Project Title: 'Tapping the Tidal Power Potential of the Eastern Irish Sea'
Principle Investigator Prof. R Burrows (University of Liverpool)
Project duration: 01/10/06 – 31/12/08
Grant Value: £288,601.00

In order for the UK to meet its ambitious targets for energy production from renewable sources (10% of electricity by 2010, 15% by 2020) it needs to expand its capacity to generate all forms of renewable energy and marine energy. This project is concerned with marine energy in the form of tidal power, specifically tidal barrages, and the UK's geographic location makes it ideal for these schemes. Indeed it was recently estimated that of the 500-1000TWh/year of energy believed to be available worldwide from barrage schemes, the UK holds 50TWh/year which is about half of the European resource. The North West of England has many suitable sites for barrage schemes and therefore has potential to generate a great deal of its electricity this way. Of all the potential UK sites, the Mersey is adjudged to be most feasible with its very narrow mouth meaning it needs a relatively short barrage and therefore has lower capital costs than other sites.

Tidal barrages are effectively dams which are built across a river estuary, these raise the level of water on one side of the dam till its high enough to drive a turbine which is built in the dam. Barrages can operate in three different modes: ebb flow; flood flow and dual which is a combination of the two. Flood flow generation is where the entry of rising tidal levels into the estuary is delayed in order to raise the water level and ebb flow generation is where the exit of tidal water from the estuary is delayed.

This project involved examining the effectiveness of the different modes of operation (flood flow, ebb flow, dual which is a combination of ebb and flood) at potential North West sites and assessing the performance of alternatives to barrages. Each mode permits energy generation for typically between 8 and 11 hours a day. This study found that the most effective mode for tidal barrages to operate in is ebb flow mode, it also found that turbine installations operating in this mode could produce up to 10% of present UK electricity need. Potential schemes on the Solway Firth, Morecambe Bay, Mersey and the Dee, in the North West, could provide about half of the regions electricity requirement which is about 5% of the UK total demand. It was also found that the generation times from these potential North West schemes compliment another planned barrage scheme on the Severn estuary thereby extending the daily generation window from 11 hours to 20 hours. Other developments elsewhere in the country may enable a 15% contribution to electricity demand to be made from tidal range energy. There are a number of alternatives to barrage structures which don't require fixed structures however these were found to generate only a fraction of the power of barrages and in many cases were economically uncompetitive.

This project has been instrumental in building awareness of the potential renewable energy resource in the estuaries of the North West to both professional bodies and the interested public. In doing so it helped lead to the launch of the North West Tidal Energy Group (NWTEG).

To read Professor Burrows full report, go to: www.corer.org/projects