

Micro-hydropower

The Cotswolds Conservation Board is the body responsible for co-ordinating the management of the Cotswolds Area of Outstanding Natural Beauty (AONB).

The Board believes that there is considerable scope for the generation of renewable energy by householders and businesses in the AONB without harming the beauty of the landscape or traditional buildings.

This leaflet is one of a series providing information about a number of renewable energy technologies which are suitable for the Cotswold landscape.* Consideration should be given to using more than one such technology in an integrated way to maximise the potential for renewable energy generation at a particular site or building.

The Board encourages everyone to reduce energy use by making their home or office energy efficient, particularly when planning for new buildings or conversions of existing buildings.



Micro-hydropower plant

* Other leaflets in the series cover solar water heating, solar photovoltaics, biomass, small-scale wind power, and heat pumps.

** An increase in the amount of oxygen in water.

MICRO-HYDROPOWER

Key points

- Generates a steady, reliable and continuous supply of electricity directly from the momentum of falling water
- No greenhouse gases are produced when in operation
- No air pollutants are produced when in operation
- Can improve water quality and aeration**
- Can help conserve historic mill buildings
- Good for running domestic electricity appliances and off-grid equipment
- Electricity produced but not required can be sold back to The National Grid
- Requires significant capital investment

How does it work?

Micro-hydropower uses the momentum of falling water to turn a water turbine which is used to generate electricity. The important factors in generating power from a site are the flow rate of water and the vertical drop the water experiences, known as the “head”.

The electricity generated can be used in the building in which the turbine is sited by a direct connection or by being stored in batteries. Any surplus energy generated can be exported and sold to The National Grid as long as a property is connected.

The installation of a micro-hydro system requires the construction of an intake and channel (**the penstock**), from the water source to the turbine housing, and a channel for returning water to the river (**the tailrace**).

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How much electricity can be generated?

For a low head site such as a former mill, the system output could be between 5-75kW depending on the size of the watercourse. A hydro system has to be engineered for a specific site. Flow calculations will estimate the annual generation of electricity that can be expected.

Why is micro-hydro generation suitable for the Cotswolds AONB?

Streams and rivers are a major natural feature of the Cotswold landscape. The aquifer beneath the ground surface provides a steady and reliable supply of water to these water courses. For these reasons water power was used on a large scale for energy generation prior to the use of fossil fuels (e.g. to power textile mills).

A new turbine building can be carefully designed and sited to integrate with its setting. Existing mill buildings could be adapted to install the generating equipment, subject to considerations of the effect on the character and appearance of the buildings if they are listed. The **penstock** and **tailrace** could be buried, subject to any archaeological constraints.

The turbine operation can increase the amount of oxygen in the water and improve the water quality of Cotswold streams and small rivers. This would have biodiversity benefits for fauna and flora associated with the watercourses.

Planning permission and listed building consent from your local planning authority may be required.

An abstraction licence and “works in rivers” consent will be required from the Environment Agency.



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