

Trinity College Dublin Coláiste na Tríonóide, Baile Átha Cliath The University of Dublin







Pump as Turbine Micro-Hydropower installation

The context

MICRO-HYDROPOWER

Despite the **potential for small-scale hydropower development in Wales being significant**, the high upfront investment needed together with the decline in subsidies contribute to making most of it



economically nonviable. The novelty of the present approach is to reduce the complexity and cost of the scheme in order to demonstrate its feasibility even down to the "pico" scale (e.g. less than 5 kW of installed power).

EU INTERREG-FUNDED Dŵr UISCE RESEARCH PROJECT

The aim of the Dŵr Uisce project is to improve the long-term sustainability of water supply, treatment and end-use in Ireland and Wales through the development of a number of new innovative technology platforms (incl. Hydropower), undertaking economic and environmental impact assessments, and developing policy and best practice guidelines to facilitate the implementation of integrated low-carbon and smart energy solutions for the water sector.

PUMPS AS TURBINES FOR HYDRO POWER

Pumps As Turbines (PAT) consist of standard water pumps running in reverse and are an effective

The

The

project

technology

The

outcomes

and low-cost technology for hydro power generation.

The use of PATs has several advantages over other turbine types, namely:

- compact dimensions;
- mass manufacturing (off the shelf availability and short delivery time);
- easy installation, operation and maintenance;
- reduced investment cost with respect to a standard hydro turbine.



MICRO-HYDROPOWER AT TŶ MAWR WYBRNANT

The 16th century historical farmhouse of Tŷ Mawr Wybrnant is a renowned touristic site in Northern Wales managed by National Trust. In an effort to reduce the energy consumption related to lighting and heating of the building a **small hydropower scheme** has been installed to generate about 3.8 kW from the water of the nearby Afon Wybrnant stream. The measured net hydraulic head corresponds to 35 m, and the design flow rate is 25 l/s.

The system is expected to generate about 19,000 kWh of clean renewable electricity per year, equivalent to over 8 tons of CO2 avoided per year. The main purpose of the installation is to demonstrate not only the **environmental benefits of the scheme** (low/null impact on the ecosystem and CO2 savings) but also to prove the **economic attractiveness** of such small-scale hydro schemes.



The Dŵr Uisce project is aimed at improving the long-term sustainability of water supply, treatment and end-use in Ireland and Wales. The present research has been supported by the ERDF Interreg Ireland-Wales Programme 2014-2020.

& www.dwr-uisce.eu







