

## Case Study: 12kW Turgo Hydropower Scheme

Location: Trefriw, Conwy, Wales

Installed: February, 2012

Total Fall (Gross Head): 85m

Design Flow: 19 litres/second

Turbine Type: 1 nozzle Turgo, Direct Drive

Generator: 12kW Induction, 4-pole, Single Phase

Penstock : 235m of 140mm HPPE Pipe



The power house



The weir, built largely from materials already on-site

This scheme had an excellent site, with a rapidly falling stream. The penstock route presented some potential difficulties, as it passes through a wooded area which is inaccessible to machinery, but a solution was reached which allows the pipe to run overground to prevent damage to tree roots. The weir was built largely from rocks already on site, which minimised the visual impact and the need to bring materials in from outside. Most of the powerhouse was also built with local stone, giving a cost-effective and low impact building.

This location had already been used for micro-hydro several decades ago. That scheme fell into disuse when mains power arrived in the 1960's, but as with many such sites the current economical climate for renewable energy means that it is now a very viable investment again. The system will give an estimated annual Energy Production of 35 MWh, enough to supply 9 typical UK homes, and saving around 18 tonnes of Carbon Dioxide from being released into the atmosphere each year. The electricity is used by the customer, with excess exported to the National Grid, providing an alternative revenue stream for the farmer worth around £8,000 / year. This is index-linked so that it will increase each year in line with inflation, and the scheme will pay for itself in 4-5 years.



The power house layout