

Cynulliad Cenedlaethol Cymru	National Assembly for Wales
Y Pwyllgor Menter a Busnes	Enterprise and Business Committee
Ymchwiliad i Botensial yr Economi Forol yng Nghymru	Inquiry into the Potential of the Maritime Economy in Wales
PME 06	PME 06
SEACAMS Prifysgol Bangor	SEACAMS Bangor University

1 RISKS AND OPPORTUNITIES

1.1

The maritime economy, particularly with respect to marine renewable energy (MRE), is intimately linked to the coastal zone. This is the environmental sector affected by the interaction of terrestrial and marine processes; it extends from the lower regions of river catchments to the outer edge of the continental shelf. It has enormous local, regional, and global significance in terms of economic value and human wellbeing and it has particular importance in Wales:

- A high proportion of the UK population is directly or indirectly dependent on the coastal zone for residence, employment, food, or leisure.
- The marine environment accounts for more than 40% of the territorial area of Wales and about 60% of its population live in the coastal zone.
- This zone is immensely important to the EU contributing more than 40% of GDP.
- The coastal zone is particularly susceptible to the impacts of climate change and human activity. In a global context, the twelve largest cities in the world occupy estuarine and/or coastal plain areas that are highly vulnerable to the combined impacts of river flooding, sea level rise, and extreme weather events. Events during winter 2013-14 have shown the vulnerability of large swathes of the UK coastal zone to erosion and flooding.
- Due to population pressure and excessive exploitation of natural resources, the coastal zone is highly susceptible to biodiversity loss, habitats destruction, pollution, conflicts between potential uses, and space congestion problems.
- There are environmental and socio-economic issues relating to sustainable resources and new technologies for food security, MRE for energy security, offshore natural resources (aggregates, hydrocarbons), water quality and ecosystem health in relation to tourism, etc.

1.2

A major challenge for the maritime sector is how is to integrate the sustainable use of natural resources for the provisioning of energy, water and food with the delivery of other ecosystem services, i.e. how to reconcile blue growth and sustainable coastal/marine ecosystem services. This is a major societal issue that has local, regional and global relevance. However, its solution offers opportunities for growth in the commercial sector.

A high environmental priority is to develop the science and policies needed to ensure coastal and marine ecosystem integrity over the long term on local and regional scales. This is especially critical for Wales given the economic value of its coastal and marine environments. While a major priority for the Welsh economy is to promote and support a dynamic and sustainable maritime economy, including MRE, this must be accompanied by policies and measures to mitigate the impacts of climate change, to adapt sensitively and appropriately to the effects of climate change, to build resilience and coastal and marine systems, and to conserve present resources.

1.3

The continental shelf and coastline of Wales experience a hydrodynamic regime that is particularly conducive for MRE developments. These include tidal stream, tidal range, and wave energy. Tidal stream potential (i.e. exploiting fast tidal currents) is focused around the Pembrokeshire and Anglesey coasts; tidal range (i.e. development of coastal lagoons) has potential in South Wales (Swansea and Cardiff Bays) and North Wales (between Colwyn Bay and the Dee estuary); the focus for wave energy is off SW Wales. In addition, there are functioning offshore wind energy devices off the North Wales coast with the potential for considerable expansion in the Irish Sea off Anglesey. Finally, there is potential for marine pumped storage hydroelectric schemes on coasts backed by high cliffs. Added to the development of increased nuclear energy at Wylfa on Anglesey, which is marine-related in terms of construction and operation, Wales will become a major contributor to the UK energy requirement on a decadal time scale. The supply chain infrastructure needed to develop and maintain the marine energy sector will be a major contributor to the maritime economy in Wales.

1.4

MRE development is an inherently high risk venture. Much of the scientific knowledge needed to progress the consenting process and for de-risking investment is at the cutting edge of scientific research. This relates to the siting of engineering installations in regions of high hydrodynamic energy which is challenging and requires high resolution data on the hydrodynamic resource including extreme events. It relates also to potential environmental impacts, both local and far-field, on time scales from days to decades. These include changes to seabed morphology and stability, coastal erosion and sedimentation, water quality issues, threats to ecosystem health and sustainability, impacts on fisheries and marine mammals, and impacts on human health.

2 SUPPORTING THE ROLE OF RESEARCH INSTITUTIONS AND BUSINESSES

2.1

Bangor University conceived and leads the £25M, five year project SEACAMS (Sustainable Expansion of the Applied Coastal and Marine Sectors), in partnership with Swansea University, supported by EU funding via the Welsh European Funding Office (WEFO). SEACAMS works directly with businesses in the commercial marine sector. About 60% of the 121 collaborative projects with businesses undertaken to date by SEACAMS have been in the marine energy sector. By the end of the project, it is likely that SEACAMS will have generated about £10M of induced investment into the Convergence Region of Wales.

2.2

SEACAMS works directly with businesses so as to address issues of direct concern and relevance to commercial developments and growth. The success of SEACAMS demonstrates the merits of the Structural Funds programme in general and the advantages of direct collaboration between researchers and businesses in particular. It is important that this direct link is maintained and not diluted by directing the contact via government or NGOs.

2.3

SEACAMS also demonstrates the value of creating a single entry point for businesses. Businesses appreciate the advantages of building direct relationships with projects like SEACAMS and with particular researchers. The direct link between research scientist and business team is essential and underpins effective knowledge transfer and consequent commercial exploitation. The direct link also enables university researchers to focus on the scientific questions which businesses want addressed. This is important for researchers in the applied marine science field as it helps them focus on science that is likely to have impact – important for the REF. The direct link provides the most effective and efficient conduit for mutual benefits to research institutions and businesses and optimises the economic benefits to the Welsh economy.

2.4

Related Welsh Government initiatives, such as the National Research Network in Low Carbon, Energy and Environment (NRN-LCEE), provide a valuable basis for collaboration for projects such as SEACAMS. The scientific expertise of NRN-LCEE expands the knowledge base, while SEACAMS provides the conduit and mechanism for knowledge transfer to the commercial sector. Moreover, the database generated by SEACAMS projects provides a valuable resource for the scientists of NRN-LCEE. This link between blue-sky and applied marine science research is an essential element in optimising knowledge exploitation by the commercial sector.

2.5

It is important that existing and successful networks in Wales are supported into the future. New government-supported initiatives should build on, and not duplicate or dilute, existing successes.

3 MEASURES TO SECURE EU FUNDING

3.1

SEACAMS is funded by the EU Structural Funds Programme. SEACAMS is a collaborative project between universities and businesses but also has buy-in from agencies (NRW). A key tenet of SEACAMS is that Blue Growth requires close linkages between researchers, businesses, and policy makers/agencies. Businesses not only have access to cutting edge research and facilities but also gain advantage from knowledge of policy developments in an era of rapidly evolving legislation. Hence SEACAMS has engaged with the relevant public bodies.

3.2

The Bangor-led follow-on project, SEACAMS2, in the EU Structural Funds Programme is a collaboration between Bangor and Swansea Universities and the Centre for Ecology and Hydrology (CEH) at Bangor. CEH is the sole institute of the Natural Environment Research Council (NERC) in Wales and plays an important role in influencing NERC's scientific strategy for the UK. SEACAMS2 therefore broadens the scientific base of the project: the radical land-ocean linkage which CEH provides is a considerable advantage for leveraging future funding from the EU.

3.3

SEACAMS2 has been developed after close consultation with the businesses with which SEACAMS has engaged. This is a uniquely strong partnership with the commercial sector which can be exploited to secure future EU funding (e.g. Horizon2020).

4 BENEFIT TO, AND SUPPORT FOR, THE MARITIME ECONOMY

4.1

Wales is a world leader in marine science research and has a strong track record in collaborative applied marine science. Thus at Bangor University, the Centre for Applied Marine Science (CAMS) which hosts SEACAMS has been a self-sustaining unit since the late 1970s and has grown considerably by developing new research in collaboration with businesses, agencies, research councils, and government.

4.2

SEACAMS is an excellent example of how collaboration between HEIs and businesses contributes to scientific knowledge and supports the development of the MRE sector. For example, one of the leaders in tidal stream technology, the Swedish company Minesto, acknowledges its debt to SEACAMS and has stated that it would not be operating in Welsh waters without the help of SEACAMS. SEACAMS has also been working closely with Tidal Lagoon Power on its proposed tidal lagoon developments in South and North Wales. SEACAMS provides such companies with expertise, facilities, and resources that they lack so as to set up collaborative research programmes.

4.3

Based on the SEACAMS experience, SEACAMS2 aims to improve significantly its offer to businesses by upgrading its data and modelling capacities and improving accessibility to businesses and other practitioners in the marine sector. SEACAMS2 will expand the strategic reach of the project by establishing a new Welsh Integrated Marine Observation System (WIMOS) linked to a new Environmental Knowledge Systems Hub (ENVOKH). WIMOS linked to ENVOKH is a portal that provides businesses with improved data handling and data availability, and tools and numerical models for data interpretation: a 'one-stop shop' for practitioners in the maritime economy.

5 WELSH GOVERNMENT STRATEGIC APPROACH

5.1

SEACAMS, funded via Welsh Government, is a strategically conceived operation designed to optimise knowledge transfer to a rapidly expanding part of the maritime economy. This represents a significant strategic investment by Welsh Government.

5.2

ENVOKH will be a pan-Wales facility that not only integrates applied marine science in Wales but also integrates science across the land-ocean boundary. ENVOKH will be developed to harmonise with EU-wide data portal initiatives. The funding of SEACAMS2 will therefore reflect a strongly strategic approach to the development of the sector that is harmonised with wider European-wide initiatives.