

Tidal energy farms influence the natural transport of sands

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Image shows water depths in the Bristol Channel.

(PhysOrg.com) -- Tidal stream farms, in which electricity is generated by turbines from regions of strong tidal flow, may influence the natural balance of marine sands, according to research at Bangor University.

In contrast to a tidal barrage, tidal stream turbines harvest the energy of the tides in a similar way to <u>wind turbines</u>. But what is significantly different from wind turbines is the environment in which tidal stream turbines operate, and their potential to interact with their environment.

Dr Simon Neill and Professor Alan Davies from the School of <u>Ocean</u> <u>Sciences</u>, Bangor University, along with colleagues from Edinburgh University and Plymouth Marine Laboratory, developed a <u>computer</u> <u>model</u> to investigate the environmental impact of extracting energy from the Bristol Channel, one of several proposed sites in the UK for



harvesting tidal streams.

They found that a large tidal stream turbine farm would have a significant and wide-spread influence on the natural transport of sands in the Bristol Channel. Neill explains how: 'tidal stream farms remove energy from the environment. But if you take energy out, then there will be less energy available for moving sand around. So, sand transport would be weakened as a result of energy extraction'.

The research, published in the journal Renewable Energy, shows that this influence on sand transport will change the equilibrium of the coast over the 30-year life-cycle of a tidal stream farm. 'This can have positive or <u>negative consequences</u> for coastal protection,' says Neill.

'Changes to the deposition of sand in an exposed estuary such as the Bristol Channel can affect wave breaking,' Neill explains. 'If a change in the deposition of sand causes storm waves to break further offshore, this may lead to enhanced coastal protection. In contrast, a change in deposition of sand which causes waves to break closer to the shore may lead to increased coastal erosion and flooding.'

'Although generating considerably less electricity than a tidal barrage scheme, the environmental impact of a large tidal stream farm in the Bristol Channel would be much lower,' Neill adds. 'In contrast to the major construction undertaking of a large barrage project, a tidal stream turbine farm can be incrementally extended, and environmental responses constantly monitored'.

Around half of the European tidal stream resource is located in UK territorial waters. For this reason, the UK is home to many of the most advanced tidal stream turbine technologies. A small-scale tidal stream turbine farm is to be installed off the coast of Anglesey, northwest Wales. This will be the first fully commercial application of the



technology. 'The exploitation of the tidal stream resource so close to Bangor University is a particularly exciting development,' say Emmer Litt, the postgraduate student who worked on the project. 'There is much scope for future research into the environmental impacts of such schemes.'

Read more about this research on <u>Planet_Earth_online</u>, the online magazine of the UK's Natural Environment Research Council.

Provided by Bangor University (<u>news</u> : <u>web</u>)

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