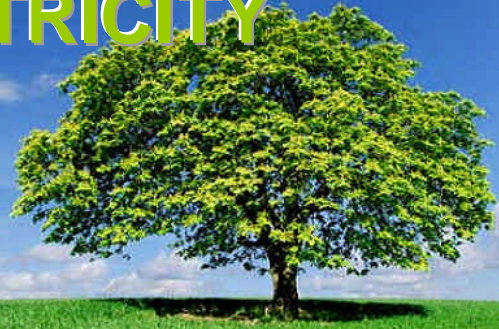


# COULD HYDROELECTRICITY WORK FOR YOU?

## Eco Fact Sheet 2



People have been using rivers and streams to generate energy for centuries – making water power one of the oldest forms of renewable energy. But did you know that, in the right kind of location, houses and even communities can run entirely on hydroelectricity: electricity made by flowing water?

More than 2,000 years ago, farmers realised that a wheel turned by water currents could help to irrigate their land. Later, water wheels were used in mills to create power, before the first **water turbines** were developed in the 19th century.

Turbines are smaller and more efficient than wheels – making them a good way to generate electricity.

What's more, by complementing your conventional supply with **hydroelectricity** – or replacing it altogether – you could cut down or completely cut out the harmful carbon dioxide (CO<sub>2</sub>) released when you use electricity.

### Could hydroelectricity work for your premises?

Because of its reliance on a nearby source of water, not everyone will be able to tap into hydroelectricity. So, before looking in detail at the sort of micro hydro system you could use for your building, it's worth making sure your premises are suitable. And that means asking yourself the following questions:

- Is your home close to a water source, like a river or stream – or perhaps on an old mill site with a **weir** and **sluice**?
- Is the water source close to a connection to the national electricity grid?
- If you're thinking about replacing conventional electricity with hydro power, are there any big seasonal variations in water flow through your source? If so, do you have a back-up power system?

But don't feel you need to work out all this on your own. For guidance on the above, call your nearest Energy Saving Trust advice centre for free on **0800 512 012**.

### Renewable energy is worth your effort

Renewable energy technologies like hydroelectricity systems are a way for you to save money over the long term and help prevent climate change. They can work alongside – and help you use less – energy generated from fossil fuels such as gas, oil and coal. And unlike fossil fuels they produce little or no carbon dioxide (CO<sub>2</sub>): the harmful gas that's one of the biggest causes of climate change.

### How does hydroelectricity work?

In simple terms, hydro-power systems use the **kinetic energy** in flowing water to turn a turbine to generate electricity. Even a small stream can produce enough kinetic energy to turn a turbine. The amount of energy **available** depends on the amount of water flowing per second and the height – or **head** – that it falls from; the amount **produced** depends on how efficiently the system converts water power into electrical power.

And, the good news: micro hydro systems are efficient enough to turn around half of the energy available into electricity.

### Can hydroelectricity meet your energy needs?

To give an example, a small turbine on a hill stream that flows at a rate of 15 litres per second – and from a head of 15 metres – will generate around 1kW of electricity at any given time: more than enough to meet the basic needs of an average home. In fact, for premises with no mains electricity connection, a good micro hydro system will generate a steady, more reliable electricity supply than other renewable technologies – at a lower cost. The power can be used for lighting and electrical appliances; if it doesn't stretch to heating and hot water, then you may need a conventional gas supply or another form of renewable energy.

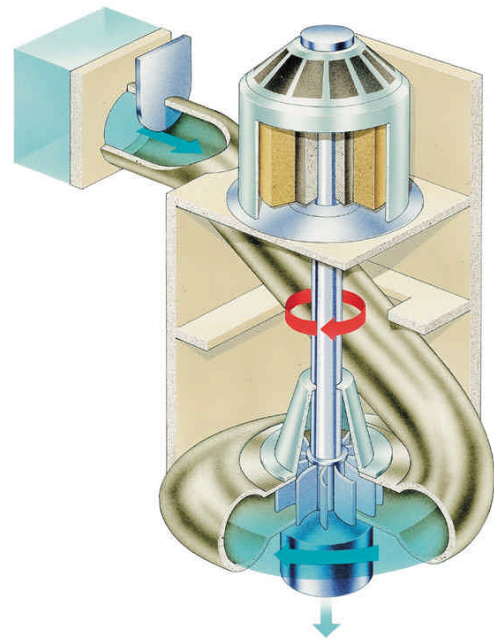
For more detailed guidance on all this, why not speak to your nearest Energy Saving Trust advice centre on **0800 512 012**.

### The working parts that make up a micro hydro system:

- The **intake**, often fitted into a weir, diverts the flow of water from the river or stream into a **forebay tank** and that filters out litter and fish.
- The **penstock pipe** brings water from the forebay tank to the turbine.
- The **powerhouse** is home to the turbine and generator, which are responsible for turning water power into electricity.
- The **tailrace** or **outflow** releases water back to the river or stream.
- **Underground cables** – or **overhead lines** – carry electricity to where it's needed.



Old style water power



New style hydroelectric generator

### How do micro hydro systems affect the environment?

Water turbines can stand out on a landscape and make a certain amount of noise too. While these issues can be solved with relative ease, your most important concern should be the water source you're using to create electricity.

To preserve a river or stream's natural ecological state as much as possible, you should restrict the proportion of water that's diverted through the turbine. In England and Wales the Environment Agency will be able to tell you how to do so, and should be your first port of call for guidance on planning issues. In Northern Ireland you should contact the Environment and Heritage Service. You should also contact the relevant planning authority to ensure that the site and design are acceptable and the appropriate fisheries body and statutory environmental body, such as the Countryside Commission.