

The Prospects for Wave Energy in Ireland and the Role of Numerical Modelling in its Development

There are many obstacles which must be overcome before wave energy can make a useful contribution to Ireland's energy supply, the foremost being the technological hurdles in Wave Energy Converter (WEC) device development and performance. Other challenges are to extend the nation's electricity grid to remote coasts and also connect it with the grid infrastructure of other countries. Public acceptance of wave power will only be ensured if wave energy farms are not unsightly, do not harm cetaceans or other marine life, and can sit alongside aquaculture and inshore fisheries. Ireland faces challenges to develop its licensing and environmental impact assessment procedures to deal with these concerns.

The economic case for wave energy is far from made yet, with uncertainty about the wave energy resource and its intermittency, together with secrecy around the likely candidates WEC's efficiency in extracting power. Once in operation WEC's will need to be serviced during weather windows, and will have to survive extreme wave events. Individual WEC's can be arranged in a number of ways as a wave farm to be optimised for efficiency, and different types of WEC may be most appropriate for different locations. Taken together, a wave farm will reduce the wave energy reaching the shoreline which may have an effect on beaches.

In Ireland the development of wave energy is being coordinated at a national level, with specific targets for scaled test sites, grid connected test sites and wave energy farms. The talk will discuss the merits of such an approach.

Numerical modelling has a part to play in many aspects of the development of wave energy. The most obvious use is for resource assessment to provide both utilities and design engineers with the information they require. Other uses are to predict extreme waves, calm weather windows, sediment movement and its consequences for moorings, intermittency of power availability and site selection. Together with the modelling of offshore wind power and tidal power, the complimentary use of offshore renewable energy can be predicted as an input to the national grid. The effect of entire wave farms on the wave energy will need enhancements to numerical models to include feedback to devices, but is a goal.

Numerics Warehouse works with the stakeholders in Ireland and elsewhere to provide numerical model solutions to some of these questions. In this way the company as a partner can reduce many of the risks associated with the roll out of wave energy.

The talk will present the state of play of wave energy in Ireland and the work and R&D being conducted by Numerics Warehouse in addressing some of the issues faced by the industry.