

[ORE Catapult](#) is the UK's leading technology innovation and research centre for offshore renewable energy. Headquartered in Glasgow, it has world-leading test and demonstration facilities in Blyth, Northumberland and Fife, Scotland and is developing and extending its regional presence across the UK.

ORE Catapult's vision is to be the world's leading offshore renewable energy technology centre by 2030.

ORE Catapult will play a key role in delivering the UK's largest clean growth opportunity, through our mission to accelerate the creation and growth of UK companies in the offshore renewable energy sector. We will use our unique facilities and research and engineering capabilities to bring together industry and academia and drive innovation in renewable energy.

Marine Energy Engineering Centre of Excellence (MEECE)

Based in Pembroke Dock, [MEECE](#) (is led by the ORE Catapult who work with Welsh Universities to deliver innovation projects on behalf of Welsh companies, demonstrating, verifying, and validating new technologies, whilst accelerating supply chain growth. MEECE is funded by the European Regional Development Fund (ERDF) through the Welsh Government.

Reason for Submission

MEECE has a unique perspective, working closely with industry partners in Wales, but with a UK-wide perspective as part of the ORE Catapult, positioning the team well to give an overview of the requirements of renewable energy in Wales, and specifically in the offshore renewables sector.

Renewable Energy in Wales

Question 1: How can the UK Government best support the deployment of renewable generators in Wales?

Response:

Promote a unified strategy across Wales, promoting collaborations and maximising benefits across sectors, whilst accepting that certain regions are best located to provide greatest benefit to the growing offshore renewable energy sector.

Floating Offshore Wind

The wind resource off the coast of Wales, and specifically the Celtic Sea, is significant and shows negative correlation to that off the east coast of England. Investing in floating offshore wind (FLOW) in the Celtic Sea will help provide a consistent renewable energy supply. However, for this to be feasible, revenue support mechanisms are required fully to commercialise the technologies available and bring costs to parity with bottom-fixed offshore wind.

Barriers to implementation must be removed, such as supply chain insufficiencies and grid constraints. A recent report by the ORE Catapult, ([Floating Offshore Wind: Cost Reduction Pathways to Subsidy Free](#)) suggested that a key enabler to cost reduction of FLOW in the region would be a Crown Estate leasing round within the Celtic Sea within the next two years, with clear commitments to future rounds.

Tidal Stream

The tidal stream resource in Wales is remarkable and is an important part of the future energy mix. It is uncorrelated with wind so would help to provide a more consistent renewable energy profile.

Tidal stream technologies are ready for pre-commercial deployment, having made significant progress in reliability and cost levels. This has been recognised by Welsh and UK Government in the funding of the Morlais Tidal Demonstration Zone ([Morlais](#)), off Anglesey, through the North Wales Growth Fund. However, this funding risks being wasted if the necessary revenue support mechanisms are not put in place. Tidal stream technologies are less mature and currently unable to compete directly with FLOW technologies. A separate CfD auction pot for tidal stream devices is necessary and would allow their development to accelerate. In the absence of a ring-fenced CfD for tidal stream, other revenue support mechanisms will need to be considered, such as the Innovation Power Purchase Agreement (IPPA) suggested by the Marine Energy Consortium (MEC).

With the necessary revenue support in place, the Morlais tidal demonstration site offers an excellent opportunity to validate different tidal technologies while coordinating learning and capturing cost reduction evidence.

Wave

Wave device technology is less mature than tidal stream. Currently, innovation investment through public research grants is probably the optimal financial support mechanism. This, backed up with suitable policy support, should provide opportunities for wave energy devices to mature. With MEECE and the Pembrokeshire Demonstration Zone ([PDZ](#)) both integral parts of the Pembroke Dock Marine (PDM) Swansea Bay City Deal (SBCD) project, ORE Catapult is well placed to provide support and guidance to early-stage wave energy developers.

Infrastructure and Supply Chain

While the more immediate term infrastructure and supply chain development requirements for the marine energy industry are gaining better understanding, a discussion on the medium and long-term requirements is required so that appropriate steps are taken to mitigate risks, enabling future growth.

The strength in UK manufacturing is in low volume, high value production. To become competitive in the production of, e.g., floating platforms and tidal stream devices, the UK supply chain must become much more competitive in large volume manufacture. While the development of regional clusters is assisting in this, more progress will be needed to ensure a competitive edge can be maintained against non-UK companies bidding in future projects. Investment in facilities and equipment will be required e.g., suitable large scale fabrication facilities and port infrastructure. If these investments are not made, Wales cannot expect to capture a significant share of the value chain.

A report by the ORE Catapult ([Macroeconomic Benefits of FLOW](#)), suggested that FLOW could generate 17,000 jobs and £33.6 billion in GVA, and make significant contributions to the government's 2050 targets. Wales has significant FLOW resources, and can expect to capture a large share of this economic value.

The national grid cannot currently accommodate this growth in either North or South Wales. Grid upgrades or new lines will be required to accommodate the supply, or this will hinder the ability of new projects to develop and will likely make investors averse to investing in the region.

The Offshore Coordination Phase 1 Report compiled by the Department of Business Energy and Industrial Strategy (BEIS) Offshore Transmission Network Review, suggested that work was required to reduce the impact from radial connection from offshore wind farms. The Celtic Sea is a clean slate in this regard and can possibly be a trial location for an integrated offshore grid network.

Grant Funding

Marine energy in Wales has been well-supported over the last 5 years, with Welsh Government ring-fencing €200M ERDF funding for innovation projects. For early-stage innovation, grant funding may be the only suitable financial support mechanism.

To best secure growth within the industry, however, repayable finance may be an option, and arguably, the UK banking system at current does not serve small companies as well in this respect as banks in other countries. Welsh Government should consider how such funding can be provided, perhaps through the Development Bank of Wales.

It is increasingly difficult to obtain insurance throughout the renewable industry, due to the insurance sector's recent losses across all sectors. The reduction in 'insurability' in turn leads to a reduction in 'investability', making the leveraging effect of debt on equity more difficult. The tidal sector is, most importantly, unable to obtain 'loss of generation' cover. A mutual model where the UK or Welsh government provides support in early years by covering extreme loss events and / or supplying set-up funding could help.

As technologies develop there is a funding gap that can ultimately end progress, when the technology becomes too big to be supported through R&D grant funding but not yet at a scale to compete at CfD auctions. A proposed solution to this is a smaller scale Innovation CfD to fill the gap between the R&D grant funding and the CfD contracts. This would allow companies to pass through the 'valley of death' and continue their innovation journey.

Question 2: How should the UK and Welsh Governments work together to support the development of renewable energy projects in Wales?

Response:

ORE Catapult is already operational in Wales, is involved in many of the renewables projects and is building an excellent overview of supply chain capability and capacity. We provide advice into Welsh Government and work with academia and industry. We are well placed to help work with both UK and Welsh governments to translate needs and requirements into coherent regional plans.

The Offshore Wind Sector Deal showed success in fostering offshore wind and bringing together the UK government and industry and helped accelerate the growth of the Sector. A similar model for the wider renewable energy sector in Wales with UK Government and Welsh Government partnering with industry would be invaluable.

Floating Offshore Wind

The [TIGGOR](#) project, funded through the Offshore Wind Growth Partnership (OWGP) and ORE Catapult with partners in the North East of England, demonstrates of how supply chain growth and productivity projects can be successful. Businesses in the region are provided Business Growth Support and Technology Demonstration Support to assist them entering or developing within the renewable energy industry. A similar programme operating within Wales, with financial support from the Welsh Government, UK Government or both, would accelerate the deployment of offshore floating wind across Wales.

Wave & Tidal

Wave and tidal technologies are at very different stages of maturity and have differing needs. Whilst there is a wave industry in Wales, it still requires nurturing at the early development stage. Tidal is pre-commercial and requires a clear route to market.

Infrastructure and Supply Chain

Wales has a strong industrial heartland and is manoeuvring itself in readiness for the growth in renewables. The Celtic Sea is regarded as an economic zone where Welsh supply chain capability will be at the epicentre of FLOW development. This will have knock on advantages for tidal and wave. Distinct supply chain clusters have emerged, seeking steerage on strategic intent and potential project pipelines. We suggest that Welsh Government should establish a steering group, or similar, to coordinate the supply chain and ports, to maximise their capacities, capabilities and ability to capture the largest share possible of the offshore renewable energy value chain.

Question 3: What mechanisms can ensure that subsidies for renewable generators are good value for money?

Response:

The Contract for Difference (CfD) is recognised as having successfully introduced competition to offshore wind, keeping prices low, but not inhibiting deployment. The recent decision to separate bottom-fixed and floating wind was well received. However, further modifications to avoid unfair competition between the different generation technologies is necessary to allow them all to succeed.

There is a danger that the UK will prioritise near-term deployment at lower cost, failing to capture the benefits of a sustainable UK-based industry over the longer term. The focus should be on creating sustainable jobs and a strong UK industry base rather than cheaper bills in the short term. ORE Catapult is engaged with the marine energy industry and has a great deal of experience determining relevant innovations within the sector and could be a valuable partner in determining innovation focus for the future.

Floating Offshore Wind

For bottom-fixed offshore wind, ORE Catapult managed the [Cost Reduction Monitoring Framework](#) (CRMF) on behalf of the Offshore Wind Industry Council, which gave UK Government great confidence in the ability of the offshore wind industry at the time to reduce its costs. This enabled UK Government to ensure it was getting value for money. ORE Catapult has undertaken a [Cost Reduction Pathways](#) study for FLOW, which could be used as a baseline for a FLOW CRMF

Tidal Stream

Tidal stream technology is now where offshore wind was when it first began to receive revenue support. It is probably too early to begin a Tidal CRMF programme, but this would be a valuable future activity, with ORE Catapult well placed to deliver it.

Catapult has experience of managing large multi-developer projects, such as the ENFAIT, Element, and TIGER, ensuring cost reduction through collaboration, learning by doing and driving economies of scale through the supply chain. Such projects ensure that as technology and knowledge are developed, they are shared across the industry rather than in individual developer silos. Evidence is emerging that learning from the wind sector can be transferred to accelerate the development of tidal stream technology. A Welsh, multi-developer project, perhaps based around Morlais, would be beneficial to support tidal steam deployment, with ORE Catapult well-placed to develop and deliver such a project.

Wave

For the less mature wave technology sector, a different approach is required. Where public grant funding is being utilised, it is recommended using a best-in-class approach and only supporting those that satisfy certain stage gate requirements. Government commitment and support would be required to drive the realignment and create an initiative where experienced OEMs can provide technical support to accelerate the design to the required timetables.

Wave Energy Scotland (WES) currently employs a Stage Gate approach to evaluating technologies through their programme and this is proving to be a valuable method of ensuring robust scrutiny of proposals. A similar approach in Wales could be appropriate to help accelerate the development of Welsh wave devices.

Question 4: What opportunities are there for renewable generators in Wales of greater interconnection with other electricity markets?

Response:

Wales is already a net exporter of electricity, so an increase in renewable electricity generation is likely to require greater export or storage capability. Ireland and the Southwest of England are the obvious destinations for interconnectors from Wales, but Ireland is also a net exporter of electricity and the generation potential in the Celtic sea is likely to fill the grid in the Southwest. The only viable option for exporting via interconnectors would seem to be mainland Europe.

As an alternative to interconnectors, combining zero carbon electrolytic hydrogen production (green hydrogen) with offshore wind provides effective use of capital assets and wind resource and a means of long-term energy storage. This strengthens the business case for future renewables investment as we move beyond the current system of long-term contracts for electricity supply. ORE Catapult has explored this issue with our [Solving the Integration Challenge](#) report. With the Milford Haven Energy Kingdom ([MH:EK](#)) project currently underway Wales is already at the forefront of hydrogen integration.

Question 5: How can the UK Government facilitate Welsh contributions to COP26?

Response:

In May 2019, the Committee on Climate Change said that the UK will require 75Gw of offshore wind by 2050. It is possible that Wales could report to COP26 that it can provide 15GW 2050 targets, however, there is currently no pipeline of projects in place. Such a project pipeline would require a series of Crown Estate floating wind auctions and a ringfenced CfD, but these are outside of the control of the Welsh Government and in control of the UK Government.

Question 6: What implications is COP26 expected to have for Wales?

ORE Catapult are not providing a response to this section.

Question 7: Has the COP26 Year of Climate Action had any significant implications for Wales?

ORE Catapult are not providing a response to this section.

Question 8: What opportunities are there for renewable energy to aid Wales post-COVID-19 economic recovery?

Response:

The supply chain requirements for wave, tidal and floating wind have some synergies, and all are looking at how to recover post COVID-19. A strategy of build back better is encouraging but must be translated into opportunity in Wales utilising the extensive natural resources available in, e.g., the Celtic Sea and Morlais ([Morlais](#)).

There is an opportunity to ensure that the UK recovery from the COVID-19 pandemic is in an environmentally responsible manner that can accelerate the UK's carbon reduction goals whilst helping the economy out of this recession. Through investment in the marine renewable energy sector in Wales, including many projects across floating wind, wave and tidal technologies, there is the opportunity to transition workers into skilled employment from other sectors, such as oil and gas.

The immediate opportunities in Wales are focused on floating wind, but the infrastructure and facilities, and the supply chain capacities and capabilities that need to be developed for FLOW will also have ready markets when tidal stream and wave developments become commercial.

Projects in Wales

Credible developers are currently working on a range of exciting marine energy devices within Wales, leading to some good supply chain collaboration. However, the scale could be enhanced to allow more companies to get involved and increase the UK capability for the future. Infrastructure investment is vital for this to be achieved.

OWGP is helping supply chain companies move into the renewable energy sector. There is a new round of projects with the OWGP starting with 2 companies in Wales participating: Ledwood and Offshore Safety Systems. While OWGP is a doing good work throughout the UK in promoting Offshore Wind, the budget of £100M over 10 years for projects across the UK forces difficult decisions to be made and potential opportunities to be missed. Further funding for the programme from the Welsh and / or UK governments at this time could really help accelerate the implementation of floating offshore wind technology in Wales.

Supporting Peripheral Economies & Community Projects

Peripheral economies are facing loss of jobs due to COVID-19, reduction in tourism, and slowdown in the oil and gas industry. There is great potential for the supply chain in Wales to support the growing renewable energy sector which will bring many highly skilled jobs to these peripheral economies and help secure the UK's position as a global leader in marine renewable energy.

Importantly, there has been a shift in recent years in the attitude of the public towards renewable energy generation and in particular, wave and tidal. There has been a growth in community energy projects in Wales and this is a potential growth area that could easily be promoted and could result in large gains. Wave and tidal projects are usually smaller than offshore wind, so better suited to these communities and types of projects.

Creating Jobs

FLOW will bring many long-term jobs into the UK economy, both directly and indirect jobs (project development, construction and decommissioning and operation and maintenance). Studies have found that throughout the UK, FLOW could create 17,000 jobs and generate £33.6 billion for the UK economy by 2050.

A study conducted by the ORE Catapult into the benefits of tidal and wave technologies on GVA and jobs suggested that 100MW/year of revenue-supported tidal deployment, allied to 3GW of global deployment, could lead to cumulative net benefit to the UK of £1.4Bn by 2030, supporting 4000 jobs, increasing to 14500 jobs by 2040.

A similar path for wave starting later could lead to £4Bn cumulative net benefit by 2040, supporting 8000 jobs.

It is important that Wales becomes a key part of these developments, and the marine renewable energy industry is currently in a good position to capitalise on the growth potential, provided they are given the requisite assistance.

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