

Gilkes Guide to Small Hydro

This guide is designed to assist those individuals considering the development of a small scale hydro project. We class 'small scale hydro' as any project which generates less than 100kW. To put this into perspective the average power consumption for a UK home is approximately 2kW, so in hydro terms 'small' amounts of generated power can still be quite substantial quantities of electricity.

How Hydro Power Works

Hydro power is generated by harnessing the potential energy of a head of water and turning it into electrical power.

The potential energy is a product of the Head and Flow of your hydro site and the more Head and Flow you have the more power you can potentially generate.

Head

Head is often measured in meters and represents the vertical distance between where the water is extracted from and the location of the turbine.

Flow

Flow is volume of water passing through the turbine and is often measured in m^3/second or litres/second.

From the Head and Flow we can calculate how much power is contained within the water as it enters the turbine. It is at this stage of the process where the potential energy from your hydro site is transformed into mechanical energy and it's the turbine Runner which performs this function. Depending on the most suitable type of turbine for your site the water will either pass through (Reaction Turbine) or be forced against (Impulse Turbine) the turbine Runner. This interaction forces the Runner to rotate which turns the turbine shaft. The turbine shaft is coupled, either by a belt system or directly, to the generator shaft which relays the mechanical energy of the shaft into the generator. The generator then converts this mechanical power into electrical energy using electromagnets.

So, to calculate the potential power at your hydro site we need the two pieces of information listed above; Head and Flow. To assist you in obtaining this information we have produced *How to Measure Head* and *How to Measure Flow* which offers some guidance on some simple methods you can use to obtain these values.

