CASE STUDY
RYDAL HALL, Lake District, UK

KEY STATISTICS

Customer: Rydal Hall Hydro Ltd
Turbine type: Gilkes Twin Jet Turgo
Number of Turbines: 1
Power (kW): 500kW
Net Head: 97m
Flow: 670
Dia: 16.5"
Speed: 1000 rpm
Date of Commissioning: May 2015

SCOPE OF SUPPLY

Gilkes 16.5" Turgo impulse turbine.
Spear valves & deflectors fitted with hydraulic actuators
Inlet pipework inclusive of bifurcation, inlet pipes, branch pipes & dismantling joint
Main inlet valve, double flanged butterfly valve, weight to close.
Synchronous Generator.
Control & switchgear pane.
Hydraulic control module.
Control & power cabling, including building services.
Installation and commissioning.

Gilkes were delighted to again provide hydro-electric equipment for the Diocese of Carlisle's Rydal Hall. The Estate, which now operates as a Christian retreat and Conference Centre is based at the North Eastern end of Windermere, England's largest lake. Able to trace its roots back to 1126, the Hall and grounds have been granted listed status. This required a visually sympathetic solution to be designed, engineered and delivered by Cumbria based developers Ellergreen Hydro and Gilbert Gilkes and Gordon.

Rydal Beck had previously been used to power the house and surrounding buildings with a 1920's Gilkes turbine, the original turbine was then replaced with a Gilkes Hydec twin jet Turgo in 1981 due to the original penstock failing. The new penstock meant an extra 30kW was available from the new turbine, which was in operation until the current scheme started construction. The current project required construction of a new intake structure, Coanda screen and 2km of penstock. With a head of 96m, the beck now produces useable flows of up to 670l/sec.

Gilkes engineers selected a 16.5" Turgo turbine in order to maximise efficient generation from the varying availability of water. The twin jet Turgo is able to continue running efficiently to very low flows. When running at maximum flow, the scheme will contribute 500kW to the National Grid. This is sufficient to provide enough power for around 400 homes.

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Another benefit of the broad and flat efficiency curve of the Turgo is that it will allow the estate to run from hydro power for the majority of the year. This includes times when there is not sufficient water available to export excess power to the grid. Gilkes engineers designed the control panel to allow this. The control systems also allows for 24/7 remote access, monitoring and trending of the installation meaning simplified operation.

Rydal hall represents a typical run-of-river scheme for Gilkes, Gilkes Turgo machines are suitable for head ranges up to 300m and power outputs up to 10MW. Another local example of a Gilkes Turgo can be seen at the National Trusts Stickle Gill site, this 100kW example can be viewed through a public viewing window is only 20 minutes away from Rydal Hall.

The first Turgo machine ever installed was designed and manufactured by Gilkes and currently resides in Scotland. Commissioning date 1919.

Above is the original 1920's Gilkes Turbine that was removed and refurbished as a display piece.

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