

The Rumbling Bridge Hydro Scheme

Near Rumbling Bridge village, Perth & Kinross, Scotland

The Rumbling Bridge Community Hydro Society

The Society was formed to develop, build and operate a 500kW hydro scheme. As a Community Benefit Society the purpose of the organisation is to deliver on its objectives for the benefit of the community.

Members who have joined the Society are doing something tangible in the fight against climate change, will receive a fair return on their investment and any profits will help deliver the objectives of the Society.



“ Since September 2016 Rumbling Bridge Community Hydro Society has been generating clean hydro electricity. ”

www.rumblingbridgehydro.coop

Development of the Hydro Plant

The project was founded by Hugh Wallace at Glendevon Energy, and deemed technically feasible by Green Highland in January 2013. Using funds provided by the Scottish Government's CARES scheme the project progressed through planning.

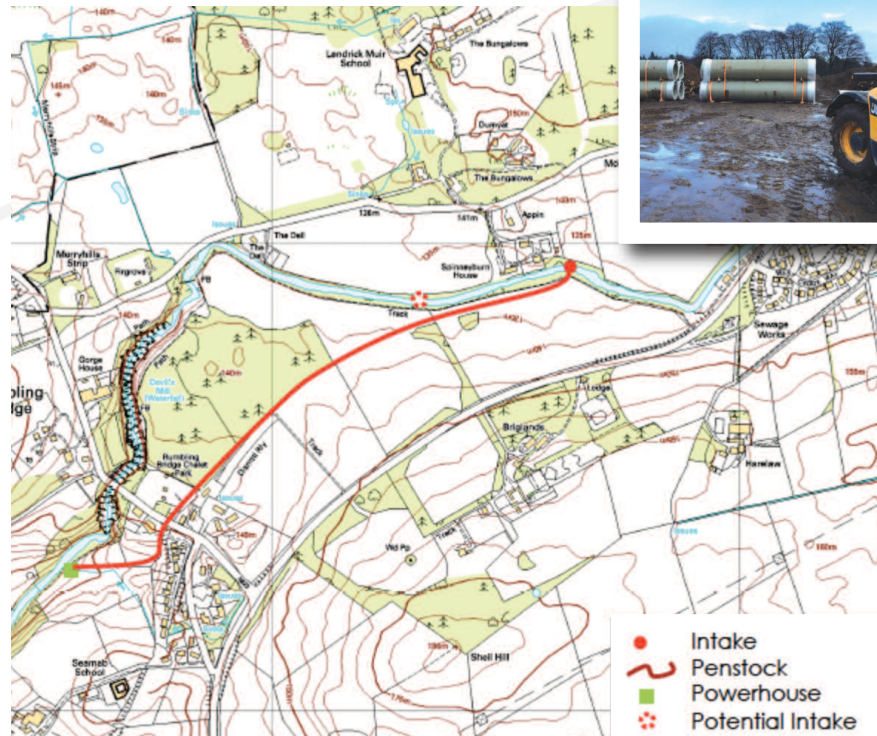
Hugh's discovery of an old railway line that could be re-opened for the 'deep dig' made the project finally viable. Due to the challenges of building a hydro scheme through a village, more funds were needed before the construction stage could be financed. Energy Prospects, a co-operative that helps communities to develop new renewable energy schemes agreed to fund the final pre-construction development stages in July 2015. Founding members from the local community and Energy4All then formed the Rumbling Bridge Community Hydro Society to own and operate the project.



They engaged an experienced hydro developer with Cairneyhill Ltd to design the scheme and manage the installation. Working alongside Energy4All, the Society produced a public share offer in October 2015, which raised £2.9m in share capital to fund the installation and attracted over 660 members. This allowed construction work to get underway and on Friday 9 September 2016 the turbines were successfully connected to the national grid.



What has been built at Rumbling Bridge is currently the largest community owned hydro project in the UK. It is a run-of-river scheme, which means there is no storage reservoir and only water running in the river is used.



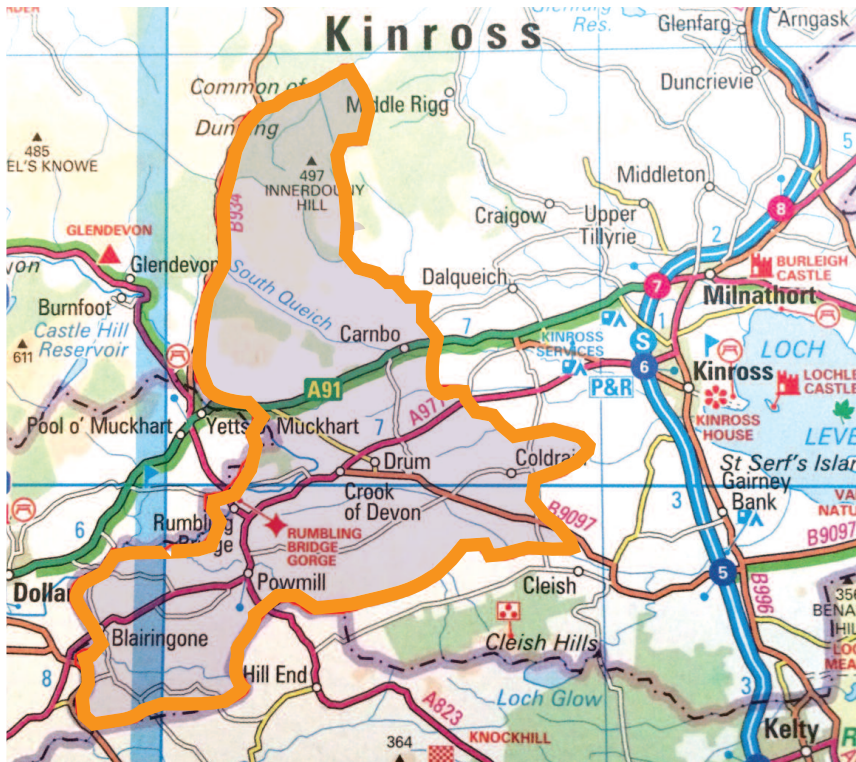
A weir has been constructed above Rumbling Bridge, which diverts some of the flow along 1.4km of pipe, down a drop of 41m to two 250kW turbines at the powerhouse. Some of the flow has to remain in the river to make sure a habitat remains for local plants and wildlife that depend on it. The designers proposed two turbines instead of one, because it increases overall output by allowing lower flows to be run more efficiently through one of the turbines. It also builds redundancy into the system by allowing generation to continue even if one of them fails. The turbines are situated in a purpose built powerhouse to the west of Rumbling Bridge. It was decided to bury the powerhouse underground, this also had two contributing benefits: first it gained a few meters of extra head therefore increasing total energy yield, but it was also a visual gain as the powerhouse will be practically invisible in the landscape. Once all the available energy has been extracted from the water by the turbines it is returned to the river Devon.

Energy Yield

Experts have carried out a hydrological assessment to calculate the potential flow that can be expected at the intake point of the river. The River Devon drains from a large upland catchment of 74.5 km² in the Glendevon area of the Ochil hills. The catchment drains through five large reservoirs operated by Scottish Water.

The scheme will be based on the long term flow duration curve of the river at the intake point and the projected price of electricity for the next 40 years.





Potential flow generated from catchment area of 74.5km²





Performance of the Hydro Turbines

Hydro turbines are described by a theoretical rated output of power based on the optimum size of turbine, relative to the flow of water available in the river.

In this case, if water at the intake were to flow in excess of 2.3 cubic meters per second, then each turbine will generate at a steady 250kW of power output.

The Hydro Turbines will benefit from a manufacturer's warranty and there will be an operation and maintenance contract in place to ensure any breakdowns are fixed swiftly. As the turbines age, mechanical parts will need replacing, so the Society has made provision for this by setting aside a maintenance reserve, however modern hydro turbines are normally extremely reliable.

It is predicted that the turbines will generate 2GWh of electricity each year, enough to power over 400 homes.

Community Fund

Ownership by a Community Benefit Society maximises the economic benefits of renewable energy schemes by generating funds for community benefit. Communities include those living within a certain geographical area and individuals or other organisations that share our common values.

Any surplus profits after payment of member's share interest will be available for the Society to deliver its objectives, which are:

1. the development, installation, management, operation, generation, transmission and supply of energy from renewable and low carbon energy sources;
2. the conservation of energy through advice on energy efficiency including energy efficient products and the supply of energy efficient products;
3. the generation of income to provide grants to community organisations in the locality of any energy project supported by the Society;
4. the promotion of awareness of environmental and related issues and support for educational initiatives related to renewable energy; and
5. enabling the local and wider community to share in the ownership of, and reinvest in, renewable and low carbon energy generation and energy efficiency initiatives.

To meet objective 3, the Society will donate £5,000 per annum to the Fossway & District Community Council.

Contractors

Rumbling Bridge Community Hydro Society worked together with a number of stakeholders to construct the scheme:

Main & Civil constructions:	Grant Ltd
Project Management & Design:	Cairneyhill Ltd
Turbine & Electrical Installation:	Kestral Ltd
Turbine Supplier:	Tinck
Grid Connection:	Scottish & Southern Electric Power Distribution

In addition there was a locally employed environmental clerk of works to oversee the construction.



Construction Statistics

- **15,000** Grant Ltd man hours to deliver the civil works
- **10,000** tonnes of rock broken, extracted and then replaced
- **20,000** tonnes of earth shifted and replaced
- **12 men** working on site at the busiest time



Cairneyhill Ltd



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