noting Scottish Renewables' view that the aims set out under *climate and environment* and *economy, business and workers* can all be quantified, and progress measured using clearly identifiable metrics such as the volume of renewable generation capacity, GVA to the economy, exports and jobs created. The aims set out under *communities and regions* are ambiguous and it is unclear how performance against these would be evidenced and evaluated.

Chapter 2 – Preparing for a Just Energy Transition

Question 2 - What more can be done to deliver benefits from the transition to net zero for households and businesses across Scotland?

For Scotland to realise the benefits of the marine energy industry it is imperative that more technology is built in Scotland and projects deployed in Scottish waters. TSE projects awarded CfDs in Allocation Round 4 (AR4) could see more tidal stream capacity in Scotland than has been deployed globally, in history. However, Scotland's leading global position will be put at risk unless more is done to address issues around accelerating consent, facilitating grid access, making more capacity eligible for future CfD rounds, and boosting revenue support for marine energy project development.

Marine renewables provide Scotland with an opportunity to create a sustainable manufacturing industry, construction industry and long-term operation and maintenance jobs. The draft marine energy vision should recognise the broader benefits the sector will provide to Scotland.

Consent, grid connection and a final investment decision are three key project milestones. It is essential that the Scottish Government does what it can to help Scottish projects achieve these milestones quickly and cost-effectively to maintain Scotland's position as the home of marine energy.

It takes too long to lease and consent marine energy projects in Scotland – a minimum of 4 years, and potentially much longer. Consent is a requirement for a CFD application, so this long timescale is a major barrier to project development. Lack of clarity and guidance on Environmental Impact Assessments and Habitat Regulations Assessments are major barriers to the timely and efficient consenting of projects, as is the lack of capacity in Marine Scotland to process applications.

If Scotland is to maintain its position as a global leader in marine energy, it is critical that it is not marginalised within Marine Scotland's ORE planning consent workstream priorities, including the ScotWind programme. The relatively small scale of proposed marine energy projects compared to multi-GW scale offshore wind farms means that a **proportionate approach** is required, which balances consenting requirements with the risks involved. The Scottish Government should update consenting guidance and ensure sufficient resources are allocated within Marine Scotland to expediate the consenting process. The Scottish Government should ensure its updated consenting guidance actively encourages proportion in consenting for MRE projects, so that EIAs are never longer than is needed. This will help applicants have greater confidence that EIA and consenting processes will not be subject to unreasonable delays based on the subjective view of consultees.

The current offshore consenting regime has been designed primarily with large scale offshore wind in mind. The Scottish Government should consider reducing the need for two year's pre-application survey for birds and mammals and shift some effort to post-consent monitoring, particularly where this is part of a formal adaptive management framework to support project phasing. This approach has been used successfully to achieve consent for tidal energy projects in Canada in less than 3 years.

The transition to net zero is urgent and can bring huge benefits to the Scottish economy. If Scotland is to achieve its ambitions, it is essential that action is taken now to address these barriers to project delivery.

Question 4 - What barriers, if any, do you/your organisation experience in accessing finance to deliver net zero compatible investments?

TSE technologies are just commencing the journey of commercialisation with relatively low levels of operational and performance data available. As such, associated TSE projects represent unfamiliar and unconventional risk profiles for the mainstream project investor community which manifests in risk driven cost burdens that create negative feedback loops within the project investment decision process.

The future rate of deployed commercial capacity will be heavily influenced by investor appetite to construct projects. Recognising the role and requirement for project finance to unlock capacity expansion; Scottish Government should focus resources on helping to reduce the early-stage investor barriers whilst not diluting the rigour which the commercial investor risk assessment brings to the process of identifying projects of suitable techno-economic viability.

Strategic entities of the Scottish Government, namely the Scottish National Investment Bank, have an ability to engage with the TSE sector in a sophisticated manner to help address unique risk profiles around project debt facilities and help turbine products increase empirical performance data under commercial models. In turn, this will help quantitively characterise the commercial cost of energy with more certainty and make it more compatible with conventional lenders. This is a progressive process where strategic assistance can help shape the cost of capital through multiple parameters [e.g. debt to equity ratio, debt price and debt duration] and is an endeavour Scottish Government should align with.

In a similar vein: an influential determinant of risk and overall cost of energy for commercial fleets of tidal turbines will be approach to, and availability of, strategic spares. Comprehensive inventories themselves will present a dis-economy of scale penalty while proving vital to minimise the impact to project economics from outages. Related initiatives and activities around maintenance strategies, operational tooling to support servicing and rigorous component bench testing and failure analysis will all help improve turbine and project performance in a forward running learning process. Not dissimilar to Scottish Government's direct capital support of technology innovations within the wave energy sector; a similar capital support facility for the TSE sector but managed around these more commercially nuanced investments and activities should be explored.

Question 6 - Where do you see the greatest market and supply chain opportunities from the energy transition, both domestically and on an international scale, and how can the Scottish Government best support these?

There is significant potential for the Scottish Government to position Scotland to benefit from a growing marine energy export market that is forecast to be worth up to £76bn by 2050.[4]

Wave energy is the world's largest untapped source of renewable energy with the Intergovernmental Panel on Climate Change (IPCC) estimating that the potential annual global production at 29,500 TWh, which could provide clean electricity for over 500 million homes.

Ocean Energy Europe's 2030 Ocean Energy Vision report, states that 1.3 GW to 2.4 GW of installed capacity from tidal energy could be deployed worldwide by 2030 and potentially more than 100 GW by 2050. Organisations such as the International Renewable Energy Agency (IRENA) have identified the enormous global potential of marine energy.

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

Scotland has significant supply chain potential for its coastal communities and beyond:

- 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 and with steel from Motherwell. For comparison domestic content of early offshore wind was around 32%.
- Construction of Nova Innovation's word-first Shetland Tidal Array saw 25% of supply chain expenditure going to companies in Shetland, including steel, blades and vessels. During operation of the array, 60% of expenditure went to companies in the Highlands and Islands region, including a network of over 40 local suppliers in Shetland.
- Scotland is already benefiting from marine energy exports. Nova Innovation exported their first tidal turbine to Canada in 2022.

Scotland can capitalise on first-mover advantage to create a new renewable energy sector in which technology built in Scotland is exported to the world.

To develop the renewable energy supply chain in Scotland across all technologies, maximise the economic benefits of our sustainability pipeline and ensure a just transition for suppliers, the MEC recommends the Scottish Government adopts Scottish Renewables' asks.

- Establishes a Low-Carbon Industrial Strategy that includes a Supply Chain Plan to drive forward renewables-led investment and a just transition for Scottish clean energy suppliers and manufacturers.
- Supports the immediate growth of Scottish renewable energy suppliers by working with near-term net-zero projects to assist in the success of local supply chain companies.
- Enhances the role that Scottish ports play in building a low-carbon economy through a net-zero ports and infrastructure programme.
- Achieves growth for small and medium low-carbon suppliers by introducing a supply chain SME support mechanism.
- Enhances export opportunities for Scottish suppliers by promoting and supporting companies moving into international markets.[5]

In addition, the Scottish Government should support the deployment of new marine energy projects, the expansion of existing projects, and R&D by Scottish companies, to cement Scotland's existing global lead in the marine energy sector.

Question 7 - What more can be done to support the development of sustainable, high quality and local jobs opportunities across the breadth of Scotland as part of the energy transition?

The Offshore Renewable Energy Catapult (ORE Catapult) has estimated that the tidal stream industry has the potential to support almost 4,000 jobs in the UK by 2030. Including wave, marine energy could support more than 22,000 jobs in the UK by 2040. Given Scotland's abundant marine energy resources and world-leading marine energy projects and companies, many of these jobs could be located in Scotland.

The response to questions 11 and 12, and the recommended actions, set out how these jobs can be created and supported in Scotland.

[5] Scottish Renewables (2022) *Supporting Scotland's Renewable Energy Supply Chain.* Available online.

Chapter 3 – Energy supply

Scaling up renewable energy

Question 11 - Should the Scottish Government set an ambition for marine energy and, if so, what would be an appropriate ambition? Please explain your views

Yes, the MEC strongly supports the Scottish Government setting ambitions for marine energy. Any ambition should be matched with a clear pathway for delivery supported by an enabling policy and regulatory environment. The Strategy, and marine energy pathway, should make a clear distinction between the devolved powers that the Scottish Government can take, and the interventions that are required by the UK Government.

As noted in our introduction TSE and wave energy face similar but distinct challenges and are at different levels of maturity. As such we believe that two deployment pathways should be set out in the final Energy Strategy and Just Transition Plan.

The MEC would welcome further consultation and consideration of an appropriate MRE ambition for 2045. This long-term view will provide guidance to key bodies including the Crown Estate Scotland, transmission, and distribution network operators, as well as providing certainty to investors.

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-intensive regions generate strong returns, imperative for a just net zero transition.

The below ambitions should inform and be included as part of the Scottish Government's deployment pathway for TSE and wave energy.

TSE ambitions

We strongly support the Scottish Government setting ambitions of:

- Working with the UK Government to deliver tidal stream capacity of 200MW in Scottish waters by 2030; and 700MW by 2035.
- Investing in Scottish project development to maintain Scotland's global lead.
- Investing in the Scottish supply chain to create export opportunities.
- Increase R&D spend in Scotland on TSE.

The draft Marine Vision is right to highlight the significant industrial opportunity, and the unique role of TSE in the energy system due to its predictability. Committing to the above ambitions will position Scotland to maintain its first mover-advantage, attract companies and investment, and create green jobs across Scotland.

The TSE ringfence in Allocation Round 4 (AR4) will deliver significant benefit to Scotland with three projects set to deliver over 35MW of TSE capacity. It is crucial to delivery of the above ambitions that the ringfence is maintained, and the sector has clarity and consistency to support its growth. The ringfence should be returned to £20m for future rounds or increased to support the sector scaling up aligned with these ambitions. The Scottish Government should work with the UK Government to enable long-term investment signals, by securing a commitment to maintain the ringfence for multiple years.

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

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.[7] The objective of the Scottish Government should be to seize as much of this potential as possible, and to embed supply chains in and across Scotland, building on the success and very high Scottish content of world-leading developers like Nova Innovation and Orbital (see response to question 6). [8]

Scottish-based companies including Proteus Marine Renewables and Nova Innovation are already exporting goods and services to the global TSE market, with a strong potential to scale up these exports in coming years. This approach seeks to emulate the success of the Danish wind energy sector, which built a strong domestic market and supply chain through investment in projects in Denmark in the 1980s and used this as the foundation to export technology and services to the world. By 2003, 90% of Danish wind turbine production was exported, and Danish wind sector exports in 2019 amounted to €9 billion.[9]

The Draft Just Transition and Energy Strategy aims to position Scotland as an international leader in the net zero transition to create and provide high-quality jobs with economic benefit. The UK and Scotland has an opportunity to create over 4,000 jobs in tidal stream alone by 2030 with over 50% of the economic benefit expected to be generated in coastal areas.[10]

TSE is on a clear cost-reduction trajectory, following the trajectories demonstrated by wind and solar energy. TSE is projected to reach £78/MWh by 2035 and 1GW of deployment, and below £50MWh by 2050 and 10GW of deployment.[11] [12] This means that by 2035 TSE could be cheaper than new nuclear, and that support for TSE will be consistent with the Scottish Government's aim to deliver affordable energy whilst supporting economic growth.

Wave energy ambitions

We recommend that Scotland sets the following wave energy ambitions:

- 1MW to be deployed by 2027. Work with UK Government to secure 200MW wave energy capacity by 2035.
- Delivery of a co-location wave and wind pilot by 2030.
- Maintain support for WES.

We support the Scottish Government's ambition to deploy 4 x 250 kW in EMEC wave machines by 2027. This is an important target that provides clarity of direction to the sector. It should be noted that Horizon Europe is aiming to secure a 2MW (minimum) wave energy array, with €40M funding available to support two such projects. To maintain Scotland's global lead, it is critical that Scotland secures at least one of these projects. As with the ambitions set for TSE, wave energy will benefit from a clear pathway with points for review and re-evaluation to ensure the Scottish Government and industry remain on track to deliver.

Scotland's 2027 target is supported by EuropeWave – an EU-funded pre-commercial procurement programme akin to those run by Wave Energy Scotland. Three wave energy developers will be selected for the final phase (phase 3) of the EuropeWave programme. This will see three different prototype wave energy converter systems deployed in the Spring of 2025 for a 12-month demonstration and operational testing programme; among them may feature Mocean Energy, who are Scotland based

[7] University of Edinburgh (2021) *What is the value of innovation ORE deployment to the UK economy?* Available online.
[8] ORE Catapult (2022) *Cost reduction pathway of tidal stream energy in the UK and France*. Available online.
[9] State of Green (2020) *Danish exports of green technology increases by billions in 2019.* Available online.
[10] ORE Catapult (2018) Ibid.
[11] ORE Catapult (2022) *Cost reduction pathway of tidal stream energy in the UK and France*. Available online.
[12] Figures provided are in 2012 currency, which is the current base year for CfD strike prices.

and developing a 250 kW WEC. Two systems will be deployed at the BiMEP test site in Spain, and one system deployed at EMEC's Billia Croo test site. The deployment of an initial array should support the route to realising 200MW of wave energy deployed in Scotland by 2035. Depending on developments in the industry this could be scaled up and should be kept under review if the industry is able to respond to a greater ambition.

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 by 14%.[13] The UK Government is currently undertaking its Review of Electricity Market Arrangements consultation, which may lead to a more efficient use of existing infrastructure having greater value than in existing arrangements, and the role of wave energy being more accurately valued.

Committing to a pilot hybrid wind-wave project as a step toward commercialisation will position Scotland to be a world-leader in innovative offshore renewable deployment. This follows the example set by Denmark 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 will attract investment into innovative technology. A similar approach could be used to support hybrid deployment of wave power in Scotland.

Finally, Grant (R&D) support has been - and will continue to be - crucial in enabling further step-change technology cost reductions, with significant impact on overall learning investment to reach competitive LCOE. A 2021 paper by Kerr et al. suggests that a 10% step-change cost reduction can reduce overall learning investment by approximately a third on the road to achieving target LCOE. [14] Maintaining support for WES, and increasing opportunities for wave energy companies to access R&D support will create jobs, enable private investment and support wave energy down the cost-reduction curve.

[13] Stats taken from a Wave Energy Scotland report to be published imminently.
[14] P. Kerr et al. (2021) – Implementing Radical Innovation in Renewable Energy Experience Curves. *Energies,* 14(9), 2364. Available online.

Question 12 - What should be the priority actions for the Scottish Government and its agencies to build on the achievements to date of Scotland's wave and tidal energy sector?

To realise the above ambitions set out in Question 11 the MEC recommends the Scottish Government take the following actions to provide clarity to industry and investors, make Scotland the most attractive country in the world to invest in marine renewable energy, and critically make it easier to get technology in the water.

Provide clarity to industry and investors.

- **Action 1: The Scottish Government should set out two distinct deployment pathways as part of any finalised strategy.**

As noted, wave energy and tidal stream are distinct technologies and should have separate deployment pathways in the finalised strategy. This will allow for Scottish Government actions, and engagement with the UK Government and other bodies, to be focused accordingly.

These two deployment pathways can be included in a Marine Energy Action Plan, which could be developed as a distinct piece of work to implement the ambitions of the Strategy and Marine Vision.

- **Action 2: Demonstrate intent by setting achievable and impactful MRE deployment ambitions.**

In question 11 we set out what we think these ambitions should be. These ambitions should be supported by a clear pathway for delivery.

- **Action 3: Engage with the UK Government on its non-price criteria consultation and the future of the CfD.**

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.[15] 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.[16]

Both tidal stream and wave energy will be cheaper than new nuclear at 1GW of deployment.[17] However, these technologies are not going to be the cheapest to deploy in the short term.

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 and Scottish 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

[15] Deloitte (2012) *Study of the macroeconomic impact of Wind Energy in Denmark*
[16] State of Green (2021) *The economic benefits of wind energy*. Available online.
[17] Catapult (2018) Ibid.

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.[18]

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. The non-price factor consultation provides an opportunity for the UK Government to introduce a mechanism that values the different services that renewable technologies provide to the energy system.

The UK Government's non-price criteria consultation provides an opportunity to include considerations around supply chain development, local jobs being created and supported, and in delivering a diverse renewable energy generation portfolio, key to energy security. It is vital that the Scottish Government engages with this consultation and ensures that the benefit of MRE is factored into future considerations for the CfD mechanism design.

- **Action 4: Drive this work forward through the Scottish Marine Energy Industry Working Group**

This industry working group has been a key driver in identifying barriers and proposing solutions to increasing MRE deployment. Internationally Scotland 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 UK[19] and is making over $1.7bn available to marine projects.[20]

The MEC believes the next iteration of the SMEIG should be minister-led, and support Scotland taking a strategic approach to MRE deployment and in responding to changes and challenges internationally. It could also have a role in monitoring industry progress on the TSE and wave energy deployment pathways, and horizon scan to identify and address any challenges in delivery.

Make Scotland the most attractive country to invest in marine renewable energy.

- **Action 5: Increase innovation, research and development support for MRE.**

Innovation and demonstration projects will be crucial in developing the MRE industry. Innovation funding is crucial to expected reductions in the cost of energy. However, limited innovation support or demonstration programmes are available for MRE in the UK, and ongoing uncertainty around UK participation in the Horizon programme is damaging.

The vast majority of recent MRE funding in the UK has come from the EU, except for Wave Energy Scotland (WES) and the Saltire Fund. While the Scottish Government should be commended for this support, we as a sector believe the Government could go further. Over a 3-year period the European Commission allocated over €160m to the sector. In comparison the sector has received £30m from the Scottish Government over the past six years.

As the sector moves from single devices and small pilot arrays towards increasing economies of scale, business as usual for innovation funding will no longer be sufficient. This issue could be compounded by the as-yet-undetermined future of European funding in the UK, which may no longer be accessible

[18] Supergen (2023) *What are the UK power system benefits from deployments of wave and tidal stream generation?* Available online.
[19] The Times (2023) *Biden's green subsidies could lure gigafactory away from Dundee.* Available online.
[20] 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.

to Scottish projects. Specific funding must therefore be made available to maintain Scotland's global lead and to achieve the expected reduction in LCOE.

Innovation funding is required at both the Scottish and UK levels, and we encourage the Scottish Government to consider how best to provide its own support while encouraging the UK Government to do the same. Funding through Innovate UK would greatly support the sector and depending on the availability of European funding, might be a critical lifeline. The Scottish Government can lobby UK Government for such funding, and the Enterprise Agencies can support Scottish companies in accessing it.

Research by the University of Edinburgh has revealed that between 2017-2022 wave energy received £39m funding (with WES accounting for £35m of that total) and TSE only £15m. This lack of investment puts Scotland's global lead at risk and should be addressed within the Scottish Government's Just Transition Strategy.[21]

- **Action 6: Introduce a support mechanism for direct to customer and off-grid markets**

Marine renewables are strongly positioned to support the decarbonisation of offshore activity. This is being demonstrated by Mocean's Renewables for Subsea Power (RSP) project. The £2million demonstrator project, called Renewables for Subsea Power (RSP), has connected Mocean's Blue X wave energy converter with a Halo underwater battery developed by Aberdeen intelligent energy management specialists Verlume.

The two technologies have been deployed in March 2023 will provide low carbon power and communication to infrastructure including Baker Hughes' subsea controls equipment and a resident underwater autonomous vehicle provided by Transmark Subsea.

The project aims to show how green technologies can be combined to provide reliable low carbon power and communications to subsea equipment, offering a cost-effective alternative to umbilical cables, which are carbon intensive with long lead times to procure and install.

Alternative markets also apply to tidal power, which could potentially be used as a reliable source of supply for hydrogen production, or to decarbonise industry. For example, Nova Innovation's Oran na Mara project in the Sound of Islay has the potential to provide predictable, renewable power to Scotland's whisky islands of Islay and Jura, offering a net zero solution to one of Scotland's most important industrial sectors.

The Scottish Government should explore ways to support projects that have developed beyond the pilot project stage but have a different application to that addressed by the UK Government's CfD mechanism.

- **Action 7: Ensure infrastructure is prepared for renewable deployment.**

The MEC recommends that the Scottish Government support national port and harbour infrastructure as well as targeted manufacturing, supply chain and skills development to ensure that Scottish companies winning CFD projects can achieve 70% Scottish content in their project supply chains. This will also enable both increased GVA and jobs to Scottish organisations from both domestic and export sales.

[21] Supergen (2023) *What is the Optimal Balance of Development and Deployment Policy Support Mechanisms for Wave and Tidal Power?*

Make it easier to get technology in the water.

- **Action 8: reduce the consent timescales to enable MRE deployment at pace.**

The Scottish Government should streamline regulation and enable synergies between marine 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 Scotland 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. That very few new sites are under development in Scotland is testament to the fact that the existing regime needs to change, and development timescales need to be accelerated.

The Scottish 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. In addition, designating key areas as strategically important for energy security could enable rapid and streamlined consents. It should be acknowledged that no negative impact on marine mammals has been recorded at key Scottish sites including EMEC, MeyGen and the Shetland Tidal Array.

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.

As with work being progressed for offshore wind, the use of Imperative Reasons of Over-riding Public Interest (IROPI) should be normalised as a standard approach in decision-making for MRE projects, which help meet Net Zero targets, domestic energy security and the levelling up agenda. Strategic and collaborative approaches to the necessary compensatory measures should be developed for tidal, in line with parallel work programmes for offshore wind.

Post-consent environmental monitoring obligations placed on MRE projects through consent conditions should be proportionate, with clearly defined objectives. Where such monitoring is gathering evidence that will de-risk consenting for the sector, the Scottish Government should be seeking opportunities to fund such work centrally, removing the financial burden from individual project developers.

- **Action 9: work with the sector to reduce the costs and liabilities associated with deploying MRE technologies.**

The Scottish Government should work with Westminster to revisit current arrangements around decommissioning bonds. Currently large projects are typically asked to set aside millions of pounds for decommissioning, provided up-front and held in real cash terms. In contrast, large offshore wind projects only require a paper bond which states there is enough cash for decommissioning, and the value of this bond can build up in value during the life of the project (mid-life accrual). An equivalent

product is not available from the bond market for tidal stream energy. This is a market failure, caused in part by a line in the Decommissioning Act, that allows the UK Government's Secretary of State to call in the bond even in the absence of an event that would require the bond to be called upon. This can be quickly addressed through an amendment which allows novel and innovative generation projects to have a bond called in only if the bond is required and following appropriate events. This will remove a significant barrier for tidal stream and wave energy projects. The Scottish Government should join industry in advocating for this change, and in supporting mid-life accrual of decommissioning securities for marine energy projects.

Equally the industry faces significant headwinds around insurance which increases the cost of deployment. The first deployments of tidal stream or wave energy projects invariably come with higher risks and therefore higher financing costs. Offshore wind has proven that financing costs can be dramatically reduced over a very short space of time. Currently insurance costs are a significant and costly barrier to marine renewable deployment. In the absence of competitive commercial insurance options, the Scottish Government should explore the proposal being developed by Renewable Risk Advisers, to introduce an 'Insurance and Warranty' Fund. This is an insurance service for early pilot farms designed to balance the interests and incentives of public authorities, ocean energy developers, and investors. As well as directly reducing the costs of the first deployments, the Fund will generate data to 'crowd in' commercial insurers, and ultimately put itself out of business.[22] As part of deploying renewable technology at pace the Government should consider support for this proposal and similar financial measures to de-risk early project development.

- **Action 10: Continue to provide cornerstone debt finance for MRE projects and invest in Scottish marine energy companies.**

We recommend that the Scottish National Investment Bank continues to provide cornerstone debt finance to early-stage MRE projects to leverage additional private sector finances, and equity investment in Scottish marine energy companies. Debt finance helps to reduce the cost of capital and make early, but commercially fundable projects more attractive to inward investors. These projects should be focused on maintaining Scotland's global lead by deploying capacity in the water and consolidating and expanding Scotland's world leading MRE companies and supply chain.

[22] OceanSET (2021) *Design Options for an Insurance and Warranty Fund*. Available online.

Question 14. In line with the growth ambitions set out in this Strategy, how can all the renewable energy sectors above maximise the economic and social benefits flowing to local communities?

Scotland has existing strategic advantages in marine energy. As noted, coastal communities will benefit significantly from support for the sector, and that marine energy strongly aligns with aims of attracting investment in post-industrial communities.

Research has demonstrated that TSE projects can deliver around 76 full time equivalent jobs during a project's construction, and 5.5 jobs for each MW and year during operation.[23]

The value of both the social and energy system benefits of marine energy is not fully recognised by the UK Government. The Scottish Government should engage with Westminster to support the industry's asks as part of the Non-Price Factors consultation.

As noted in the draft strategy, key sites like Nova Innovation's Shetland Tidal Array and the European Marine Energy Centre (EMEC) have already delivered significant local benefit. EMEC has contributed 370 million gross value add (GVA) to the UK economy. £263 million of that was accrued in Scotland; and half of that, £130 million, in the Orkney Islands. To date £42 million public funding has been invested in the centre by public sector organisations; thus over £8 has been accrued for every £1 spent by the public purse. EMEC has created highly skilled, high value jobs and is now one of the top 20 employers in Orkney. The number of people directly employed increased from 44 to 85 between 2017 and 2023, with average earnings higher than the Orkney average.

Since 2016, EMEC has diversified and grown its operations with support from competitively won grant-funded projects. EMEC has secured £49.5 million of research and development funding since 2016, taking part in R&D projects totalling £538 million for the development of the renewable industry. EMEC is fundamental in supporting industry to commercialise new technology, reduce risk, cut costs and improve efficiency.[24] It has been critical in ensuring Scotland is a leader in marine energy technology deployment and is evidence of the broader benefits that supporting renewable development can have for the local and national economy of Scotland.

[23] Element (2019) *Socioeconomic Analysis Plan.* Available online.
[24] Updated stats outlining the economic impact of EMEC will be published shortly on its website, available here.

Chapter 5: Creating the conditions for a net zero energy system

Question 40 - What additional action could the Scottish Government or UK Government take to support security of supply in a net zero energy system?

As noted in our response to question 1, the MEC strongly supports delivery of a diverse energy generation portfolio to be an explicit aim of the Scottish Government's draft strategy. This is not only to seize opportunities associated with marine energy, but also to support a more secure energy system.

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%.[25] 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.[26]

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 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.

The work of Project EVOLVE highlighting the ability of marine energy to deliver a more cost-effective energy system has already been set out in this response. In addition, 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. [27] A reduction in required storage will make the UK's energy system more cost-effective and potentially secure.

[25] Frost (2022) *Quantifying the benefits of tidal stream energy to the wider UK energy system.* Available online.
[26] D. Pudjianto, G. Strbac (2022) *Role and Value of Tidal Stream Generation in the Future UK Energy Mix*.
[27] Coles et al (2022) *Impacts of tidal stream power on hybrid energy system performance: An Isle of Wight case study*. Available online.