



# Introduction to REDAWN

 #WATEFCON 2018

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University of Aveiro, Portugal

**wat****f**  
Water Efficiency Network

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# REDAWN

## Reducing Energy Dependency in Atlantic-area Water Networks

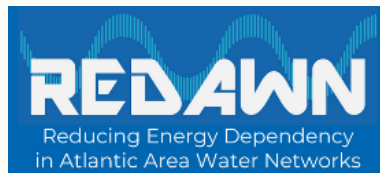
15 partners

5 countries

3 pilot demonstrations



@REDAWNAA



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

**Renova**



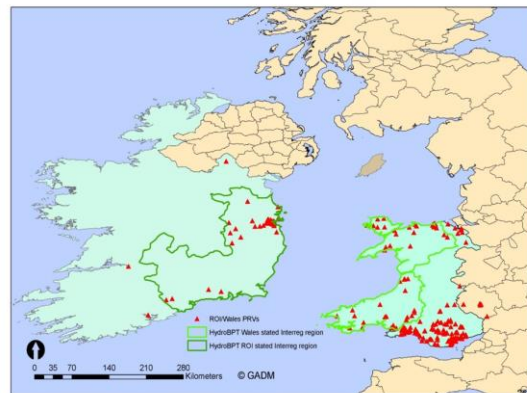
# Opportunities for energy recovery

## Water Supply Networks (Ireland & Wales)

238 sites identified, 80 feasible sites with 20 GWh of potential energy recovery

€2.5 million savings

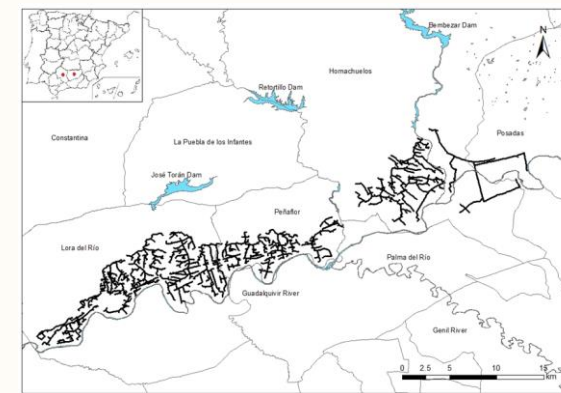
Reduction of  
>10,000 tonnes  
CO<sub>2</sub> per annum



## Irrigation Networks (S. Spain & Portugal)

15 irrigation networks in Spain & Portugal

20,000 ha of land



Potential for 43  
installations &  
>1,000 kW  
per year

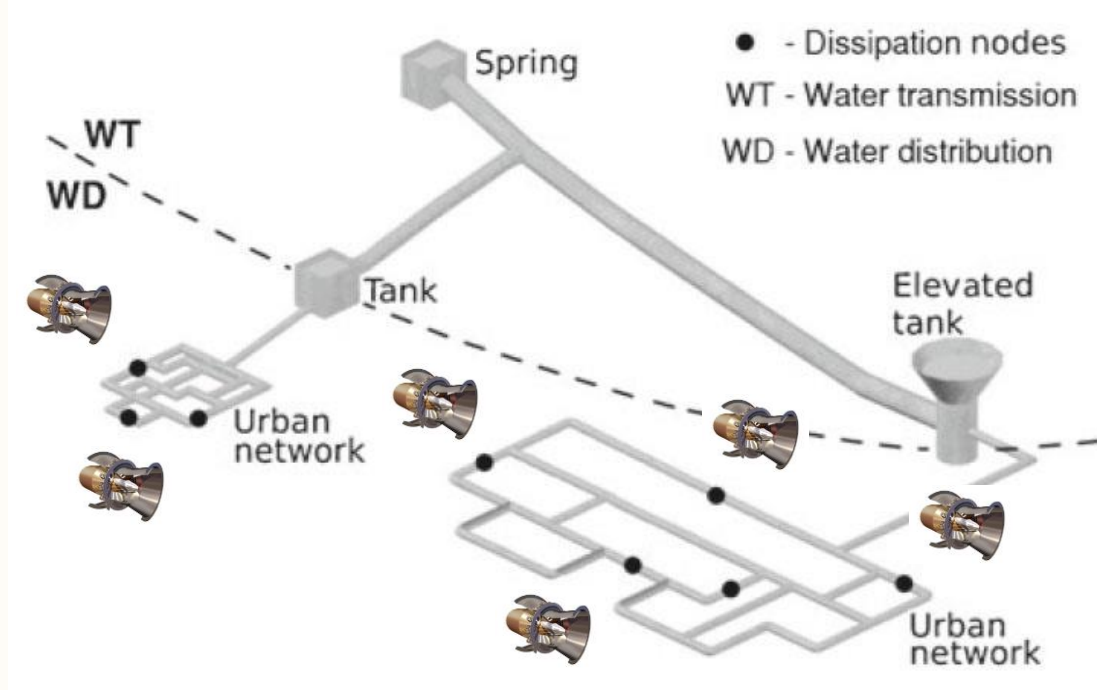
(We aim to replicate this feasibility assessment across the Interreg Atlantic Area region and beyond)

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# Micro-hydropower in Water Networks

Recovering energy from flowing water in network infrastructure at points of excess pressure.



## Barriers

Need for low-cost turbines

Need for an assessment of the market potential

Need for supportive policy & regulations

Need for an assessment of the environmental & societal impact potential

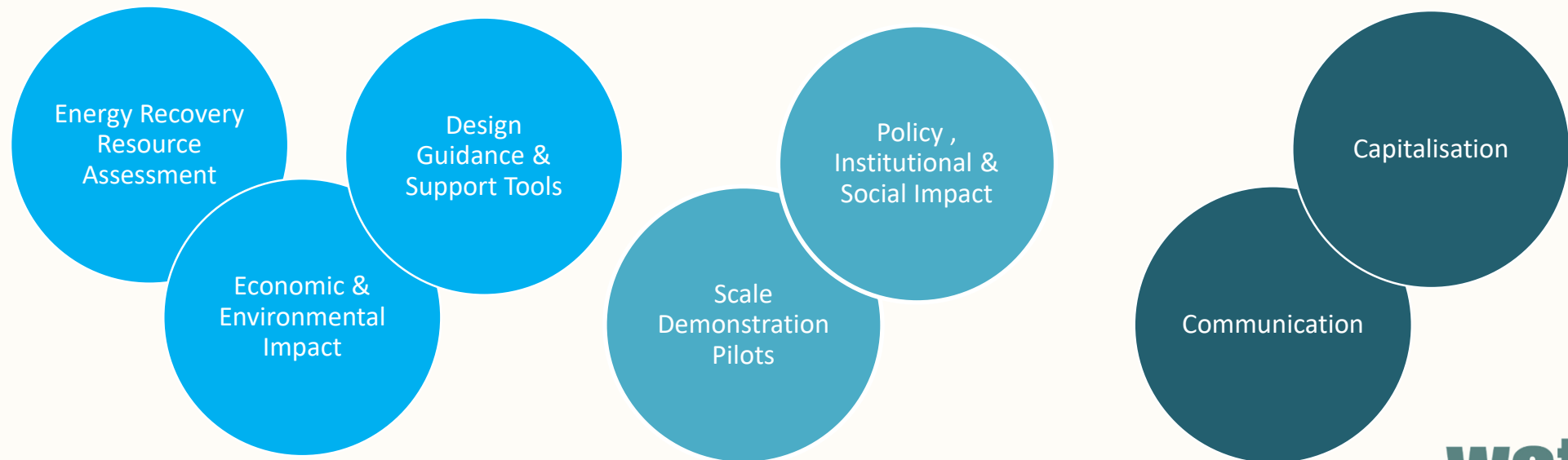
Need for pilot projects

# Project Overview

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Aim to foster the adoption of hydropower energy recovery technology in built water networks in the Atlantic Area (AA).

REDAWN will develop an adequate institutional, social and technological environment to foster greater resource efficiency in water networks, including:



# Resource, Economic & Environmental Assessments

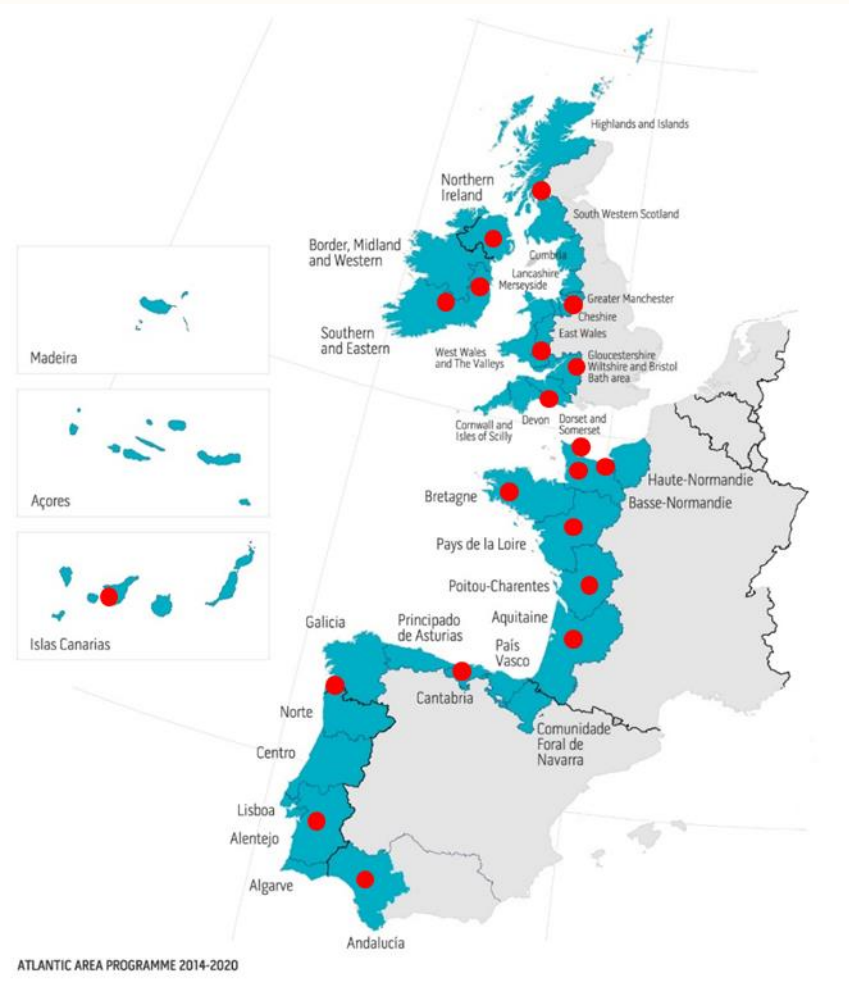
The potential of low-cost hydro plants for the reduction of energy use

Resource assessment:

- Existing infrastructure
- Flow and Pressure data
- Optimum recovery
- Long term growth

Challenges:

- 4 network sectors
- Missing data
- Access to data

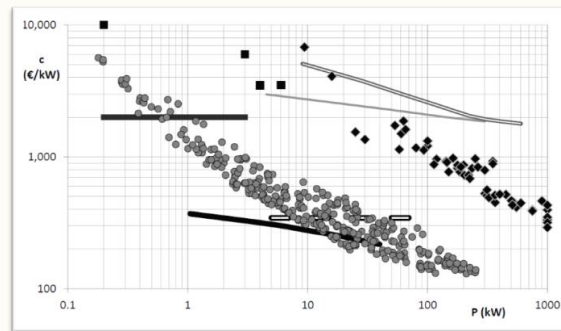
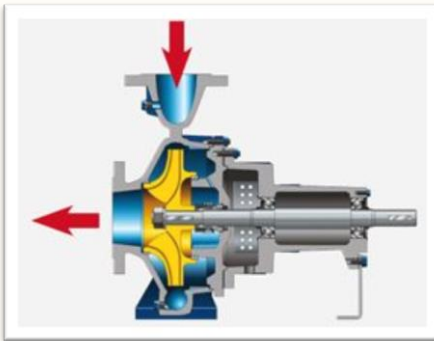


# Design guidance and support tools

## Energy from PRVs & pressure control

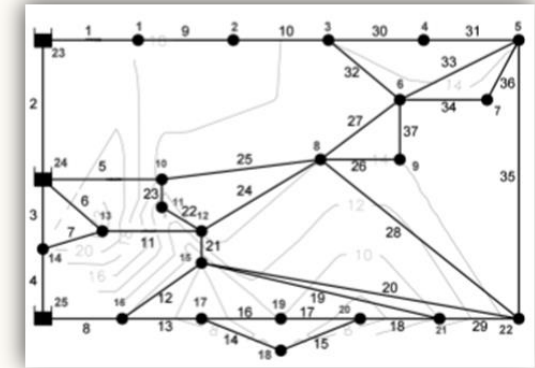
### Pump-as-turbine (PAT)

Low cost, lower efficiency, unknown performance, no flow regulation



Predict behaviour, design guidelines, reduce risk for investment

### Optimisation for energy recovery



Pressure control

Leakage reduction

Maximum energy production



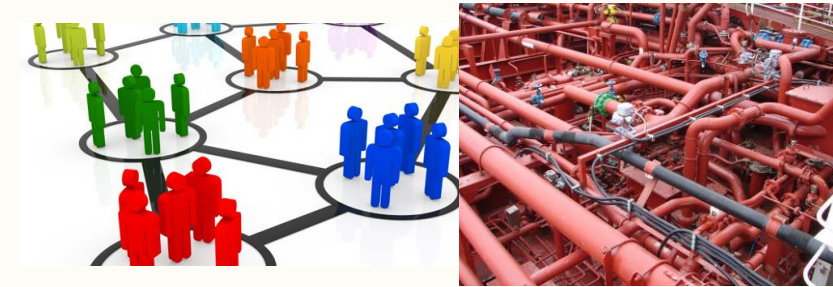
# Policy & Institutional Support Tools

Development of supporting organisational structures to accelerate the implementation of MHP energy recovery in practice

Diverse and changing water industry structures across the EU

Capturing the value (economic, environmental & social)

Need for robust business models & lean thinking, to support implementation



## Environment

- CO<sub>2</sub>
- Leakage

## Customers

- Water Bills

## Business

- Operating cost
- Food price
- Competitiveness

Reducing the water sectors contribution to climate change

Reducing the cost of water production and the price paid by the community



# Pilot demonstration

Three scaled demonstrations shall cover the different sectors:

Irrigation (University of Cordoba, Spain)

Process industry (RENOVA, Portugal)

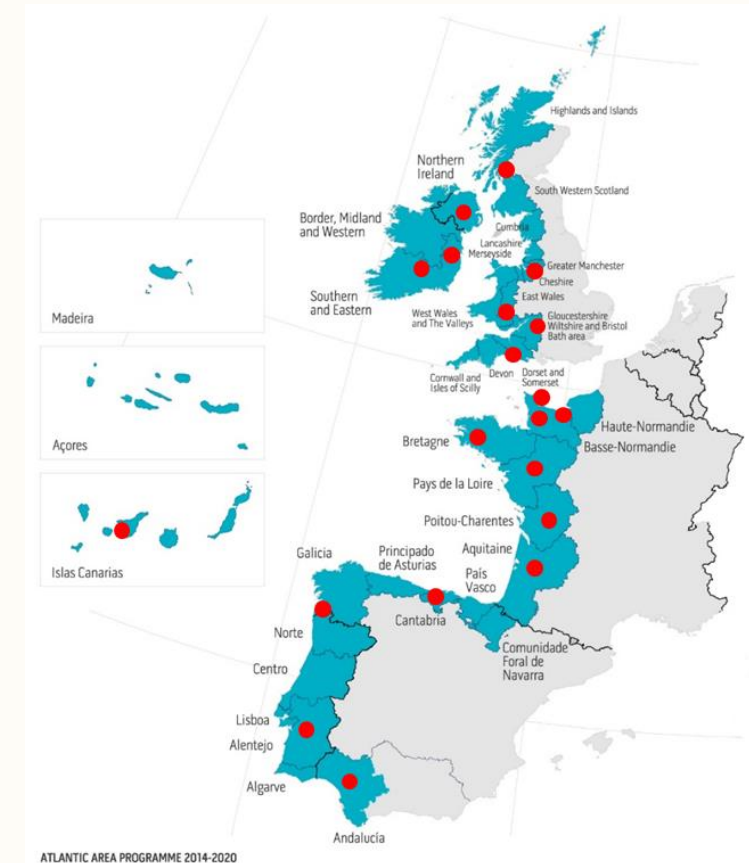
Waste/storm water sectors (SMPGA, France)

Construction of sites, monitor site performance, feedback on design guidance, optimise performance and analysis of non-specific technical challenges.

Supports communication and capitalisation of PAT technology.

Validation of design guidelines and support tools.

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# Conclusions

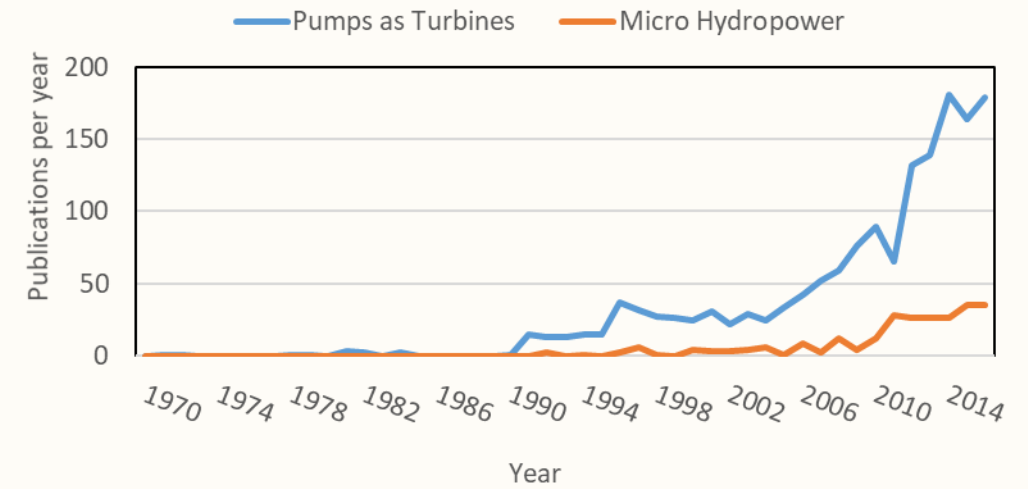
PATs in water networks has been deeply investigated in the recent past.

We now know how to make the control of a micro-hydropower plant using a PAT for energy recovery.

We know how to maximize the energy production without losing in system reliability.

The design of the hydropower plant and the PAT selection will be available in short time from REDAWN for all technicians as in the design of a traditional pumping system.

Guidelines will be produced within the project to facilitate the choice of the plant layout and of the PAT.



# Thank you for your attention

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**REDAWN**

[www.redawn.eu](http://www.redawn.eu)

## Partners

Action Renewables, Trinity College Dublin, Università degli Studi di Napoli Federico II, Empresa de Electricidade da Madeira, EDA Renováveis, Instituto Superior Técnico Lisboa, Northern Ireland Water, Water Efficiency Network (University of Bath), Hidropower Ltd, Renova, Asociación Feragua de Comunidades de Regantes de Andalucía, Universidad de Córdoba, Parceria Portuguesa para a Água, Fundación Asturiana de la Energía, Syndicat Mixte de Production d'eau potable du Granvillais et de l'Avranchin

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