RENEWABLE FACT SHEET
HYDRO & TIDAL POWER

JHWalter
SUSTAINABLE RESOURCE MANAGEMENT

What is Hydro Power?

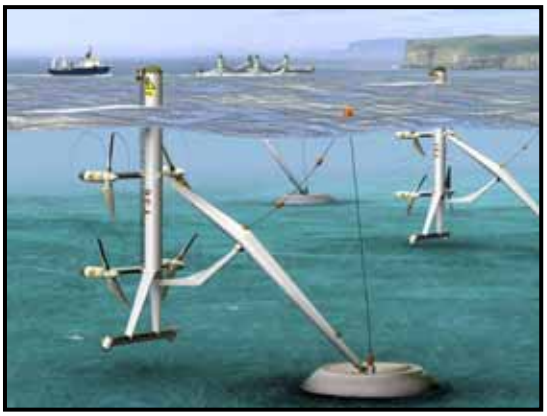
Hydro power is created from the energy of moving water, usually by channelling water at high pressure from the top to the bottom of a dam or by making use of river flows to drive an electricity generator. The energy is initially obtained from the sun, which evaporates water from the sea and deposits it over land, giving it potential energy in the form of height. Although large-scale hydro using dams is still being developed around the world, UK developments focus on small-scale, 'run of river' projects due to their lower environmental impact and smaller spatial requirement.

What is Tidal Power?

Despite very large resources, tidal energy has not been successfully exploited on a wide scale. Tidal produced electricity is generated by making use of tidal water flows. It can be done by constructing a tidal barrage in an estuary and operating this like a conventional hydro dam – however, the environmental impacts are often prohibitive. Alternatively, turbines can be placed underwater in the tidal stream – these produce power from both in and out flows. Other variations are also possible. Tidal power is gaining increased interest in the UK, with a number of projects at demonstration and testing stage

What is Wave Power?

Waves transmit large volumes of energy from windy conditions far out to sea to the shore. The sun energy on the water creates the wind that in turn creates the waves. Here the energy can be used to generate electricity and a variety of technologies are being developed to do this. The World Energy Council estimates that the energy that can be created from the world's oceans is equal to twice the amount of electricity that the world currently produces. The potential of wave energy in the UK is large due to our extensive coastline.



Where will it work?

The Sustainable Development Commission estimate that the UK's tidal resources could provide up to 10% of the UK's electricity requirement. The most talked about potential tidal barrage in the UK is across the Severn. Potentially 4.4% of the UK electricity supply could be generated, but at the cost of 75% of the intertidal habitat. Clearly issues of renewables, power security and environmental impact have to carefully balanced.

Wave powered turbines can operate along the shore line, offshore, near shore and at breakwaters. As far as we are aware the only commercial wave generator in the UK connected to the grid is on the island of Islay in Scotland.

MICRO HYDRO

Micro hydro systems generate electricity from rivers, streams etc. Clearly the speed (head)/volume of flow and the regularity of flow will determine the suitability of such a scheme. DC or AC systems can be considered with the decision probably influenced as much by head/flow as any other variable. Where appropriate, surplus electricity can be sold into the grid.

Regulations

Planning permission may be required depending on the size of the installation. For most micro hydro systems an abstraction licence must be obtained from the Environment Agency for the right to take the water from the river and pass it through a turbine. This can be a complex process with detailed flow data having to be prepared and also account taken of the system on the environment. An environmental statement is required and statutory advertising must be completed.

Income/Savings

Installation costs will vary depending on the location and scale. If the hydro system both replaces electricity bought from the National Grid and also surplus power is sold back to the grid savings could be significant.

Feed-in Tariffs

The scheme provides for payments not dissimilar to ROCS for electricity and heat generated by green technologies and came into effect on 1st April 2010 for electricity. It relates to installations below 5MW and so will be of particular interest to the housing, small business, and community sector. Feed-in tariffs are available for bioenergy systems, solar power, geothermal power, wind power, hydropower and marine energy technologies. The scheme will create a significant shift in the cost/benefit of smaller scale schemes with additional income now being generated from green power generation

Capital Costs

A typical 5kW scheme suitable for an average home might cost £20,000 - £25,000 including installation. A 1kW installation may be in the order of £5,000 to £6,000 plus installation costs.

Grants

Grants for domestic and community installations are available through the Low Carbons Building Programme. Larger units in rural locations may be eligible for grant under the RDPE. However where ROCs are to be claimed, such funding may then prohibit the award of the second ROC which over the life of the turbine is likely to generate significant income so that an initial capital grant becomes unattractive in comparison.

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Scoping Feasibility Project Management Planning
Environmental Compliance Design Funding Delivery

David Wright	Henry Leivers	Steve Catney
01522 504321	01522 504315	01522 504330
07919 694228	07738 421391	07919 694229
davidwright@jhwalter.co.uk	henryleivers@jhwalter.co.uk	stevecatney@jhwalter.co.uk