



Hydropower

Clean, renewable energy from water



Ardchattan Case Study



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The Ardchattan Hydro Scheme is a conventional 'run-of-river' scheme on the Esragan River, Argyll. It was developed by Ardchattan Hydro Ltd in partnership with Gilkes Energy Ltd.



Summary:

Head of water: 94m

Length of pipe work: 1,500m

Catchment area: 14 km²

Power produced: 920kW

The catchment area feeding the Ardchattan scheme is approx 14 square kilometres and is subject to, on average, 1600 mm rainfall per annum.

The water is abstracted at a 2m high weir using a 'Coanda' style self-cleaning screen. This screen also allows no more than the design flow of 1.4 cumecs (m³ per second) to enter the intake. At the intake, a fish pass has been constructed to facilitate the upstream migration of fish.



The water is then conducted via a 1.5km long penstock pipeline to a powerhouse, giving 94m of gross head. The outlet is approximately 0.5km North of Loch Etive at Inveresragan.

A secondary intake was utilised on a tributary to the Esragan, in order to increase the size of the catchment captured by the scheme.

From the intake channel beneath the Coanda screen, water is conducted through a non-pressurised pipe to a header tank, and then into the main penstock. The penstock pipeline is 800mm in diameter, and is buried along its entire length. Throughout its length, the main pipeline is provided with concrete thrust blocks at all significant changes in direction, both horizontally and vertically.

Access to the pipe is provided for cleaning and 'pigging' via a custom designed pig launcher which was integrated into the pipeline.

The powerhouse is below ground level in a field adjacent to the Esragan River. It was decided to excavate and build the powerhouse below ground-level in order to maximise the available head, minimise noise, negate any worries about visual intrusion, and cause minimum impact on the river bank.





The powerhouse contains the turbine, generator, hydraulics and the protection and control panels. A 415V/11kV transformer and switch unit are located outside the main powerhouse. The turbine installed is a Gilkes 22.5" Twin-Jet Turgo Impulse Turbine producing 920kW.

The full E&M (Electrical & Mechanical) package incorporating turbine, generator, protection and control panel, installation and commissioning was provided using a Gilkes Energy equipment lease meaning that approximately 25% less capital was required in order to develop the scheme.

The Gilkes Energy equipment lease is linked to an agreed % of revenue – if the scheme is not generating no lease payments are due (unlike bank debt).

This reduces the overall financial risk for the owner as in dryer than average years the lease cost reduces.

Gilkes takes responsibility for maintenance and repair throughout the lease period. The lease structure provides a reassuring incentive to Gilkes to keep the equipment running as efficiently as possible and develops a very close partnership between Gilkes and the Estate owner.

The system was installed and commissioned in 2009.

