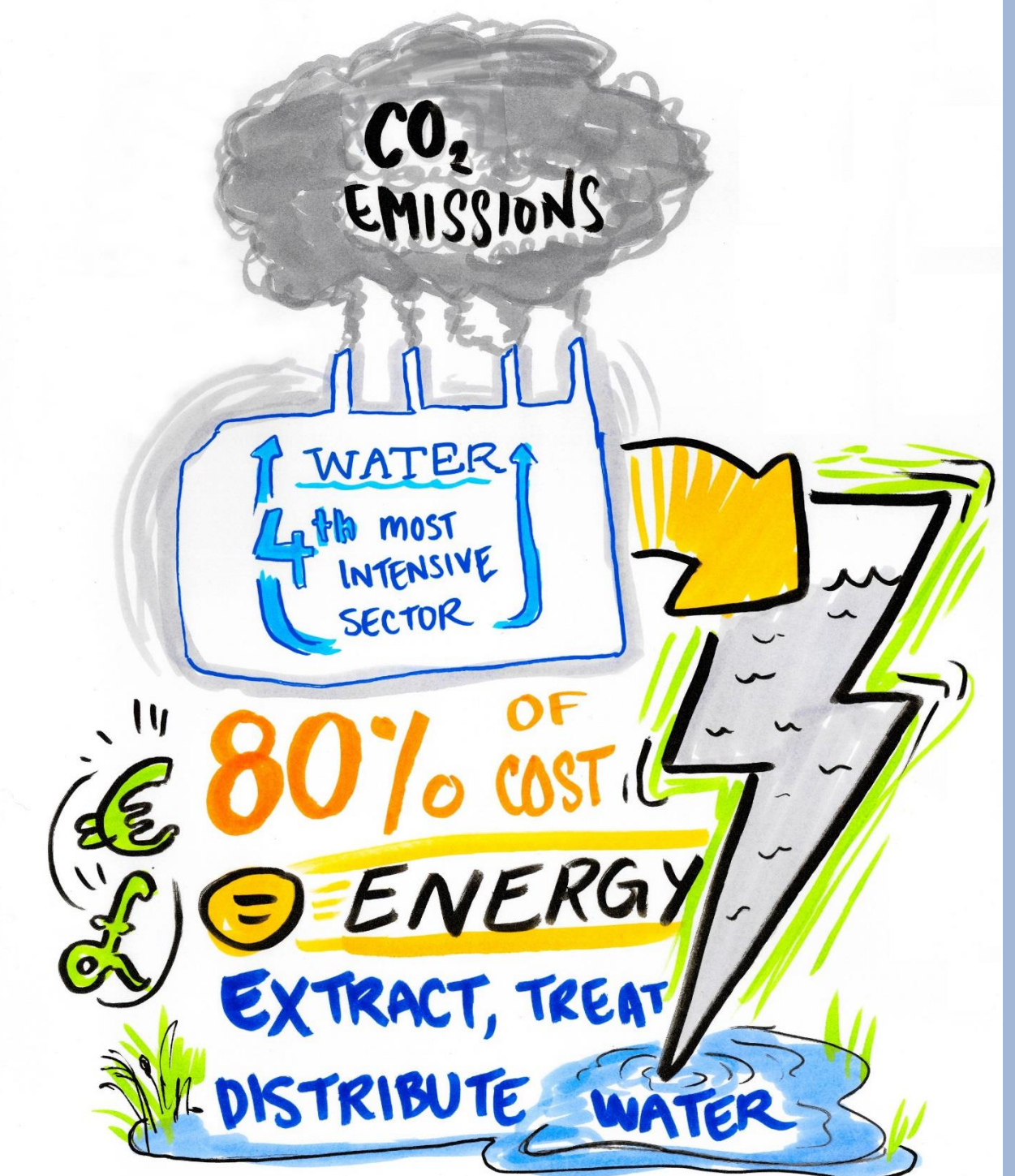


Pump as Turbine installation for energy recovery from water infrastructure

The context

HYDROPOWER FROM WATER NETWORKS

Water utilities are among the largest electricity users in industrialized countries, and are therefore also responsible for significant CO₂ emissions. Utilities from around the world are struggling to reduce their operating cost, contain water leakage and provide a reliable service while at the same time maintaining user's bills as low as possible. Among the possible solutions to address the problem is the partial **recovery of kinetic energy by means of hydraulic turbines** from sites within water infrastructures where this is currently dissipated.



The project

ERDF INTERREG IRELAND-WALES FUNDED RESEARCH PROJECT

The Dŵr Uisce project was funded by the ERDF Interreg Ireland-Wales Programme (2014-2020). 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.

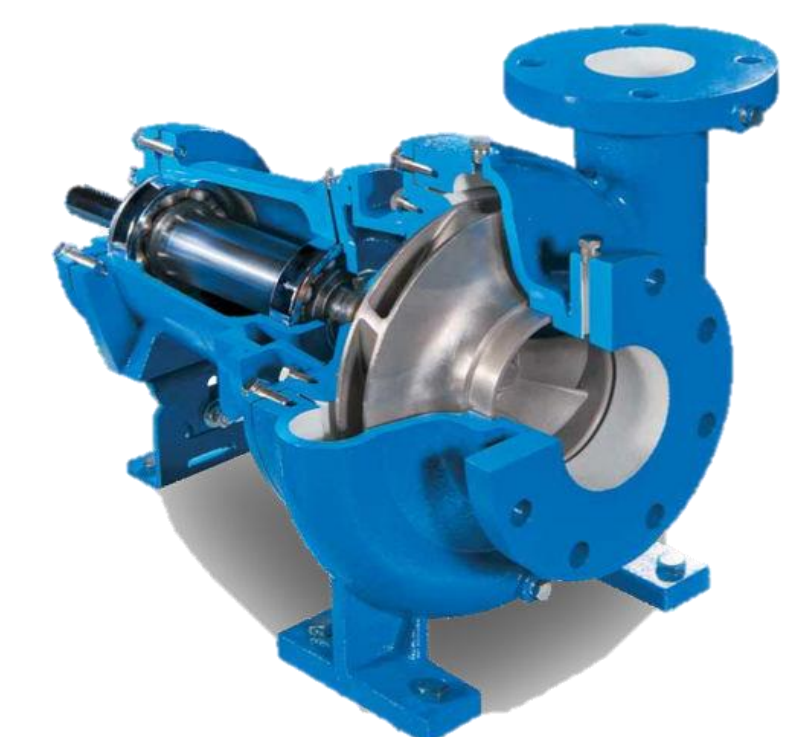
The technology

PUMPS AS TURBINES FOR HYDRO POWER

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



The outcomes

ENERGY RECOVERY AT BLACKSTAIRS TREATMENT WORKS

A previous investigation from the Dŵr Uisce team identified a **significant potential for energy recovery on the water supply line leading into the raw water storage tank** within the premises of the treatment works operated by EPS Group. This potential could most conveniently be exploited by installing a centrifugal Pump As Turbine (PAT) in the terminal section of the pipeline. A design flow rate and head of 17 l/s and 40 m respectively were selected, leading to a power output of 3.3 kW. The PAT design algorithm developed at Trinity College Dublin has been applied on the selected site, and helped identify the ideal characteristics of the main PAT and generator set to be chosen.

