

RENEWABLE ENERGY BEST PRACTICE CASE STUDY
IRISH ENERGY CENTRE, RENEWABLE ENERGY INFORMATION OFFICE

KENMARE HYDROPOWER STATION

Site: Kenmare, County Kerry

Starting-up date: 1995

1. AIM OF THE PROJECT

The aim of the project was to upgrade an existing hydropower station by increasing the power output and improving the aesthetics of the site. An additional objective was to demonstrate an innovative diagonal flow turbine and a new type of screen cleaning system.

2. DESCRIPTION

Power output at this run-of-river small-scale hydro site has been increased from 120 kW to 600 kW as a result of the upgrade project.

The innovative runner design, with a specific speed of 412, is suitable for sites with characteristics that allow the installation a high specific speed Francis turbine or a low specific speed Kaplan turbine. The runner is 50 % radial flow and 50 % axial flow and so can be regarded as a design that is between a Kaplan and Francis turbine. An innovative cleaning system installed on intake trash screens uses a local PLC to operate a number of sluice gates in response to a signal that detects screen blockage.

The overall aesthetics of the site have been improved by replacing a visually obtrusive overground reinforced concrete aqueduct with a buried pipeline, which directs water from an intake pool to the turbine. In addition, a pre-existing concrete powerhouse was replaced with a new natural stone building designed to harmonise with the architectural style of the adjacent mill building.

Technical Data

Gross head 14.5 m

Design flow 6m³ divided between 2 diagonal low runners in the split 3.5m³/s and 2.5m³/s

Maximum river flow 6.0 m³/s

Minimum flow 0.75 m³/s

Mean flow 5.0 m³/s

Maximum turbine power 750 kW

Maximum electrical power 600 kW

3. OWNER

The hydropower plant is owned by Sandview Ltd hydropower site also includes a refurbished 5-storey woollen mill dating back to the 1840s.

4. INVESTMENT AND FINANCING

The total investment costs for the plant were in the region of IR£815,000. These costs were met through a combination of third party financing and THERMIE funds in the region of IR£165,500.

Annual operating costs are in the region of IR£10,00 per annum.

Revenue is derived from electricity sales via a power purchase agreement secured through the Alternative Energy Requirement. Two different tariff rates apply: IR£0.0667 / kWh for peak-time generation and IR£0.026 / kWh for all other times. Both of these rates are linked to the Irish consumer price index.

A pay-back period of 12.69 years has been estimated.

5. RESULTS (ENERGY DETAILS)

Annual energy production at the plant during the first year of operation was 2.1 million kWh. The operation of the trash screen system has been very successful.

6. ENVIROMENTAL IMPACT

The project demonstrates that small-scale hydropower can be developed in harmony with the environment. An array of control devices regulate flow to protect aquatic life on this important salmon fishing river. The upgrade project had improved the visual impact of the site and on a more global level, this project promotes environmental protection by displacing the need to burn fossil fuels and thus reducing emissions that contribute to global climate change, acid rain and air pollution.

7. USERS

The state utility, ESB, is the sole user of electricity generated from the plant. In terms of future use, there is considerable scope for replication of this project at other sites.

The new turbine design will be added to the product range of the turbine supplier. The intake trash cleaning system is working very satisfactorily and this design could be replicated elsewhere.

8. MAIN MANUFACTURE AND SERVICE SUPPLIERS

Overall Project Management

Sandview Ltd., Ashgrovemill, Kenmare, County Kerry.
Tel +353 21 336198 Fax +353 21 336306

Civil and Mechanical Engineering Design

Hydesign Limited, Trafalgar House, Montenotte, Cork.
Tel +353 21 271456, Fax +353 21 502148

Turbine, Power and Control Panel and Electrical Equipment

Hydro Power Plant 28, Rue Emile Galle, 5400 Nancy, France.
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9. MORE INFORMATION

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