

3 Hydroelectric Power in Northern Ireland

Flowing water has kinetic energy that can be harvested as it flows downhill. This can be converted into electrical energy via a mechanical turbine which drives a generator. A body of water such as a river dam or the sea can be a source of hydropower. The greater the volume and flow of water and the greater the “drop” in water level, either downhill or via tides, the more electricity can be generated.

While there are many examples of hydroelectric dams on watercourses elsewhere in the world, and significant use has been made of tidal water movements to produce electricity, this resource has not been widely used in Northern Ireland even though a pilot scheme was in operation by QUB at Strangford Lough for some years. Some small scale run-of-the-river installations do exist in Northern Ireland these are called Pico or Micro hydro systems. The total capacity from hydro in NI is about 6MW (www.soni.ltd.uk)

All Children’s Integrated Primary School in Newcastle, Co Down, has a hydro-electric generator which uses energy from the nearby Glen River to supply green electricity to the school and to neighbouring primary schools. This generator has been in operation (under the staff car park) since about 2013 and provides a good example for the locals of an alternative method of energy production, making good use of a readily available resource.

There is no large scale hydroelectricity generation in Northern Ireland but the plant at Ballyshannon, County Donegal, just across the border, uses water drained from NI in the River Erne, Co Fermanagh.

Some benefits of hydropower

- A freely available and reliable energy source in suitable locations
- Hydro systems can operate day and night in any weather conditions so long as there is a consistent flow of water through the turbine
- Small scale projects cause little or no visual / environmental impact
- Very suitable for community projects in isolated places

Some drawbacks of hydropower

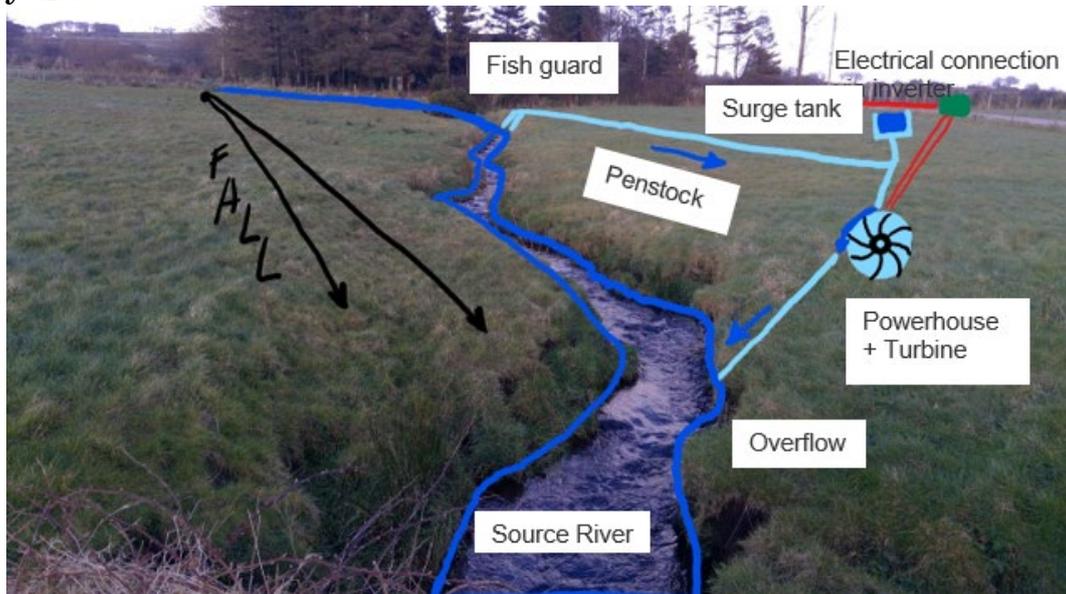
- Lack of suitable locations limits increased contribution from this source
- Often expensive
- Large projects that create a reservoir by building a dam across a river valley to provide a good water “drop” can have adverse social and environmental impacts
- Local fish and wildlife must be considered by design

Opportunities

Microgeneration (up to 100kW)

Smaller Pico generation turbines of 200-300W may power a single home, requiring a relatively small water “drop” Such schemes may prove beneficial to rural isolated dwellings beside or close to a suitable water course.

Pico Hydro



Pico hydro is hydroelectric power generation of under 5 kW. This would be useful in rural NI where small remote communities require only a small amount of electricity. The system transforms the kinetic energy of flowing water into a renewable and accessible form of AC electricity through a turbine connected to an inverter and electrical connection.

Pico-hydro setups typically are run-of-stream, meaning that a reservoir of water is not created, only a small weir is common. A piped system diverts some of the water flow through a dropping gradient, or penstock, and through the turbine before being put back to the stream.

Environmental concerns must be considered during the installation of the race to avoid damaging local wildlife, for example a fish guard.

Flowing water has kinetic energy that can be harvested as it flows downhill twenty-four hours a day.

The greater the drop and quantity of water there is flowing through the turbine, the more electricity can be generated. A steady stream of moving water has significant advantages over solar and wind generation systems. Micro-Hydro systems can run day and night and in any weather conditions, so long as there is a consistent flow of water through the turbine.



The Valeira dam on the River Duoro, Portugal.
(photographed recently by a Drumlin member)

Dam height 33m
Output 810GWh/yr