**Seascape Review- Barriers to Marine Renewable Energy Supply Chain Development in Welsh Waters**

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Keywords: marine renewable energy, Wales, supply chain, barriers

Introduction:

The purpose of this paper is to review the current status and barriers to the development of the marine renewable energy supply chain in Welsh waters. Results of a literature review will be discussed.

Background information:

UK waters are host to a rapidly expanding offshore renewable energy industry. The UK Government’s Energy Security Strategy (UK Government, 2022[[1]](#endnote-1)) has set a UK renewable energy generation target of 50 GW representing a fivefold increase compared to installed capacity in 2021. It is suggested that Welsh waters could provide approximately one seventh of the wave energy resource, one quarter of the tidal range resource and one third of the tidal stream resource requirements for the UK (DECC, 2011[[2]](#endnote-2); Lewis, 2015[[3]](#endnote-3)).

The extent to which local and regional Welsh communities benefit from the development of the sector depends very much on decisions taken during early stages. Although offshore consent for schemes larger than 350MW are taken at UK, rather than Welsh Government level, the supply chain for renewable energy generation installation and maintenance activities within Welsh waters can and certainly should be based in Wales. However, the gap between Welsh renewable energy supply chain capacity and production appears to be widening between Wales and the rest of the UK. A number of barriers have exacerbated the situation. These will be explored in further detail.

Research approach:

During November and December 2022, a desk based literature review was undertaken using Scopus. Search terms included “marine renewable energy” AND “Wales”; “offshore renewable energy” AND “Wales”; “marine renewable energy” AND “UK”; “offshore renewable energy ”AND “UK”. A range of peer reviewed academic papers, conference papers, books and policy documents were identified, published between 2002 and 2022. 511 sources were originally identified. This was reduced to 44 following a review of abstracts in order to identify Welsh marine renewable energy policy and capacity development documents.

Discussion:

At present, 726MW of fixed wind energy is generated at Rhyl Flats, Gwynt y Mor and North Hoyle sites in North Wales (Crown Estate, 2022[[4]](#endnote-4)). In addition, a number of Welsh demonstration sites have been consented, although none of these are currently operational. These include a 240MW capacity tidal stream project located off the west coast of Anglesey (Morlais, 2022[[5]](#endnote-5)), a 100MW capacity full-scale wave and floating wind array off the coast of Pembrokeshire (META, 2022[[6]](#endnote-6)), Llyr1 and Llyr2 floating wind projects 40km off the coast of West Wales which aim to generate 200MW of electricity by around 2027 (Llyr, 2022[[7]](#endnote-7)) and the Celtic Sea Floating Wind Zone which aims to generate 4GW from 2023 onwards, subject to consents (UK Government, 2022[[8]](#endnote-8)).

The literature review identified a number of UK-wide consenting and manufacturing issues. These include:

* Limited seaspace availability
* Limited understanding of complementary and competing sea space uses
* Leasing and consenting timescales
* Complex governance structures
* Lack of an agreed framework for monitoring environmental and social impacts
* Lack of an agreed framework for implementing post consent guidelines
* Lack of decommissioning considerations early in the development process
* Lack of regularly scheduled Contract for Difference rounds
* Lack of Contract for Difference penalties for non-delivery
* Complex grid management systems
* Lack of large-scale manufacturing facilities for key component parts.

Welsh installation and maintenance specific issues include:

* Lack of monopile and floating platform fabrication facilities
* Lack of direct involvement of government pump priming and co-ordination of regional and national assets
* Lack of collaborative funding mechanisms
* Lack of sectoral plans for ports, grid, technology and supply chain
* Lack of integrated supply chain.

Conclusions/ implications:

A number of issues have been identified for the UK and also specifically for Wales. Some of the key Welsh barriers are being addressed through the recently published Celtic Sea Strategy include (Celtic Sea Cluster, 2022[[9]](#endnote-9)):

* Regional leadership
* Regional involvement in zonal planning, leasing and subsidy regimes
* Investment in ports and the electricity distribution grid
* Private public sector networking activities
* Encouragement of regional component assembly, deployment and maintenance
* Work with education institutions to rapidly expand skills and training
* Support key SMEs and large companies to move into the sector and then export.

However, some of these aims are quite generic and there remain gaps in terms of addressing issues that have been identified. For example, how will monopile and floating platform fabrication facilities be developed, where are the collaborative funding mechanisms, when will sectoral plans be developed and how do we ensure supply chains are integrated? While it is accepted that some of these are implicit within the Celtic Sea Strategy, there still needs to be some clarity and specific actions. It is also noted that Welsh Government have announced their intention to invest directly in the onshore wind sector (Welsh Government, 2022[[10]](#endnote-10)), although this needs to extend to offshore activities.

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