Sustainability Committee

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Inquiry into Carbon Reduction in Wales: Evidence on Energy Production from Swansea University

Tidal stream power uses freestanding turbines which look like underwater wind turbines and are driven by the flow of the tidal current. It has the advantage of any tidal power in that it is predictable and regular, however it also can be deployed in modular fashion and has a minimal environmental impact.

This technology has the potential to provide 5% of UK electricity (Carbon Trust) at a much lower cost than the proposed barrage.

Swanturbines predict that the mature tidal stream technology will cost approximately £1.2m per MW installed. Therefore to generate the same as the barrage it is expected to cost approximately £6bn. (Some 2500 2MW turbines).

However, the locations which are ideal for tidal stream are at the extremities of the national grid. Grid strengthening is expected cost between £2bn and £5bn, which indicates that tidal stream is clearly the less expensive option. (i.e. up to £10bn total to match the barrage)

The resource is located around the UK, and the tides are out of phase, meaning that when the inputs are combined, tidal stream energy can make a constant contribution to national energy production. This is described as base load. This geographically disperse resource also has the advantage that it is less vulnerable and provides greater energy security. In addition the technology is modular which allows electricity generation to start earlier and reduces the capital risk on multiple smaller projects.

The ultimate potential in the UK is 5% of UK electricity, some 18TWh per year. Equivalent to the largest barrage predictions. The deployment of commercial devices will begin in 2010 and it is predicted that full capacity can be reached by 2020.

As the turbines can be completely submerged, the risk to shipping is considered low. Conversely, the barrage will affect the Ports of Bristol (Avonmouth and Royal Portbury), Cardiff, Newport, Gloucester and Sharpness. Indications are that 3% of the UK Seaborne Trade, some 17.2 million tonnes of cargo move through the ports concerned. It is difficult to estimate the effect the barrage may have on trade in the region, but toll charges and delays resulting from the barrage would make alternative ports more attractive to shipping firms.

The tidal stream industry also has the potential for export overseas. The worldwide potential is estimated as between £112bn and £444bn (Douglas Westwood Ltd). The UK is currently the world leader in the technology and has the potential to meet world demand by creating an export industry to rival wind energy in Denmark or Solar in Germany.

In conclusion, although the potential for tidal stream power in the Severn itself is a fraction of the potential of the barrage, deployment across the UK has the same potential as the barrage at lower cost and with lower environmental impact. The potential benefits also include greater energy security, lower impact on shipping and a multi-billion pound technology export industry.

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