Making waves...

A large part of the major influx of energy to this planet, solar energy, is converted by natural processes, i.e. through wind generation, to energy associated with waves. Waves are generated by the wind as it blows across the ocean surface. The energy thus contained is significant, in favoured latitudes with values of around 70 MW/km of wave frontage.

Ocean waves represent a considerable renewable energy resource. They travel great distances without significant losses and so act as an efficient energy transport mechanism across thousands of kilometres. Waves generated by a storm in the mid-Atlantic will travel all the way to the coast of Europe without significant loss of energy. All of the energy is concentrated near the water surface with little wave action below 50 metres depth. This makes wave power a highly concentrated energy source with much smaller hourly and day-to-day variations than other renewable resources such as wind or solar.

Since in principle hundreds of kilometres lined with generating stations are conceivable, wave energy could contribute significantly to world energy supply if an economic way of extracting this energy could be found. The highest concentration of wave power can be found in the areas of the strongest winds, i.e. between latitudes 40° and 60° in both the northern and southern hemispheres on the eastern sides of the oceans. Countries like the United Kingdom are thus the world's most favoured locations for the extraction of wave power.

What is happening now?

Europe, and in particular the United Kingdom, are looking at wave power. A recent review by the UK government has shown that there are now types of wave power devices which can produce electricity at a cost of under USD 0.10/kWh, the point at which production of electricity becomes economically viable. The most efficient of the devices, the "Salter" Duck can produce electricity for less than USD 0.05/kWh. The ?Salter? Duck was developed in the 1970s by Professor Stephen Salter at the University of Edinburgh in Scotland and generates electricity by bobbing up and down with the waves. Although it can produce energy extremely efficiently it was effectively killed off in the mid 1980s when a European Union report miscalculated the cost of the electricity it produced by a factor of 10. In the last few years, the error has been realised, and interest in the Duck is becoming intense.

Summary

The disadvantages of wave power stations compared to maybe their closest rival - wind power - are obvious: A wave power unit will probably not have much more than three times the output of a single wind turbine, but the construction costs are likely to be far higher due to mooring problems, the bulkiness and comparative complexity of the whole structure and the water-based location. It will take some time - and far more investment into renewable energy sources - before the only comparative bonus, the fact that they use up and deface less land, will prevail over economic considerations.

And while wave energy is used successfully in very small scale applications, such as powering lighthouses or navigation buoys, its short term prospects as a major contributor to large scale energy production seems to be economically almost ruled out. So until the cost of maintaining the present rate of carbon dioxide emission is taken into account when building new power stations and a policy is adopted that depends less rigorously on market forces, the likelihood of tidal or wave power playing a major part in the energy supply of western industrialised nations even in the medium term future is small.