Renewable Energy Information sheet

alternative technology centre

HYDRO-ELECTRIC POWER

What is hydro-electric power?

It is electricity generated when we extract energy from falling water. Its use can be traced back to ancient times. Nowadays the power of water is used to generate electricity. Currently, hydroelectric power accounts for around 2% of the UK's total installed electricity generating capacity, but this is mostly from large scale systems, which are not likely to be built in the future

How is energy extracted from the falling water?

Electricity is produced when a flow of water, either from a reservoir or river, is channelled through a turbine connected to an electricity generator. The amount of power produced depends on the rate of flow and the volume of water available. Hydroelectric schemes can be divided into two broad categories: large scale – more than 5 MW and small scale – less than 5 MW. Smaller systems of a few tens of kilowatts are called microhydro.

How do we make the most of the water flows we have available?

The principles of operating a small-scale and large-scale scheme are essentially the same. They both require:

- A suitable rainfall catchment area
- A good 'head' of water (vertical distance between the reservoir or river to the turbine) OR a good amount of water flowing through the system. The height of the 'head' and amount of water flow available will determine how much power can be produced.
- A water intake placed above a weir or behind a dam
- A pipeline or channel to transport the water from the reservoir or river to the turbine
- A turbine, generator, grid connection and associated building
- An outflow, where the water is returned to the main water system

How long will a system last?

Hydroelectric schemes can last for decades with suitable maintenance.

What are the environmental impacts of small-scale hydro power?

Hydro-electric schemes are environmentally attractive because they do not produce pollution during operation. Small-scale schemes, which do not involve collecting water behind dams or in reservoirs, have very little impact on the environment. The principle environmental issues are:

- the visual intrusion of the turbine building but this can be hidden by bushes and plants
- the ecological impact of diverting water flow
- the effect on the fish but they can be protected by close fitting mesh screens
- the impact of the scheme's construction phase especially when temporary dams may be necessary

Decommissioning at the end of their useful life is simply a matter of removing the equipment.

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Do I have to ask permission to install a micro hydro scheme?

Yes, before extracting water from any river or stream, a licence has to be obtained from the Environment Agency or other relevant authority. Planning permission may also be needed.

How much does it cost?

The initial capital outlay depends on the site but with the long lifetime of the equipment, high reliability and no fuel costs the running costs are very low. Initial capital costs can be substantially reduced when using pre-existing infrastructure, e.g. at a former water powered mill site.
Costs are low for schemes with high 'head' of water with costs increasing as the height decreases.

Are there any grants or incentives available to help with the costs?

As of April 2010, feed in tariffs have been introduced in the UK - making it not only environmentally friendly, but also economically profitable, to have microgeneration systems installed in ones home or workplace. Feed in tariffs pay a guaranteed premium rate for the energy you generate regardless of whether you use it yourself or export it onto the grid. To ensure that you can gain the full advantage of being part of the feed in tariff scheme please ensure that your system is installed by an MCS registered fitter. For tariff details, download **the Financial Incentives information sheet** from our website. For information about accredited installers within the Yorkshire and Humber area visit www.yhmp.org

Are there many hydro schemes in the UK?

Figures from December 2011 show that there have been 44 new hydro schemes commissioned under the new FIT scheme with a combined total of nearly half a megawatt of capacity. Yorkshire has a rich heritage of hydro schemes, used to power mills before coal. Although many of the original buildings, weirs and mill ponds have fallen into various states of disrepair, what gave the Victorians power could still provide today and into the future?

Trade Association

The British Hydropower Association (BHA) is a trade association which represents the interests of all those involved in the hydropower industry. Members include manufacturers of all kinds of equipment used in the industry, civil, mechanical and electrical consulting engineers, academic institutions, developers - large and small, individuals, charities and students - anyone who is interested in and keen to promote the use of hydropower. More information and a full list of members can be found at the BHA website: www.british-hydro.org

The ATC promotes energy efficiency – it is cheaper to save energy than produce it.

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