



**« HOW CAN THE EU, THROUGH ITS POLICIES, ENSURE THAT INNOVATION IN MARITIME ENERGY TECHNOLOGIES INCREASINGLY BENEFITS PERIPHERAL MARITIME REGIONS? »**

# Marine Energy

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## CONCLUSIONS OF THE CPMR ENERGY WORKING GROUP SEMINAR

### Introduction

In the long term, ocean energy has the potential to satisfy 10% of the European electricity demand, and in some countries, such as the U-K, wave and tidal resources can even provide 15-20% of national demand. It is clear that such considerable asset should not be neglected if we want to meet the EU's carbon reduction goals, which are due to become gradually more stringent, as well as to strengthen the Union's energy security.

Maritime energy is naturally seen as providing potential economic benefits to peripheral maritime regions. However, and though its development potentials vary from one technology to another, the exploitation of maritime energy remains, at this stage, more a long term ambition than a short-term prospect. Hurdles are numerous, from having to prove a satisfactory energy conversion potential while facing very high technical risks related a harsh environment. Required investment is considerable, prospect for returns remote, and difficulties of all kind remain to be overcome, which explains that, to this day, the installed power capacity of marine energy remains marginal. The situation of marine energy is much as that of wind energy ten or 15 years ago, but with the added difficulty that the latter, which has gone leaps and bounds in the recent years, has now reached production stage, and has a competitive advantage as a low-carbon energy source.

Hence the question: should one persist in investing in marine energy, or disregard it as being too complex and uneconomic? Rather ominously, the recent EU Commission document on the SET-Plan advocating an extra €50 billion investment in low carbon technologies over the next decade has made only a fleeting reference to marine energy whilst highlighting other priorities such as wind, solar or nuclear energy<sup>1</sup>. So, is marine energy "missing the boat"?

This issue concerns not only those industries directly involved, but also to those regional authorities which border Europe's maritime peripheries.

As a whole, peripheral maritime regions feel particularly concerned about the climate change issue, if only because they tend to be themselves very exposed to the risks of sea level rise, extreme weather conditions and drought, etc. These areas are equally concerned by the UE need for better energy security, since dependency on imported petrol and brutal price rises tend to affect badly population and industries located

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<sup>1</sup> Commission Communication on Investing in the Development of Low Carbon Technologies (SET-Plan) Brussels, 7.10.2009, COM (2009) 519 Final/ merely states: "At the request of Council and Parliament, the Commission is examining other avenues with great potential such as other sources of offshore renewable energy,, energy storage and renewable heating and cooling."

on the periphery, and henceforth more transport dependant. But the development of marine energy also has an obvious added bonus for maritime regions, namely that it exploits a natural resource located in their vicinity. This is, in particular, the case in areas with high marine energy potential, such as, for example, the Atlantic coast with its high tide levels and strong currents, or such as the Outermost Regions, with their capacity for Ocean Thermal Energy Conversion.

Marine energy development raises the hope of transforming many maritime peripheries from being energy dependent to being energy producers, making them at least more energy self-sufficient, at best exporters. Needless to say, the activities arising from such development (be it through construction, servicing, research, training etc.) could become, in the long term, major sources of employment and wealth, helping these regions to redress their socio-economic discrepancies with the rest of the Community. In short, even if this is a very long term vision, marine energy appears as a perfect instrument - or at least one not to be neglected - if we are to "turn the table round", and make geographically peripheral regions much more "central" in the context of the European Union.

But what are the obstacles which stand in the way of such a vision? And how could they be overcome?

The time seemed ripe to have an exchange of views on such matters, hence the initiative taken by the Conference of Peripheral Maritime Regions (through its Energy working group), in cooperation with Cornwall Council and the Cornwall Development Company, to organise a seminar on the theme: "How can the EU, through its policies, ensure that innovation in maritime energy technologies increasingly benefits peripheral maritime regions?". It is to be hoped that the open discussions which have taken place in Falmouth during two days between experts and representatives from the public and private sectors (be it from the industry, from the regional authorities or from the European Commission), will have contributed usefully to assess the state of play, and that the conclusions of this seminar will prove a good basis for political recommendations in the future.

Participants of the seminar included a wide geographical range of regional and local authorities, representatives of the European Commission, marine energy technology developers and supply chain businesses, regional development agencies and energy agencies.

Part of the seminar utilised the expertise of the cross sectoral partnership which is jointly delivering the Wave Hub project in Cornwall.

## **I - SOME PROBLEMS FACING THE MARINE ENERGY INDUSTRY.**

- The expression "marine energy" or "ocean energy" covers a whole range of technologies which are widely different in nature (but which all strive to capture the energy potential of the sea, be it through waves, tides, currents, salinity or thermal gradient). Offshore wind turbines are sometimes also mentioned as marine energy, but this is debatable for, though they share many common problems (such as installation at sea, or exposure to a difficult environment) they nevertheless relate to the exploitation of a non specifically maritime energy resource, i.e. the wind<sup>2</sup>.
- If some marine energy technologies such as tidal barrages, are well established, in most cases they are largely experimental, and at the research and development stage. Projects and solutions are numerous, especially with wave energy, where they near the thousand. There is no indication that one technology is vastly superior to others, and should thus focus efforts. Resources are consequently scattered over a large number of initiatives.
- Industries in the field of marine energy tend to be small or medium-sized enterprises, much more than large players like with the wind energy. Their financial means are henceforth limited, which severely restrict their capacity for research or experimentation when costs are high (for example, the mere cost of installing a device at sea for testing can prove prohibitive for a small developer).

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<sup>2</sup> However, within offshore wind energy, one must differentiate "near-shore" from "far-shore" wind energy, the latter facing difficulties not unlike those met by marine energy, and requiring special consideration.

- A major factor hampering the development of marine energy is the multiplicity and high level of risks. For instance:
  - natural conditions can be extreme, and devices may suffer at sea, or risk accident with shipping maritime and coastal areas being often classified under environmental legislation, considerable efforts are required to assess the environmental impact of a project, with the possibility of the project eventually facing prohibition, or be compelled to relocate due to the above constraints, it is often difficult for industries to get insurance cover, and if so at a reasonable rate. Lowering the cost of such risks (“de-risking”) seems to be considered a priority by the industry.
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  - due to the above constraints, it is often difficult for industries to get insurance cover, and if so at a reasonable rate.
  - Lowering the cost of such risks (“de-risking”) seems to be considered a priority by the industry.
  
- Access to public funding depends upon the level of commitment of national or regional authorities, and the industry note that support levels can vary substantially from one country to another, or even from one region to another – though this is understandable since political commitment is seldom homogeneous, and since there is no harmonisation of support mechanisms at EU level, but only ceilings to be respected.
  
- Access to capital is a major problem. The potential for investment in low-carbon technologies is not unlimited, and investors in that sector are more likely to be attracted by tried and true techniques, and by large scale projects with reasonable prospects of returns in the short, or at least in the medium term, than in new, often unproven, and risky technologies which may not yield profits in a foreseeable future.
  
- Generally speaking, the involvement of Green investors tends to be highly related to the evolution of fuel prices. With marine energy being often at the R&D stage, this is aggravated by the fact that the return cycle is not aligned with a set development timeline. Private equities, with usually expect revenues within one or two years are unlikely to be interested, and the industry has to rely on venture capital and strategic investors.
  
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- The mechanisms set in place by the EU to support R&D&I are extremely diverse and complex. As a result, marine energy industries which tend to be SMEs, with modest staff levels, do not always find the time to explore their possibilities.
  
- Whether marine energy, once developed, will prove a viable proposition will depend also on its condition of access to the grid. Though one could expect that marine energy will first of all satisfy the needs of the communities closest to its deployment, and help them to increase their self-sufficiency, any increase in capacity beyond such needs will imply exporting electricity through the grid, which in many cases will have to be upgraded. The issue of transmission charging will then become all important, and due attention should be paid to the fact that, in conformity with EU legislation, no discrimination should be exerted against renewable energy produced in peripheral or island areas.

## II - THE REGIONAL DIMENSION.

- Peripheral maritime regions, especially those located along the Atlantic and North Sea shores, not to forget the outermost regions, have substantial potential with regards to one marine technology or another. A growing number of them hope that such natural assets will help them to play a leading role in the low carbon industrial revolution, to increase their energy self-sufficiency, as well as to reap practical benefits in terms of resources and jobs, through marine energy-related activities (e.g.: manufacture or assembly of devices, their deployment, operation and maintenance, involvement in the supply chain, knowledge-based consultancies, touristic attraction, etc.).
- In England and in Scotland, in Spain, France and Portugal, as well as in the Outermost regions, some regional authorities have been increasingly involved to foster marine energy related activities off their shores; sometimes taking initiatives which have been followed-up at a later stage by their Member State. Regional authorities have, for example, been involved in setting-up mooring-test facilities, wave hubs for research and experimentation, or in providing or improving all kind of necessary infrastructures. Also, marine energy devices being often voluminous, the industry requires proper harbour facilities to develop its activities from a region. This can imply substantial expenditure (dredging, pier building etc.).
- Regional authorities have also supported the setting-up of maritime clusters bringing together local industries, public bodies, research or training centres, etc. It may be argued that clusters focussing on the development of a given regional area have a strong potential to overcome the contradictions inherent to such structures; i.e. that their participants, especially those from the private sector, are likely to end-up being in open competition against one another. Though regional clusters may have size limitations, those may be overcome by fostering cooperation between clusters (“clusters of clusters”).
- The question has been raised whether Regional authorities should not make use of their substantial purchasing power to support marine energies through public procurement ( for example through contract clauses requiring that, in performing their obligations, contractors use a set percentage of marine energy ). This policy could also be achieved through the means of local Energy Service Companies (ESCO). The EU Commission rules on environmental public procurement presently authorise public authorities to make the use of renewable energy a requirement<sup>3</sup>. However, it remains to be clarified if such rules would allow public authorities to be specific about marine energy, or, even more so, to be specific about locally produced marine energy, without this being considered a distortion of competition.
- Though regional authorities expect to reap the benefit of marine energy mostly through jobs and activities, one cannot deny that marine energy is comparatively at disadvantage with onshore wind energy when it comes to direct financial impact. The implementation of an onshore wind farm usually results in a whole range of financial benefits at different levels: land hire or purchase to landowners or tenants, compensation for disturbances to the local community, payment of taxes or royalties to the local authority... However, maritime areas within the 12 miles limit usually escape the jurisdiction of neighbouring regional authorities, and fall under the scope of national administration ( for example, in the UK, licensing for offshore renewable development is a matter for the Crown Estates Commission). Though this is clearly a matter for negotiations between national and regional authorities, one could suggest that associating the latter to the benefits arising from the licensing of offshore installation could prove a powerful incentive to commit maritime regions to actively support maritime energy development off their shores. <sup>4</sup>

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<sup>3</sup> Commission Staff Working Document, “Buying green! A handbook on environmental public procurement », Brussels, 18.8.2004 SEC(2004) 1050

<sup>4</sup> The example of Orkney and Shetland islands, which have reaped substantial benefits from North Sea Oil developments illustrate the point. Empowered by an *ad hoc* legislation, the Regional authorities of both archipelagos have negotiated profitable deals with the oil industry for the use of oil terminals at Flotta and Sullom Voe. However, one must observe that the use of such financial rewards to foster the local economy has been hampered by EU State Aids legislation.

### III – WHAT CAN THE EU DO?

#### a) A long term strategy for marine energy.

- Though wind energy has a clear lead over marine energy both in terms of feasibility and costs, it should be remembered that to meet the requirement of CO2 reduction, all technologies and all assets have to be developed. Marine technology is much in the same situation that wind energy was at its inception, and the success of the latter <sup>5</sup> should be regarded as a clear example of the relevance of a long term strategy.
- The EU should play a key role in this long term strategy by giving a higher priority to marine energy in its SET-plan, and by defining a clear roadmap for marine energy, like it has done so for other low carbon technologies. This roadmap should strive towards the coordination and rationalisation of R&D efforts, to ensure optimal efficiency and avoid a scattering of efforts.
- As in offshore wind energy where for the past 10 years the EU have strongly supported the rise of an industry derived from onshore wind technologies, a similar effort should now be directed to support the emerging marine energy industry taking place in deeper waters and drawing on oil and gas offshore know-how.
- The EU should be aware that insufficient efforts to promote and support marine energy may result in Europe losing to third countries some of the firms spearheading research in that field, and thus lose a competitive edge in the long term.
- The specific case of Outermost Regions justifies that the EU should include the Ocean Thermal Energy Conversion into the marine energy R&D themes to support. Its considerable potential could indeed, as a first stage and at medium term, satisfy the needs of tropical Outermost Regions. But in the long run, with the development of new energy carriers, such as hydrogen, these resources could also supply Continental Europe with energy. Given the early stage of development of these technologies, the EU should identify them as eligible to cofinancing facilities, together with regional authorities, within its framework research programmes, whether it be library-oriented research, small-scale pilots or industrial prototypes implementation.

#### b) Better access to funds.

- EU should ensure that marine energy benefits from effective and long term financing, giving a maximum of visibility to project founders and investors.
- EU financial instruments should endeavour to meet market failure, and to allow smooth transition as project evolves from prototype demonstration to first farm/pre-commercial demonstration, on to commercial project development.
- However, at the present stage of development of the industry, priority should be given to testing and demonstration, for example by supporting Wave Hub type operational activities and early-stage projects.
- Funding, presently available through numerous instruments of FP7, CIP or through the Structural Funds, should be made more accessible to the industry through a quicker and simplified procedure.

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<sup>5</sup> The Commission believes that about a third of wind energy generation in 2020 could be from offshore installations representing 4% of the EU electricity generation. The industry envisages a six-fold increase in wind energy capacity in Europe by 2030 with about half of this offshore. If this works out, today's total offshore wind capacity of less than 2GW would be multiplied by 75.

- Coverage of risks being an essential difficulty The EIB should be encouraged to finance projects other than those which have been “de-risked”.
- State aids ceilings for R&D in marine energy should be increased to higher level than the present one. Bearing in mind the high level of risks facing that industry, the generally small size of its players, and the fact that its development prospects tend to be long term, the ceiling of aid intensity for experimental development should be raised to a minimum of 70%, some arguing that a 100% rate should be allowed till a device is actually in the water.

c) **Grid & transmission charging.**

- Grid development towards or between peripheral maritime regions must be undertaken without delay to ensure that the marine energy can, in due course, be exported to the markets. Particular efforts should be made to develop the subsea grid in the North Sea or in the Atlantic, in synergy with those related to the development of offshore and onshore coastal wind energy.
- Transmission charging must not hamper the development of marine energy in peripheral maritime regions. The EU Commission should ensure that, inconformity with EU legislation; transmission and distribution tariffs do not discriminate against renewable energy produced in peripheral or island regions, or regions of low population density<sup>6</sup>.

d) **Other infrastructures and services.**

- The development of marine energy also relies upon the existence of proper facilities onshore, such as harbour installations, capabilities support for manufacture, R&D, supply chain, skilled labour... EU assistance should be made available to build, provide or upgrade these facilities, thus improving the socio-economic benefits and opportunities for maritime energy in peripheral maritime regions. This should be considered as part of the general effort to achieve the goals of the Energy/Climate change package.

e) **Environmental assessment.**

- The development of marine energy is confronted by numerous regulatory constraints, and the regulatory framework should be made as predictable as possible. This is in particular the case in the field of environment, since many marine or coastal areas are designated under one legislation or another.
- EU Environmental legislation should be applied with a degree of pragmatism and flexibility. Businesses should be spared the costs and delays of individual environmental assessments if situations can be extrapolated from other cases showing a reasonable degree of similitude. The presence of protected specie in one area should not automatically stall a project, especially if the specie exists elsewhere.
- It will be recalled that such flexibility is precisely advocated by Directive 2009/28/EC which states that: *“(44) The coherence between the objectives of this Directive and the Community’s other environmental legislation should be ensured. In particular, during the assessment, planning or licensing procedures for renewable energy installations, Member States should take account of all Community environmental legislation and the contribution made by renewable energy sources towards meeting environmental and climate change objectives, in particular when compared to non-renewable energy installations.”*

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<sup>6</sup> See Article 16§7 of the **DIRECTIVE 2009/28/EC** on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.

f) **Taking on board the regional dimension.**

- It will be borne in mind that the direct implication of peripheral maritime regions in marine energy is an important factor to foster polycentric development within the EU, and meet the goals of territorial cohesion outlined by article 174 (ex 158) of the Lisbon Treaty.
- Such results will not be achieved if EU support is channelled uniquely by calls for proposals at EU level, as it is generally (though not always) the case with FP7 and CIP. It will be argued that such calls are more likely to favour those R&D projects arising from large structures which have reached a certain critical mass, at the expense of smaller projects located in peripheral areas, thus aggravating territorial imbalances within the Union.
- For similar reasons, strong concerns have been expressed about the Commission Budget reform proposals which, though welcomed for having highlighted the importance of R&D, and the need for making it a priority of the energy and climate change issues, have also hinted at a strong re-nationalisation of regional policy. Such an evolution would deprive many regions of a key tool to promote R&D&I on their territory, and must be strongly resisted.
- In conclusion, increasing support should be granted by EU financial instruments to regional authorities which have strong natural assets in the field of renewable energy, and especially marine energy, so as to enable them to act as catalysts, and reap a large share of the subsequent socio-economic benefits locally. The allocating of such resources over a multi-annual programme will encourage the regional authorities to define a long term economic strategy answering simultaneously both the needs of marine energy development and the goals of territorial cohesion.