TIDAL POWER: AN OVERVIEW

Flood tide rushing to shore (by Jenny Lee Silver @ flickr- click on image for source)

The United Kingdom holds about half the total European potential for tidal energy. To create power from tides, barrages are built across estuaries that have turbines located throughout. A typical barrage is made from these turbines as well as sluice gates to allow the water from the tide to flow through with ease. Ship locks are also essential to allow ships to pass and the entire barrage is linked to the shore by embankments (Elliott 2004).

There are three main ways to generate power from a barrage and they are ebb generation, flood generation and two-way operation. In ebb power generation, water from the tide is allowed to pass through the sluice gates without the help of turbines. The sluices are then closed at high tide, trapping water on one side of the barrage; the sluices are opened once the water level on the opposite side of the barrage is low to allow the water to move the blades of the turbines and generate power. Flood generation uses the incoming tide water to move the blades of the turbine to generate electricity (Clark 1972).

The two way operation method utilizes both ebb and flood generation methods, yet it is less efficient at producing power than a single generation method. The reason this event occurs is because neither phase can be taken to completion to get ready for the next cycle. One benefit to using two-way operation is that there can be a more continuous supply of power rather than short bursts of power two times a day every 12.5 hours. The barrage at La Rance, France uses the two-way generation along with pumped storage (Elliott 2004).

There are also many environmental considerations that must be made when considering the construction of a barrage. The changes to the water ecosystem can be substantial during the building of the barrage and also when the barrage is fully operational. Large bird and fish populations can be negatively affected. When determining where to position a barrage, the technical, environmental, institutional and economic factors must be considered. The site and position of the barrage must also be studied effectively before a decision is made to increase the resonance of the tidal wave against the barrage; this resonance will greatly increase the overall power output (Clark 1972; Elliott 2004).

Current advances in tidal power technology seek to harness the power in tidal currents using underwater turbines similar to wind turbines. The benefits of using these in-stream turbines are that they are both cheaper and more ecologically sound than the traditional barrage system. Research into the long-term environmental impacts of these turbines on a larger scale is still needed

Source : http://www.sassweb.ca/3bb3/volume1-0/hydroelectric-and-tidal/tidal-power-an-overview