ENERGY RESEARCH, DEVELOPMENT AND DEMONSTRATION

A response to the Consultation Paper

By

THE MARINE INSTITUTE

Introduction

The Marine Institute operates under the aegis of the Department of Communications, Marine and Natural Resources (DCMNR). It was established in 1992. Its remit is defined by the Marine Institute Act, 1991, to:

'to undertake, to co-ordinate, to promote and to assist in marine research and development and to provide such services related to the marine research and development, that in the opinion of the Institute will promote economic development and create employment and protect the marine environment'.

Since its establishment the Institute has played an active, if modest, role in promoting research and development in the area of renewable Ocean Energy, primarily Wave Energy. Its role in this area is not directly related to policy or practice in the Energy sector in Ireland, but to the fact that the measurement, monitoring and development of the marine resource, in its broadest sense, is a core interest of the MI and, more particularly, that a future global market for Ocean Energy systems provides an opportunity for Ireland to develop leading technical and private sector competences in this emerging field of industrial technology.

Background 1996-2003

The following briefly summarises Marine Institute initiatives in the area of Ocean Energy, to date.

1. Projects to a total value of €400k. have been supported under the Marine Research Measures.

- Wave energy resource assessment (Hydraulics and Maritime Research Centre, UCC)
- Rock cavern technology (TCD)
- CFD/Turbine analysis (UL)
- High-pressure Seawater Pump for use in Wave Energy Converters (MTLtd.)
- Mathematical Models for Predicting Wave Device Performance (Clearpower Ltd.)

2. Support for early device development has been provided (via MI equity holding) for RTD finance support (Total €155):

3. In 2002 The Marine Institute and Sustainable Energy Ireland jointly published a public consultation document, with the objective of eliciting discussion and feedback on the approach to the development and utilisation of wave energy in Ireland.

Ocean Energy Economic Study 2004-2005

In 2004, The Marine Institute and Sustainable Energy Ireland jointly commissioned a study, from Peter Bacon and Associates, in association with ESB International,
to identify the potential economic contribution of Ocean Energy to Ireland and to devise a rational , viable and economically feasible strategy to promote the development of the sector.

This concluded that the eeconomic benefits of a proactive approach to the development of Ocean Energy in Ireland included:

- At least 200MW of installed capacity in 2020.
- Creation of 1,125 jobs in the economy by that year.

- If the potential to develop export markets is realised then this estimate rises to 1900 jobs in 2020.

- Total value, of this output, when all impacts are included, is €227 million in current values.

- A supported programme, where the price paid for the energy is around 10cent per KWh, would produce positive net returns to the economy.

The principal recommendations of this study were:

- All major stakeholders (SEI, EI, CER, MI etc.) to pool expertise, towards agreed ends, as a matter of urgency.

- An Ocean Energy Development Unit (OEDU) should be created and charged with the development of the sector. This should have overall responsibility for driving development of the sector and should be located within an existing agency, such as the Marine Institute.

- Resource information deficiencies should be addressed in the short term.

- Adequate test facilities and verifiable standards should be provided so as to enhance the credibility of the technologies and incentivise investment.
- Strategic Development Zones, based on the natural resource, should be identified and utilised for pilot projects.

- The commitment by the public sector to this industry should go beyond funding, to ensure that appropriate actions are undertaken to remove all barriers to private sector investment by ensuring that appropriate fiscal, pricing and access regulations are introduced. In the R&D phase it will be important that those measures introduced in the Finance Act 2004 are sufficiently flexible to promote R&D in academic institutions.

- Appropriate targets should be set for development, including:
  - the institutional developments identified above,
    the creation and funding of a targeted R&D programme from 2004,

  - the establishment of three pilot programmes by early 2006 in wave

energy

  - contingent on the results of the resource measurement study,
    a project in tidal stream.
- A target for investment in generating capacity of 200MW by 2020 should be set. This would be equivalent to 2.5% of total electricity demand in that year and would provide the required mass to drive development of supporting industries.
- The OEDU should have a significant focus on R&D in the early years. Then it should become more focussed on the creation and extraction of value through the promotion of exports and creation of regional employment, once initial commercial production has been achieved.

The Institute, with Sustainable Energy Ireland are currently finalising a comprehensive
15 Year Plan of costed R&D, infrastructure and industry support measures for the Ocean Energy sector, with the related
objectives of:

- Supporting the introduction of Ocean Energy to the renewables 'portfolio' in Ireland.
- Developing an Irish OE industry sector to deliver:
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200MW installed by 2020.
  >1900 jobs created by 2020.

This has been flagged to DCMNR and will be presented more formally in the coming weeks.

Specific Comments on the Consultation Paper

As will be clear from the foregoing, and particularly the conclusion that has emerged from the recent Study on development of the Ocean Energy sector in Ireland, the Institute concurs with the general recommendation in the Consultation Paper that Energy research and development should be co-ordinated. The strategy we have been pursuing, in respect to Wave Energy, provides a case study that illustrates and supports many of the suggestions made in the Consultation Paper. In effect, the approach of the Institute and SEI to Ocean Energy R,D & D is resulting in a proposal for
'a structure for enhanced coordination and support (including relevant capital funding and long-term programmatic support'. (2.4)

Other specific observations in respect to the Consultation Paper are:

Institutional and Governance Options

The Institute broadly concurs with the views expressed but take the view that executive authority is required to drive and implement long-term R,D&D programmes involving multiple agencies and interests.

EU Perspective

For information, the Institute has expressed concern that Renewable Ocean Energy does not appear as a theme in the draft 7th Framework Programme and has proposed the following activity for Theme 5:

Renewable Offshore Ocean Energy

> *'Development, validation and demonstration of Europe's offshore wind, wave and tidal energy resource's*
> 'To contribute to the utilisation and exploitation of Europe's considerable offshore wind, wave and tidal energy resources, increase security of energy supply and diversification, reduce CO_2 emissions and create an new industry sector. While synergies exist with on-shore wind energy utilisation, the offshore province exhibits unique features which link offshore wind, wave and tidal energy generation. Research will focus on innovative energy generating structures and technological designs, marine energy resource assessment, prediction and modelling, "*marinisation*" of operating and generating systems, sub-marine grid connections and mooring systems.'

Links with Environment

We agree that relevant environmental research should be captured in the energy R,D&D arena

Long-term vs. short-term goals

The Institute strongly agrees with the suggestion that 'a structure be put in place to facilitate the development of proper institutional and funding arrangements for longer-term research and innovation'. The exercise in which the Institute and SEI have been engaged in the Ocean Energy area illustrates the validity of the above. The realisation of the economic opportunities in Ocean Energy Technology requires a 15 year programme of research, development, capacity-building and capital and regulatory support measures to be put in place. In addition the variety of actors and actions required to implement this programme points to the necessity of having an executive co-ordination and management mechanism in place.

Funding

The Ocean Energy Development Strategy being finalised by SEI and the Institute proposes a 15 year programme of R,D&D, capital and price support expenditure. Whatever the profile of the funding sources for this programme, it is important that, where technology and industry development objectives are a significant aspect of an energy R,D&D programme, there is a long-term commitment and guarantee in respect to the funding and other measures necessary to realise innovation and development objectives.

Capacity Building

The Institute fully concurs with the views expressed in the Paper about the need to build research and technical capacity. Among the measures proposed in the Ocean Energy Development Strategy is the building of a critical mass of research and technical capability to support the emergence of an Irish industrial presence in this sector. As a preliminary step, in this context, the Institute has recently concluded a contract with University College Cork, under its competitive Research Measure, to fund an Ocean Energy team, (Principal Investigator, 2 Post-docs, 2 Post-graduates, 1 Technician), at the Hydraulics and Maritime Research Centre for an initial 3-year period. It is also currently engaged in a Foresight exercise to identify additional energy

Research and Innovation measures, including research areas and capacity-building, that are required to support Ireland's objective of developing a leading industrial position in this emerging area of commercial technology. DCMNR representatives have participated in this exercise.