



# STATE OF THE SECTOR 2023

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## NOTE FROM THE EDITOR ON DATA VALIDITY

During analysis, data is thoroughly checked for any discrepancies. In some cases, changes in reported values and spending allocations may affect past values presented. Updates and corrections are made accordingly. The figures are our best assessments as of March 2023, and MEW does not accept liability for the use of the data.

Data validity is heavily dependent on the quality and quantity of survey responses. While we receive information from most of our active members, some choose not to or prefer not to disclose certain variables. Therefore, assuming the data obtained is accurate at the organisation level, the total values presented in this report are likely to be lower than the real-world values.

Data presented in this report is aggregated and anonymised to protect the commercial interests of our members.

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# FOREWORD

This year, I picked up the reins as the Marine Energy Wales programme manager and it is my pleasure to bring you 2023's 'State of the Sector' – Marine Energy Wales' flagship industry economic report.

As a nation, we have made tremendous progress and celebrated several major milestones this year, showcasing our ambition to be a true global leader in the marine renewable energy sector.

Dubbed the decade of delivery, rapid investment is now essential for deployments at scale. Encouragingly, this report highlights a significant increase in infrastructure spend for 2023, creating a good platform for delivery and future sector growth.

In March, Wales' first floating offshore wind (FLOW) farm, Erebus, was given the green light. With the capacity to generate clean power for 93,000 homes, this pioneering project from Blue Gem Wind has the potential to show the world how Wales can successfully combine renewable energy generation with the responsible stewardship of our natural environment.

In North Wales, Magallanes Renovables' tidal stream device, to be deployed at Morlais Tidal Demonstration Zone, received vital UK Government revenue support, enabling the first commercial deployment of its kind in Welsh waters. This will generate over 5 megawatts (equivalent of up to 5,000 homes) of reliable, predictable energy once installed in 2025.

However, we cannot be complacent. Revenue support for commercial-scale projects at a realistic market price is critical. The recent decision to reduce the tidal stream ringfence is deeply concerning, jeopardising megawatt-scale tidal deployment in Wales and the UK. Despite having the world's largest pre-consented demonstration zone in North Wales, market mechanisms and the loss of access to European funding schemes pose challenges to this innovative sector.

Additionally, delivering reform and investment to create a net-zero-ready electricity network is essential to the sector's success and currently an enormous barrier to development.

The Welsh Government remain committed to decarbonising the energy sector, and are currently reviewing Wales' renewable energy targets, with a proposal to meet 100% of our electricity needs from renewable sources by 2035. The Welsh First Minister, Mark Drakeford, recently announced his ambition to "make Wales a world centre for emerging tidal technology". This, alongside £750,000 of funding, will support at least three research projects to address barriers that have prevented development of a Welsh tidal lagoon.

Marine renewables are crucial in combatting climate change and achieving a diverse and reliable energy mix for current and future generations. This report examines the marine renewable economic landscape, celebrates the highlights of 2023, sheds light on skills and education initiatives, and discusses the challenges ahead by analysing a dataset collected from our extensive industry network.

The Marine Energy Wales team continue to effectively represent this sector and provide a single point of access for expert industry knowledge and drive the sector's growth. I express gratitude to the Marine Energy Wales team and our members for their invaluable support as we strive to influence Welsh and UK Government policy in favour of marine renewable energy.

Consider this report a resounding call to action. Tackling infrastructure and skills gaps, and shaping policy, are vital steps towards our shared goal of achieving net zero. I urge you to explore the remarkable achievements of this year and take the essential next steps with us.

**TOM HILL**



**MARINE ENERGY WALES  
PROGRAMME MANAGER**



# KEY FINDINGS THIS YEAR

Wales has experienced an unprecedented surge in spending and investment, with a staggering **£103.4 million** recorded. This is a ground-breaking achievement – nearly four times larger than any previous year. The primary catalysts for this are infrastructure expansions, which are paving the way for upcoming deployments.

The latest figures show the Welsh marine energy sector sustains **440.2 full-time equivalent jobs**, spanning a diverse range of roles.

Newly gathered data sheds fresh light on the **gender distribution** of employment within the sector, offering valuable insights for the first time.

The sector's **growth prospects** remain promising, especially for tidal stream and FLOW. Notably, FLOW emerges as a standout, presenting a remarkable £1 billion economic opportunity in the next five years alone.



# 2022-23 MARINE ENERGY WALES HIGHLIGHTS

## APRIL

- ORE Catapult launch trials of a new marine testing buoy at **Marine Energy Test Area (META)**
- DP Energy mark new office opening with UK Gov ministerial visit to Pembrokeshire
- 'Renewable Revolution' event at Bridge Innovation Centre to outline the scale of the opportunity from marine renewables to Pembrokeshire College

## MAY

- MEW attend **All Energy** Conference in Scotland showcasing Welsh developments
- UK Government ministerial visits to North Wales to demonstrate how tidal developers **Minesto** and the **Morlais Tidal Demonstration Zones** are benefitting the UK

## JUNE

- **RWE** enters into an agreement with Tata steel to support the delivery of floating offshore wind structures in the Celtic Sea
- Milford Haven Future Energy cluster launched in the House of Commons, supported by Stephen Crabb MP

## JULY

- First Welsh project awarded under the Contracts for Difference scheme. Spanish tidal stream developer **Magallanes will deploy over 5 megawatts by 2025** at Morlais in North Wales

## AUGUST

- **2022 'State of the Sector'** report published revealing marine energy represents a **£600 million opportunity for Wales** over the next 5 years
- Wales' First Minister, Mark Drakeford, visits Marine Energy Wales to meet with members and discuss how to make Wales a global leader
- Welsh developer, **Marine Power Systems**, signs up to demonstrate a multi-megawatt wave energy array at the European Marine Energy Centre (EMEC) in Orkney, Scotland

## SEPTEMBER

- **Morlais awards £2 million local contract** for construction work to begin on new substation for the Tidal Demonstration Zone
- MEW appoints **FLOW Project Manager** to focus on MEW FLOW activities and co-ordinate our new membership body, the Celtic Sea Developer Alliance (CSDA), representing floating offshore wind developers with an interest in the Celtic Sea
- The new MEW FLOW Project Manager visits Kincardine, the world's largest floating offshore windfarm at 50MW, 15km off Aberdeen
- Two new industry supported renewable courses begin at Pembrokeshire College - a
- **BTEC in Engineering** for 14-16year olds, and the **'Destination Renewables'** programme for 16-18 year olds

## OCTOBER

- Marine Energy Wales represent Wales on the international stage at the world's largest event for ocean energy, **International Ocean Conference on Ocean Energy (ICOE) and Ocean Energy Europe's (OEE)**, in Spain as part of a Welsh Government delegation
- The Crown Estate updates developers on the design of the tender process for the Celtic Sea
- Our SELKIE and META project teams teach students on the new 'Destination Renewables' programme about how to design a renewable power system
- **RWE commissions Swansea-based Marine Power Systems (MPS)** to develop a project plan for delivering up to 1 gigawatt (GW) of floating wind using the ports ABP Port Talbot and Pembroke Dock for foundation and turbine assembly

## NOVEMBER

- META – our flagship Welsh Marine Energy Technology Test Centre - upgrades its marine license to welcome larger tidal turbines and sea surface infrastructure
- **Celtic Sea Cluster**, launches a new **regional strategy** to help Wales capitalise from floating offshore wind
- Spanish tidal stream developer Magallanes visits North Wales to see progress on the Morlais Tidal Stream Demonstration Zone
- Marine Energy Wales chairs a session on local supply chain benefits at the **Future Energy Wales** conference in Newport.
- Welsh Freeport bids launched

## DECEMBER

- **Pembrokeshire Coastal Forum Impact report** published – outlining the marine energy opportunities for Wales
- Westminster Hall debate on marine renewables

## JANUARY

- Celtic Sea Developer Alliance hosts **political receptions in the House of Commons and the Senedd** calling for public investment to support floating offshore wind
- The **Haven Waterway Future Energy Cluster** sets out its vision to Welsh Government
- Welsh Government Minister gives evidence on Wales' floating offshore wind potential to UK Government Welsh Affairs Committee

## FEBRUARY

- **Nova Innovation mothball 0.5MW tidal stream project** in North Wales, due to revenue support and grid issues
- **Celtic Sea Developer Alliance hosts webinar with The Crown Estate** to update developers on leasing

## MARCH

- **Marine Energy Wales Annual Conference attracts more than 500 delegates.** Wales' First Minister Mark Drakeford announces **£750,000 'Tidal Lagoon Challenge' fund**
- Wales' first floating offshore wind farm, **Erebus, 40km off the coast of Pembrokeshire given the green light.** The 100 MW renewable energy project will power 93,000 homes
- **Two Welsh Freeport winners** announced – Milford Haven and Port Talbot and Anglesey – promising investment worth £5bn and the promise of 20,000 jobs
- Supply chain engagement: Celtic Sea Developers begin a series of 'Meet the Buyer' events to set out how businesses in Wales can benefit.

## KEY STATS

- 29 new members joined over the last financial year. 16 of these were Celtic Sea Developer members, underscoring growing interest in FLOW in the Celtic Sea.
- MEW now has 94 members

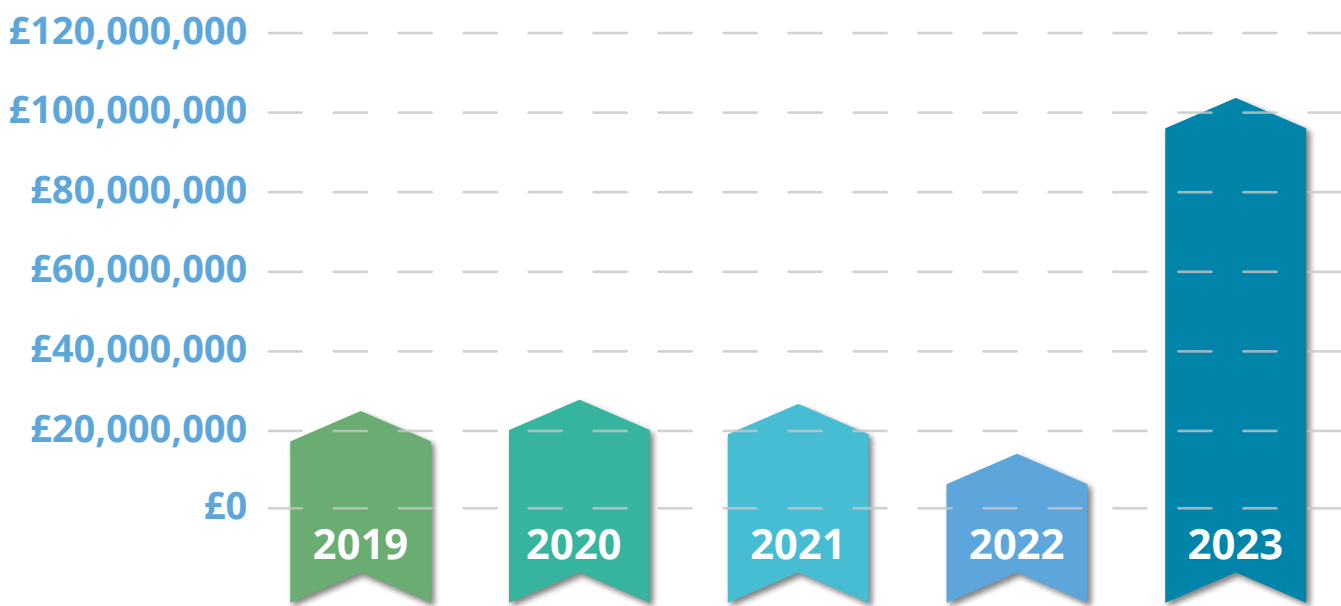


# TECHNICAL REPORT

## THIS YEAR'S SPEND

This year marks by far the highest annual spend since we began producing our annual State of the Sector reports. During the 22/23 financial year, the marine renewable energy sector delivered **£103.4 million** to the Welsh economy. The development of significant infrastructure projects, which we delve into extensively in this report, has sparked this surge. These projects generate and sustain employment opportunities, while simultaneously establishing a solid groundwork for a prosperous future.

Total cumulative spending and investment from marine renewable energy in Wales has now reached an impressive **£263 million**.



## PEMBROKE DOCK MARINE

Of these infrastructure developments, the Pembroke Dock Marine project has brought major improvements to the Port of Milford Haven, in anticipation of a greater number of marine renewable energy deployments in the coming years. Pembroke Dock Marine aims to establish a world-class centre for marine energy and engineering on the Milford Haven Waterway. Initially focusing on low carbon energy engineering, it has applications in various blue economy sectors, such as ship building, aquaculture, oil, gas, and nuclear.

Led by Celtic Sea Power, Marine Energy Wales, the Offshore Renewable Energy Catapult, and the Port of Milford Haven, Pembroke Dock Marine aims to overcome obstacles in the marine energy industry that are hindering technology development, demonstration, and commercialisation. Work has focused on testing prototypes and components, commercialising research, and upgrading port facilities.

A significant aspect of the project involves developing port infrastructure to meet industrial demands. At Pembroke Port, work is underway to create laydown space and a new slipway to accommodate marine energy devices and vessels. The addition of workboat pontoons and the renovation of Grade II listed annexes will further enhance operations and maintenance capabilities. These developments are expected to be completed by the end of 2023.

The project has also sparked other initiatives like the Milford Haven Energy Kingdom and contributed to the Celtic Freeport proposition. As the industry continues to evolve, the site will adapt and expand to accommodate future growth.



## BREAKDOWN OF SPEND

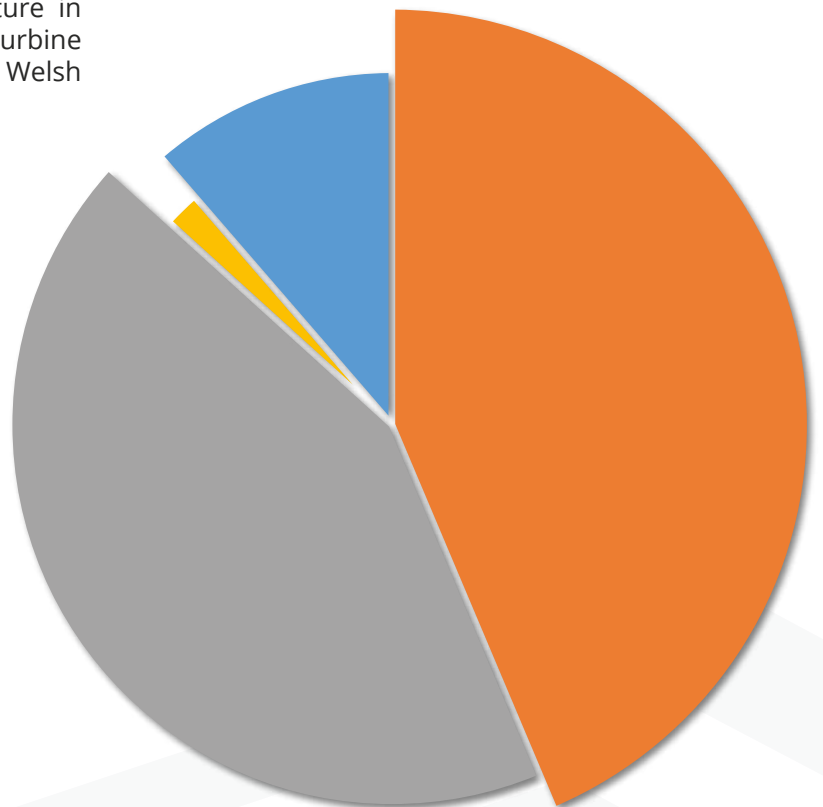
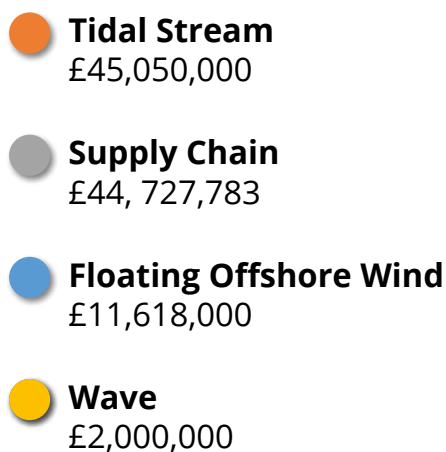
Across the sector, tidal stream was the largest contributor to the Welsh economy this year, delivering **£45.1 million** in spending and investment; closely followed by the supply chain at **£44.7 million**.

Spending and investment in both these areas was fuelled by the contributions of two key projects in particular – Morlais Tidal Demonstration Zone, the world's **largest** pre-consented demonstration zone based in North Wales, and the Pembroke Dock Marine project.

Off the coast of Anglesey at Morlais, preparations are underway to install electrical infrastructure in anticipation of numerous international tidal turbine manufacturers deploying their technology in Welsh waters over the coming years.

FLOW is growing rapidly year on year, injecting **£11.6 million** into the Welsh economy in 2022-23. With the first deployments expected toward the end of the decade, an ever-expanding group of project developers are progressing planning and consenting work aligned with the leasing process undertaken by The Crown Estate.

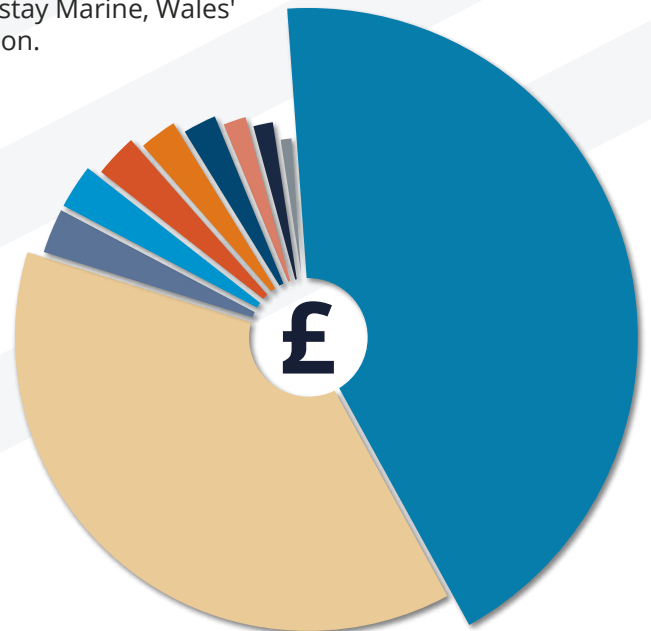
The development of wave energy also continues to drive modest amounts of spending and investment, with a total of **£2 million** over the last year.



## THIS YEAR'S TOP INVESTORS

This year's top investors encompass a diverse group of stakeholders, including project developers, technology developers, and supply chain companies. The Port of Milford Haven and Morlais Tidal Steam Energy Zone have emerged as significant contributors, accounting for most of the investment. Prominent manufacturers of marine renewable energy technology such as Minesto, Bombora, and Marine Power Systems, have made substantial contributions. Developers involved in FLOW projects, such as EDF Renewables, Celtic Sea Power, Hiraeth Energy, and Blue Gem Wind, have played a significant role. Another notable entrant is Mainstay Marine, Wales' leading business specialising in marine energy device fabrication.

- |                         |                             |
|-------------------------|-----------------------------|
| 1 Port of Milford Haven | 6 Celtic Sea Power          |
| 2 Morlais               | 7 Marine Power Systems      |
| 3 Minesto               | 8 Hiraeth Power             |
| 4 Bombora               | 9 Blue Gem Wind             |
| 5 EDF Renewables        | 10 Mainstay Marine Services |



## Magallanes Renovables

In the first allocation round of its kind, Spanish company Magallanes Renovables successfully secured a UK Government subsidy award through the Contracts for Difference (CfD) scheme to support tidal energy. The award was for a 5-megawatt tidal stream array at Morlais. Due to be operational by 2025, Magallanes will now become the first tidal turbine developer to deploy commercially in Welsh waters.

A full-scale prototype generating 1.5 megawatts of power has just finished a gruelling series of trials at the European Marine Energy Centre in Orkney.

Three years of testing proved the concept works. It also demonstrated clearly where efficiencies could be made, from the optimum blade design to maximise performance, right down to the smallest details, like positioning the mooring hook-up lines above, rather than below, water level to improve access and save time and cost.

**“Menter Mon’s Morlais project created the perfect ecosystem, and that is why we are going there”** says Alejandro Marques de Magallanes, from Magallanes.

It seems likely a Welsh company base will soon follow, bringing with it more jobs and opportunities.





## MORLAIS TIDAL DEMONSTRATION ZONE

Run by social enterprise Menter Môn, Morlais has a potential generating capacity of 240 megawatts.

Its unique 'plug and play' model means once the infrastructure is in place, it will provide a reduced risk route to commercialisation for turbine developers.

With a contractor appointed in 2022, construction is well underway. Cabling to the eventual grid connection is complete and remaining work on the infrastructure project is due to finish this autumn.

The next challenge for Morlais is connecting to the transmission grid and successfully implementing the environmental monitoring and management plan, as well as making the most of Holyhead's new freeport status.

Projects set up locally to support the tidal energy sector – amongst them the Marine Characterisation Research Project – continue to innovate. Using pioneering technology, it monitors marine birds and mammals and will ensure schemes like Morlais and others worldwide, can be developed in a way which safeguards the environment, marine wildlife, and habitats.



## MAINSTAY MARINE SOLUTIONS

As Wales' leading marine energy fabricators, Mainstay continues to invest in facilities to capitalise on future growth. They have purchased a new ultra-high-pressure washer and high-access plant and machinery, and recently announced their successful bid into the Offshore Wind Partnership Fund Grant to increase the width of their hoist once the Pembroke Dock Marine Infrastructure developments are complete.

Mainstay have substantial technical understanding of manufacturing and assembling prototype devices. Their capabilities include welding and fabrication, electrical and mechanical engineering, marine finishes, and naval architecture, as demonstrated in the following projects:

- Build and assembly of the 200t DeltaStream demonstration device for Tidal Energy Limited.
- Conversion of a vessel into a wave energy converting device on behalf of the developer Wavetricity.
- Build of 48t pendulum wave energy converter for AMOG Consulting Ltd.
- Build of the main frame, stab plate and PTO for the 75m long, 950t mWave device for Bombora.
- Refit and upgrade to cross beam for QED Naval SubHub and the design and build of bespoke deployment support barge.
- Refit and upgrade to ORE Catapult Buoy.

Mainstay's in-house design team is currently supporting the team at AMOG Consulting Ltd on their next generation dual-hull hinged wave energy converting 'Sea-Saw' prototype. The team are undertaking the structural analysis and design optimisation of the hull.

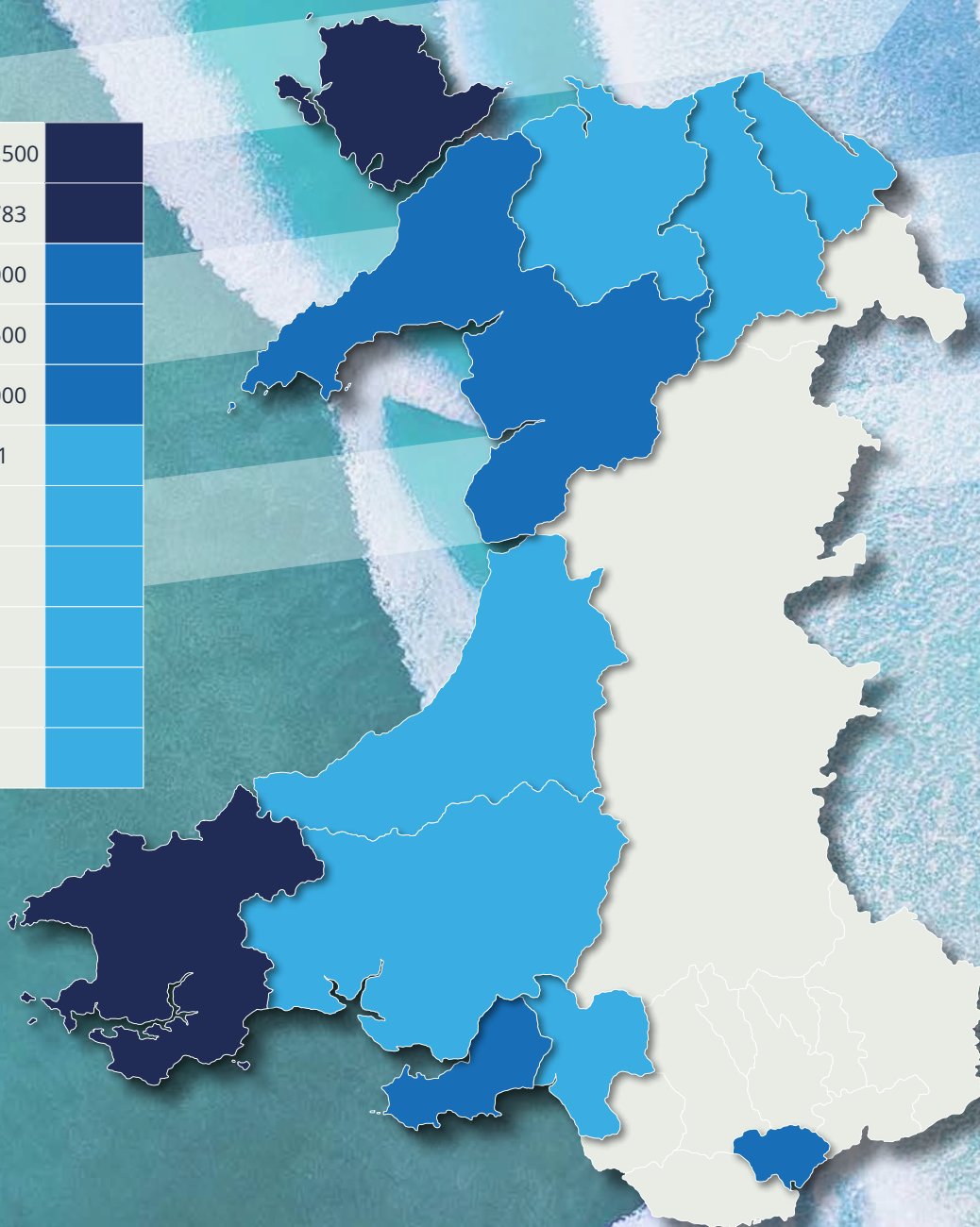


# INVESTMENT/SPEND PER COUNTY

The regional spend map highlights the significant impact of the marine energy sector on economic development and regeneration in Wales' coastal and peripheral regions. Anglesey leads the way with an impressive £103.2 million invested to date, followed closely by Pembrokeshire with £90.7 million. Swansea, Gwynedd, and Cardiff have also experienced substantial spending and investment, with figures reaching £33.1 million, £18 million, and £14.5 million respectively.

## SPEND PER COUNTY

Anglesey	£103,157,500	
Pembrokeshire	£90,733,783	
Swansea	£33,078,000	
Gwynedd	£18,037,500	
Cardiff	£14,464,000	
Ceredigion	£932,000	
Flintshire	£450,000	
Denbighshire	£362,500	
Conwy	£312,500	
Carmarthenshire	£270,000	
Neath Port Talbot	£270,000	





"The Welsh Government is making a huge commitment to the offshore renewable energy sector.

"I truly believe that it could be a catalyst to providing not only green electrons and decarbonising our communities and business, but also providing high quality career opportunities throughout Wales.

"We applaud the work of MEW and the wider marine energy sector and hope the great achievements made to date continue. The challenge of climate change facing all of us is too great and too important not to give our best efforts."

**MARK DRAKEFORD MS**

FIRST MINISTER OF WALES



# EDUCATION AND SKILLS SPOTLIGHT

As the world shifts towards renewable energy sources, the demand for skilled workers in the renewable industry is ramping up, presenting a daunting challenge for companies to meet the demands of project development, construction, and operations. Several regional initiatives are now placing a focus on developing education, skills, and training to boost awareness among coastal communities about the economic opportunity and job opportunities available, and to build Wales' capacity to deliver local, well-paid, green jobs over the coming decades.

## MILFORD HAVEN WATERWAY ENERGY SECTOR SKILLS GAP STUDY

As part of the South Wales Industrial Cluster's 'Plan for Clean Growth', Celtic Sea Power was commissioned by the Port of Milford Haven to study the current and future workforce requirements of the Milford Haven Waterway energy sector. Celtic Sea Power collaborated with Pembrokeshire Coastal Forum to carry out stakeholder engagement.

A detailed report outlined the current layout of skills provision for the energy sector, an analysis of gaps and challenges in provision, and some recommended toolkits for addressing these challenges.

Key findings include:

- **Industry** – there is a significant gap in expectations between employers and the supply chain on the likely impact of new low-carbon industries. Modelling undertaken by Celtic Sea Power for FLOW alone predicts a growth in employment of at least several hundred percent. However, the supply chain is only predicting employment growth of 33% by the 2030s.
- **People** – the study identified the risk of a workforce shortage, as well as shortfalls in minority representation. A survey of households in the Milford Haven Waterway area found strong interest in the opportunities of the energy sector, but a perception among some that these opportunities are not equally accessible to all.
- **Best practice** – several commendable educational schemes were discovered, including the collaborative industry-backed 'Destination Renewables' course at Pembrokeshire College. Currently, courses are mostly project-funded, and there is need for sustainable centralised funding.

## GWYNT GLAS OFFSHORE WIND



The Gwynt Glas FLOW project, a joint venture between EDF Renewables UK and DP Energy, is committed to educating and inspiring young individuals about the green energy sector. They have three impactful initiatives aimed at fostering equal opportunities and preparing future generations for successful renewable projects.

'Destination Renewables', in collaboration with Pembrokeshire College and industry partners, has delivered an award-winning program that showcases careers in renewable energy to over 90 learners. Based on positive feedback, the course will be tailored for wider implementation.

The Skills Wales Competition now includes a category dedicated to Renewable Energy, with Gwynt Glas' local team in Pembrokeshire actively involved in shaping and assessing project ideas from eight participating teams.

The SEREN Innovation Project provides students across three counties with a hands-on workshop utilizing 3D visualization technology. This enabled them to gain valuable knowledge and a competitive edge when applying to UCAS.

These initiatives demonstrate Gwynt Glas' commitment to empowering young minds and fostering a skilled workforce for the future of renewable energy.



## INDUSTRY PROPELS LEARNERS TOWARDS A NET ZERO FUTURE



Swansea Bay City Deal funds supported the development of a pilot skills programme at Pembrokeshire College to raise awareness of the renewable energy sector in the region. The Pearson Technical Award in Engineering, co-delivered by Pembrokeshire College, Blue Gem Wind, Bombora Wave, and Ore Catapult, enrolled 30 STEM learners from Milford Haven School and Ysgol Harri Tudur. Industry partners brought the future job landscape into the classroom, introducing new technologies and practical activities. Pembrokeshire College created a teacher training course to enhance lesson planning and delivery. The collaborative effort of industry colleagues, school leaders, Pembrokeshire County Council, and college staff proved inspiring to learners and will serve as a model for future initiatives.

## COLLABORATE, CREATE... AND LEARN TO CODE WITH THE FIRST® LEGO® LEAGUE CHALLENGE



FLOW Developers supported Pembrokeshire schools in the FIRST® LEGO® League, an initiative that introduces children to STEM education through hands-on learning. Over 100 students from 12 schools explored energy

## LEDWOOD PARTNERS WITH 2B ENTERPRISING

Ledwood Mechanical Engineering has partnered with 2B Enterprising to deliver an education programme for pupils at Fenton Primary School, Haverfordwest.

The 'Bumbles of Honeywood' comprises a series of primary school storybooks and resources to teach the mandatory element of the new curriculum for Wales. 2B partners primary schools with corporate engagement organisations, like Ledwood, who are keen to invest in the next generation of our local workforce. This is especially pertinent given the huge skilled labour force requirements for FLOW in the Celtic Sea.

2B CEO Jayne Brewer says: "The appetite from businesses like Ledwood to support and engage their local primary schools has been exceptional. They recognise how important it is to invest in the next generation."



sources and their distribution, storage, and use in the 'Superpowered' challenge. The Pembrokeshire Lego League Championships in March showcased participants' skills in manoeuvring coded robots for energy system missions.

Hiraeth Energy emphasise the importance of inspiring and equipping young people for employment in the offshore renewable energy sector. "We want to maximise the value to Wales from the FLOW sector," says Joseph Kidd, Partner of Hiraeth Energy and Programme Manager for Môr Glas. "What better way to achieve this than by inspiring and equipping young people with the skills and knowledge needed for employment in the offshore renewable energy sector."

The competition was sponsored by Celtic Sea Power, Ocean Winds, RWE, Floventis, Cierco Energy, and Offshore Renewable Energy Catapult.

# EMPLOYMENT BREAKDOWN

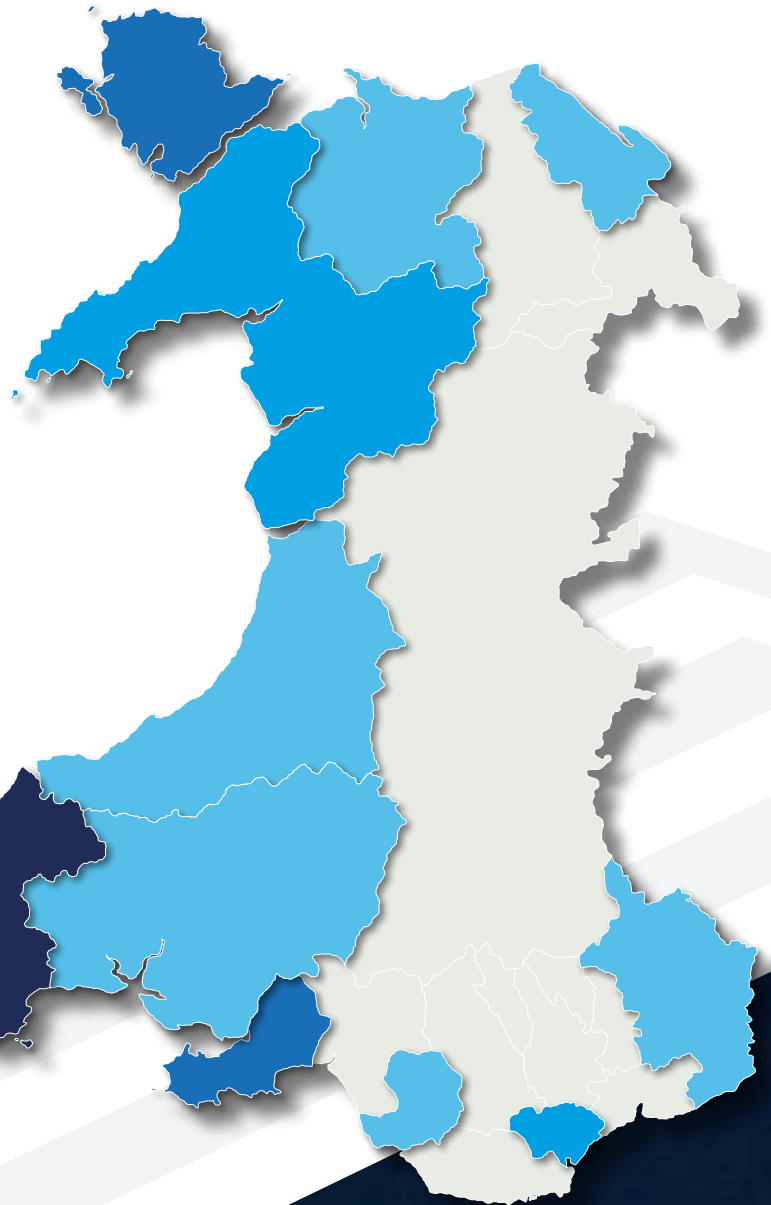
In Wales, the marine renewable energy sector provides employment to 440.2 full-time employees (FTEs). This spans technology and project developers, academia, and the associated supply chain. Pembrokeshire tops the chart with the highest number of people employed in the sector, boasting 281.25 FTEs.

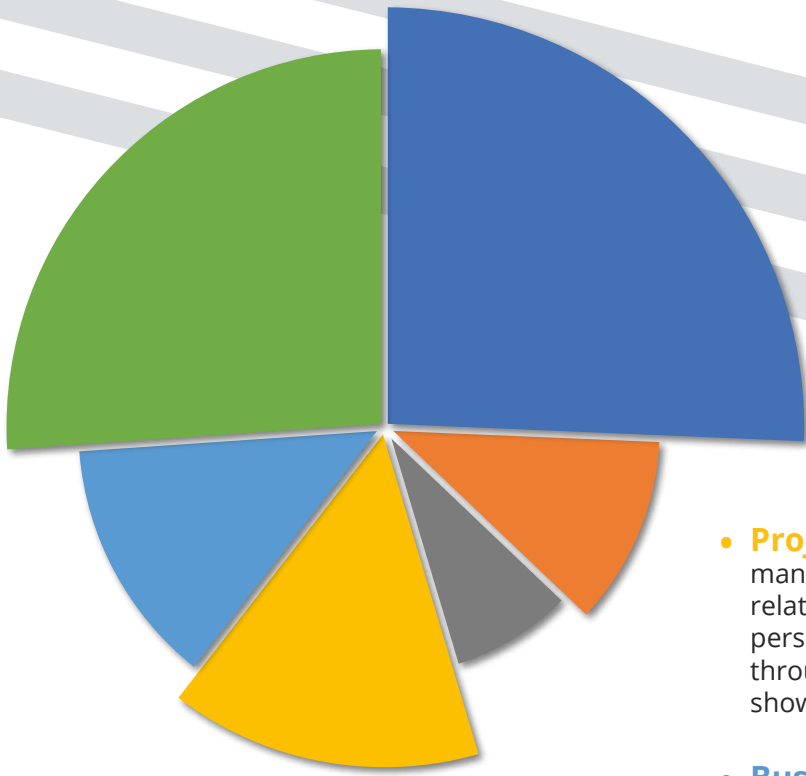
This can be attributed to the presence of a well-established supply chain cluster, comprising fabricators, engineers, environmental consultants, marine operators, technology developers, project developers, and other supporting organisations. Anglesey and Swansea also boast a significant level of employment – 56.3 and 53.9 FTEs respectively – reflecting the substantial investment in these areas.

The Welsh marine energy sector offers a diverse range of work and career opportunities across various pathways. The 440.2 individuals employed in the sector can be broadly categorised into six principal areas:

## FTE CURRENTLY EMPLOYED

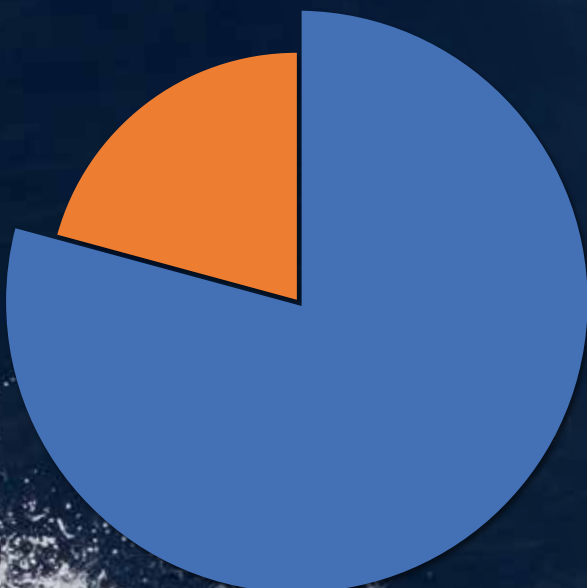
<b>Pembrokeshire</b>	281.25	
<b>Anglesey</b>	53.9	
<b>Swansea</b>	56.8	
<b>Gwynedd</b>	26.7	
<b>Cardiff</b>	14.15	
<b>Conwy</b>	2	
<b>Camarthenshire</b>	2	
<b>Ceredigion</b>	1	
<b>Flintshire</b>	1	
<b>Bridgend</b>	0.8	
<b>Monmouthshire</b>	0.6	





- **Construction and fabrication (26%)** – this includes roles such as mechanical engineers, electrical engineers, welders, fabricators, shipwrights, apprentices, and painters involved in hardware and infrastructure manufacturing.
- **Technical (26%)** – involving software developers, data analysts, geographical information systems technicians, environmental analysts, marine scientists, marine mammal observers, and consents managers. These roles are prevalent in academia, technology developers, and consultancies.

- **Project services (15%)** – in finance, office management, human resources, marketing, public relations and communications, administration, and personal assistance. These roles are distributed throughout the sector, with larger organisations showing a higher concentration.
- **Business development and commercial (13%)** – individuals in this category may serve as project managers, business managers, financial analysts, funding specialists, patent advisors, and lawyers. A higher proportion of these roles are found in larger organisations and specialised service providers.
- **Design (12%)** – design and development engineers, 3D modelers, computer-aided design operators, and prototype engineers. They primarily work for technology developers, although academia and the supply chain also employ a small number.
- **Operations and maintenance (8%)** – including marine operatives, divers, health and safety executive managers, pilots, crane operators, drone operators, and asset engineers. While currently the smallest area of employment, we anticipate significant growth as more technologies are deployed and installed.



## AVERAGE GENDER SPLIT OF COMPANIES WORKING IN THE SECTOR

This year, for the first time, we also gathered data on the gender split of sector. This shows that, on average, companies working in the Welsh marine energy sector employ 79% men and 21% women. While there are many initiatives currently underway to encourage and enable more women to work in the sector, this baseline data helps to better understand the current employment landscape.



21 -22 March 2023

# MEW Conference 2023

SWANSEA ARENA | ARENA ABERTAWE

- 501 DELEGATES
- 100 SPEAKERS
- 299 ORGANISATIONS
- 13 NETWORKING HOURS
- 21.8 HOURS OF ENGAGING PRESENTATIONS & PANELS



## WHO ATTENDED?

PROJECT DEVELOPMENT	x199
SUPPLY CHAIN	x115
TECHNOLOGY DEVELOPMENT	x82
NGO	x50
ACADEMIA	x48
POLICY MAKER	x31
REGULATOR	x21

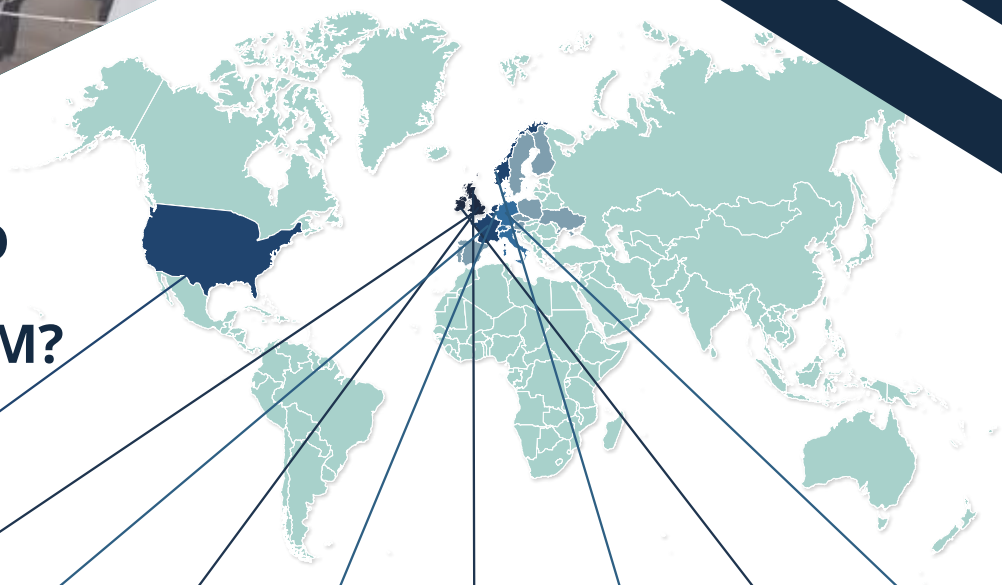
The Marine Energy Wales annual conference is the premier event for networking and gaining valuable industry insight in Wales's emerging offshore renewable energy sector. Our latest conference, MEW2023, was a resounding success, attracting a diverse and influential group of stakeholders. This year, we took over the impressive and modern Swansea Arena for two impactful days in March.

As the event continues to grow in significance, it serves as a magnet for key players committed to shaping a future where Wales is powered by offshore renewable energy. With a spacious exhibition hall, dedicated meeting rooms, and abundant networking opportunities, our conference provides an unparalleled platform to establish and expand your business contacts. Engage in meaningful discussions with like-minded professionals who are passionate about shaping the industry's future.

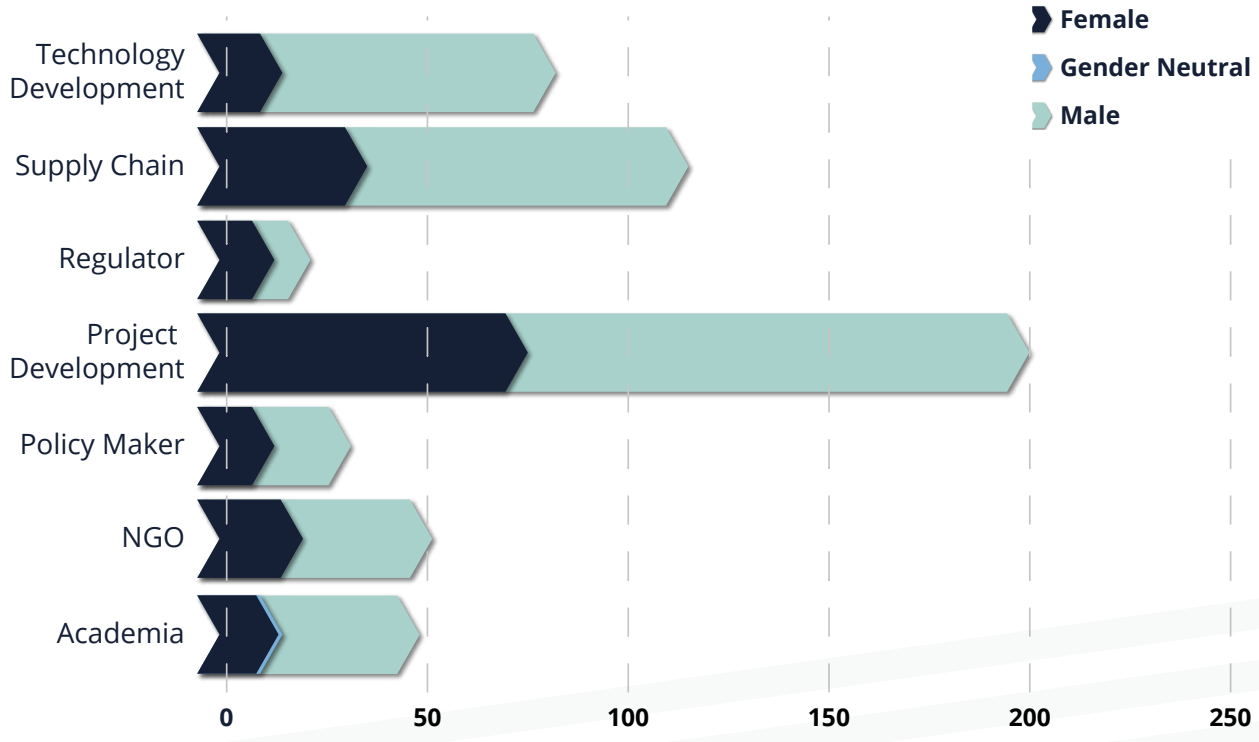
One of the primary reasons to attend is the wealth of knowledge and insight awaiting you. We offer three rooms filled with carefully curated programming, featuring the latest sector developments. Industry experts will grace the stage to share their groundbreaking work, while thought leaders explore innovative solutions to address the industry's most pressing challenges. You can't afford to miss this exceptional opportunity to expand your understanding and gain a competitive edge.

Mark your calendars for MEW2024 on March 13th – 14th next year and secure your spot at Swansea Arena. Stay tuned for updates by visiting our website regularly.

# WHERE DID PEOPLE COME FROM?

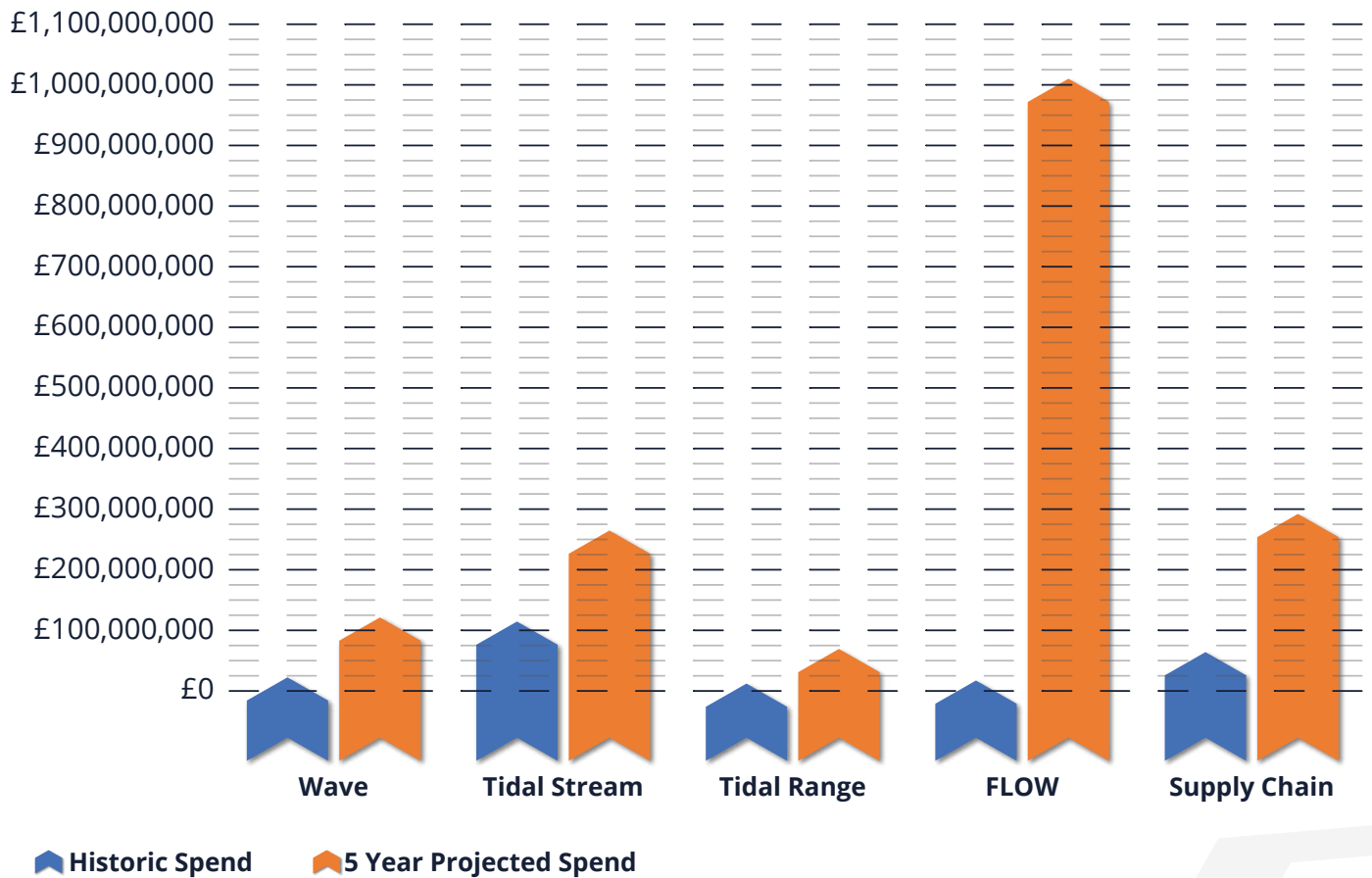


- USA
- Wales
- France
- England
- Netherlands
- Scotland
- Norway
- Ireland
- Europe





# FUTURE OUTLOOK



Our member survey for this report yielded crucial insights on future spending plans, contingent upon the continuation of current project pipelines.

FLOW stands out, with a projected £1 billion in economic opportunities in the next five years alone. This is why the sector is being billed as a 'once-in-a-generation' opportunity for Wales. However, capturing these benefits requires appropriate infrastructure and a balanced approach to cost considerations.

Tidal stream, having already contributed substantially to Wales, is expected to deliver £261 million in the next five years, enabled by the development of electrical infrastructure in the Morlais Tidal Demonstration Zone. The supply chain, consisting of Marine Energy Wales members, is predicted to provide £289 million – over five times the historic levels – as more companies diversify their offerings. Further investment and spending is likely to follow as more supply chain companies diversify and move into providing products and services to the marine energy sector.

Wave and tidal range technologies show potential growth, with estimated benefits of £118 million and £69 million respectively. However, project pipelines for these technologies currently lack clear market routes. Celtic Sea Power's wave energy demonstration zone and the Welsh Government's £750,000 research funding for a pioneering Welsh Tidal Lagoon challenge offer optimism for future commercial opportunities.

These findings underscore the vast economic potential in Wales' marine energy sector. But, to fully capitalise on these prospects, strategic infrastructure investment, development, and a conducive business environment are vital.





## MARINE POWER SYSTEMS A TRUE WELSH EXPORT

Working with a range of industry stakeholders, Marine Power Systems (MPS) is helping set a clear pathway for the deployment of FLOW. They are developing commercial relationships with a cohort of strong industrial partners, bringing the expertise, competence, and flexibility required to make the rapid deployment of industrial-scale FLOW possible.

Commissioned by RWE, Wales' largest energy producer, MPS has developed a project plan for the deployment of FLOW turbines in the Celtic Sea. The plan includes the use of ABP Port Talbot and Pembroke Dock for assembly and deployment and identifies the economic regional supply chain opportunities that can be unlocked by staying competitive on materials and components.

Their unique and flexible floating platform, PelaFlex, is well suited to a high-energy environment,

such as the Celtic Sea. The kind of industrial scale developments that will be required to meet the UK's capacity target mean farm developments will need to be delivered quickly. Pelaflex is specifically designed to maximise local content delivery and minimise the need for specialist ports.



## A WEALTH FUND FOR WALES

Hiraeth Energy and Magnora Offshore Wind are bidding for the rights to develop a FLOW project in the Welsh area of the Celtic Sea. A key aspect of the project is community ownership, giving residents a meaningful stake in its success. The aim is to establish a Wealth Fund for Wales, providing returns to Welsh communities and contributing to the goal of achieving Net Zero by 2050. Various mechanisms, including a community benefit society and a community interest company, are being considered. While challenges such as lease costs and future strike prices exist, Hiraeth Energy remains dedicated to pioneering community ownership in renewable energy projects of this scale, setting a precedent for the future.

## EREBUS "THE GREEN LIGHT"

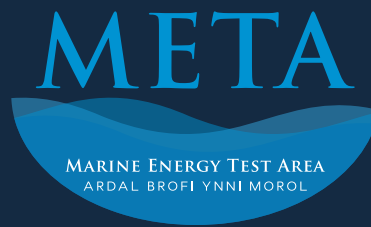
In 2023, Erebus became the first approved FLOW project in the Celtic Sea, located 40km off the Pembrokeshire coastline.

The project, led by Blue Gem Wind (a joint venture between TotalEnergies and Simply Blue Group), will deploy seven 14-megawatt turbines on WindFloat® platforms, supplying clean energy to 93,000 homes. It will feature next-generation turbines on floating platforms, generating low carbon energy, and supporting net zero goals and energy security.

MarineSpace, a marine environmental and planning consultancy, has supported Project Erebus since 2019, providing expertise in site selection, environmental impact assessment, offshore survey management, and more. Overcoming various challenges, MarineSpace and partners successfully navigated two consenting regimes, introduced new technology to an inexperienced region, and developed the project with limited baseline data.



MarineSpace will continue to assist Project Erebus in the post-consent phase, collaborating with regulators and stakeholders to develop monitoring and compliance plans for construction and operation.



## META PROJECT SHOWCASE

The Marine Energy Test Area (META) is a key asset for the marine energy sector. The only pre-consented, pre-commercial testing centre of its kind, META is Wales' flagship project dedicated to reducing the time, cost, and risks associated with deployment and commercialisation. They offer testing in real sea conditions for wave, tidal and FLOW devices, and components in and around the Milford Haven Waterway. META boasts a range of sites, encompassing deep and shallow, sheltered and with high-quality wave and tidal resource. And it's all just a stone's throw from world class port, engineering, and manufacturing facilities.

It has been a busy year. The MEECE Buoy has been deployed at Dale Roads – collecting data on peak mooring loads and testing a mooring damper solution. Swansea University have successfully conducted another test campaign of their C-ADCP at Warrior Way, which is designed to capture high-quality turbulence measurements to improve understanding of loading on tidal turbines. Cardiff University have deployed low carbon concrete at META Quayside to understand durability in a marine environment and use in tidal range schemes. Finally, settlement on natural fibre mooring lines is being investigated at Dale Roads.

META is becoming a hub for research and innovation. Get in touch if you would like to find out more or book one of their 12 berths.

[meta@marineenergywales.co.uk](mailto:meta@marineenergywales.co.uk)

[www.meta.wales](http://www.meta.wales)





# RETHINKING CFDS: TURNING THE TIDE ON RENEWABLE ENERGY FUNDING

Contracts for Difference (CfD), the UK Government's main mechanism for supporting low-carbon electricity generation, has delivered revolutionary cost reduction in offshore wind over the past decade. It is often hailed as a massive policy success for the UK.

As of 2022, this policy mechanism was expanded to both tidal stream and FLOW for the first time, providing new opportunities for these technologies to be deployed at scale within UK waters. Hexicon's 32-megawatt TwinHub FLOW project at the former WaveHub site in Cornwall became the first FLOW project to secure a CfD. Four tidal stream projects also secured contracts with a combined capacity of 40.82 megawatts. Of this, 5.62 megawatts are to be deployed to Welsh waters by the Spanish company Magallanes Renovables.

In addition to newly earmarked funding for emerging offshore renewables within the CfD structure, the allocation rounds now take place annually, rather than every other year. Whilst this effectively creates more frequent opportunities for projects to secure support, the level of funding available has remained constant, effectively halving the amount of money available to projects in each round.

The nature of this UK funding mechanism has always been competitive. Those that can guarantee the lowest cost of energy via their bid succeed, and this has been instrumental in driving costs down to date. However, there are concerns that incredibly tight competition over a smaller allocation of funding will reduce the total number of contract winners overall. And, as a result, this will reduce opportunity for the kind of cost saving that only comes about by getting devices in the water and learning through demonstration.



In this year's allocation round, several tidal turbine manufacturers are bidding to join Magallanes Renovables in deploying their technology at the Morlais site off the coast of Anglesey. They will compete not just against each other, but with several other projects and sites elsewhere in the UK. With only £10 million on the table compared to last year's £20 million, it is expected that less than 20 megawatts of tidal stream projects will be approved. If Welsh projects are not competitive enough on cost, they will miss out.

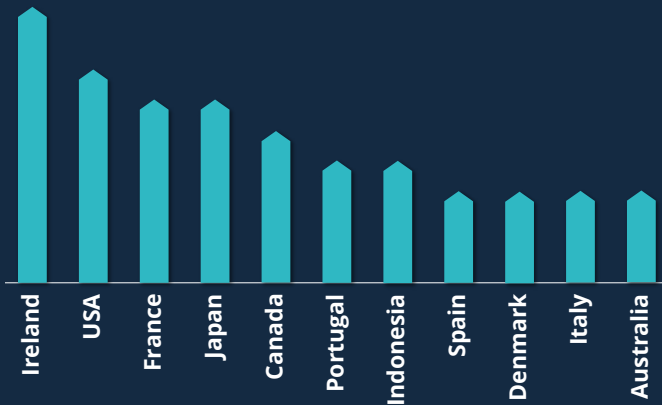
For FLOW in this year's allocation round, Blue Gem Wind's 100-megawatt Erebus project, located off the coast of Pembrokeshire, will be bidding for an available £25 million, which will require a challengingly low bid to clear. Adding to this is the further challenge that the project will be competing for funding with EDF's Blyth 2 FLOW farm off the coast of Northumberland. It is highly unlikely that the £25 million would stretch to supporting both projects.

While allocation rounds are now an annual event, it is unclear how money will be allocated over the coming years. Information is released one round at a time, making it hard for projects to plan how much to bid for and when. Everything rides on securing contracts in the latest round.

In this decade of delivery, questions need to be raised as to whether the CfD process is fit for purpose. While effective in delivering lowest cost projects and the associated value for money to treasury, this approach can hinder other areas. Pitting projects against each other can limit the number approved, thereby slowing roll out and impeding our net zero objectives – particularly as the long-term opportunities remain unclear. The emphasis on cost saving has also driven projects to seek out cheaper supply chains overseas rather than fostering jobs, economic opportunities, and associated tax revenue in the UK. Is lowest cost at any cost the right approach, or is it time for rethink of how we fund low-carbon energy generation in the UK?



# OPPORTUNITIES BEYOND WALES



The international market for marine renewable energy is growing rapidly, particularly in countries with abundant wave, tidal, and offshore wind resources. Our members shared insights on their business activities outside the UK, revealing promising growth, export, and collaboration opportunities.

European coastal nations like Ireland, France, Portugal, Spain, Denmark, and Italy were frequently mentioned, with Ireland ranking highest overall. These countries see significant potential in offshore wind, both fixed and floating. Tidal energy shows promise in Ireland and France, while wave energy projects are actively being pursued in Ireland, Portugal, Spain, and Denmark.

In North America, the USA and Canada both emerge as strong potential markets. Although they have yet to embark on major offshore wind development, there is a focus on rapid expansion. Canada has long been a leader in tidal stream development, while the USA is now starting to fund wave and tidal energy projects.

Japan is recognised as a major market for tidal stream, wave, and FLOW technologies. Tidal stream developers are exploring opportunities in Indonesia, while Australia is seen as a nation with untapped potential for various forms of offshore renewable energy.

## WALES IN FRANCE FOR FLOW TRADE VISIT

Led by the Welsh Government and supported by Floventis Energy, a trade mission to France was undertaken earlier this year by 19 delegates from supply chain companies, ports, and industry membership bodies.

Aimed at gathering information and exploring potential opportunities around the assembly of floating wind platforms, the trade mission visited Provence Grand Large, France's first pilot floating windfarms at Fos-sur-Mer, near Marseille.

The visit allowed potential supply chain partners from Wales to gain insights into the requirements and preparations necessary for the development of FLOW farms.

Richard Selby, Director and Co-Founder of Prosteel Engineering said: "this was a great opportunity to find out more about how we can prepare our business to be in the best possible place to tender for the engineering and fabrication work associated with the proposed developments in the Celtic Sea".

Floventis is developing the Llŷr 1 and Llŷr 2 projects, located 31km off the coast of Pembrokeshire, which will generate around 200 megawatts of clean energy, powering approximately 200,000 homes. Each project will feature six to eight turbines and is expected to be operational by 2027.



# BUSINESS NETWORKS

To understand which organisations are most embedded and connected in the Welsh marine energy sector, we asked members who they are collaborating with in our network.

All of those listed here are known to be highly active in the sector. Those featured most prominently represent some of the leading experts and collaborators driving forward sector progress and development.





## JOIN US ON OUR MISSION TO NET ZERO, BECOME A MEMBER

Be part of our growing membership of developers, manufacturers, researchers, statutory bodies and alliances to build a bright, prosperous healthy future fuelled by the sea.



### BUILDING YOUR NETWORK

As the single-point of access for the industry in Wales we can sign-post and make the key introductions you need to succeed.



### BUSINESS SUPPORT

We work with members to help overcome business obstacles.



### POLITICAL ENGAGEMENT

Your business needs will feed into our political engagement and supply chain work.



### ACCESS TO EXCLUSIVE EVENTS

Business to business networking through our events and workshops.



### COMMUNICATIONS

Keep informed with the latest industry news, updates and opportunities, as well as the chance to boost your profile through our own channels.



### STAKEHOLDER ENGAGEMENT

We can advise and support with stakeholder engagement activities.

EMAIL US AT [INFO@MARINENERGYWALES.CO.UK](mailto:INFO@MARINENERGYWALES.CO.UK)  
OR VISIT OUR WEBSITE [WWW.MARINEENERGYWALES.CO.UK](http://WWW.MARINEENERGYWALES.CO.UK)  
TO FIND OUT MORE.



# CLOSING REMARKS

We would like to thank everyone who has taken the time to read this year's edition of the annual report. Its findings are based on an annual survey of our membership, with annually revised figures made up of the most recent information and historic data. We have therefore presented the clearest possible picture of the developing socio-economic benefits created by the marine renewable energy sector in Wales.

This year's data has solidified this point in time as pivotal for the sector, with much of the important groundwork now laid out ready for future growth and expansion. The remainder of this decade is now well positioned for both FLOW and tidal stream projects to be delivered, bringing with them very real benefits to Wales. This is, however, not totally assured, with continued support from both UK and Welsh Governments needed to ensure that development moves forward in a beneficial way.

The route to market for wave and tidal range energy remains somewhat uncertain. However, the announcement of £750,000 in Welsh Government funding for research that can help facilitate a first-of-its-kind tidal lagoon is a positive step. Wales also remains home to two leading wave energy technology developers who are currently progressing some of the most powerful wave energy converters ever built. But until these have undergone extensive real sea testing, a full commercial pathway for deployment is yet to emerge.

Without a doubt some of the most promising opportunities in the marine renewable energy sector lie with the supply chain. There are now enough positive market signals and surety of pipeline to make the roll out of marine energy inevitable. And this has the potential to bring real benefits to Wales providing we can nurture a strong local supply chain and associated workforce.



CSDA



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