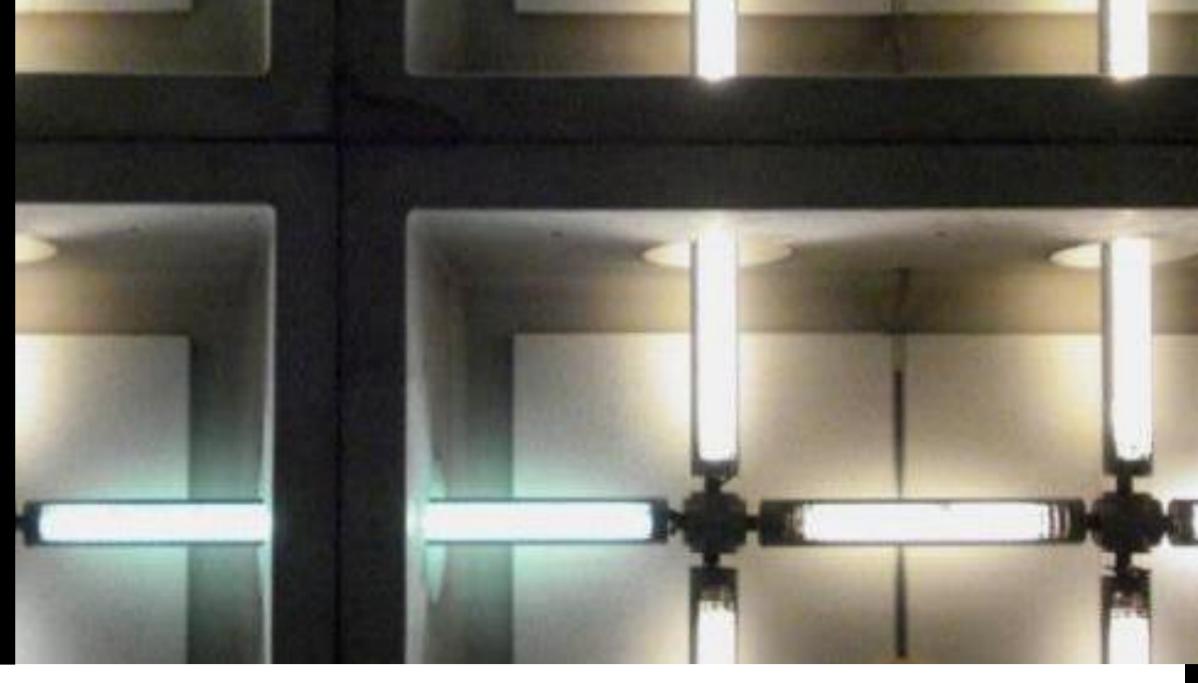
ENCONTRO EFS 22

ALUNOS & EMPRESAS



Full integration of water and energy nexus in water supply systems

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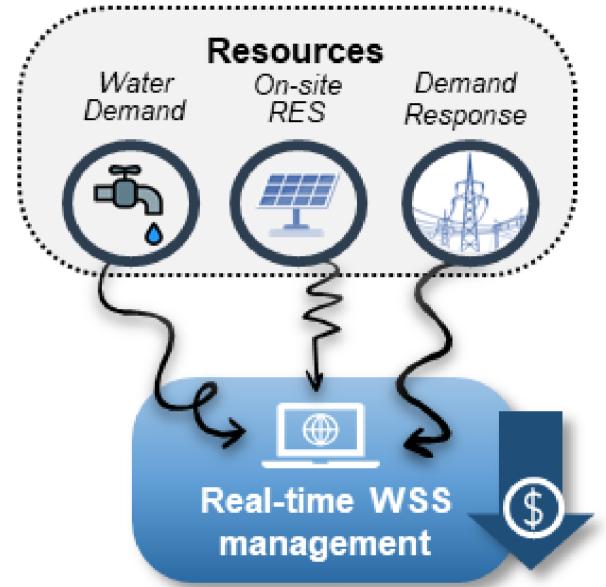
Objectives



Promoting the cost-efficiency water-energy operation of WSS by optimize the integrated management of the available resources

Assessing the **potential application of Demand Response** actions to water utilities, especially:

- dynamic electricity pricing tariffs
- incentive-based (e.g., participation in energy markets as the Electricity Market Regulation Reserve)



Work plan



Analyze and validate existing water demand forecasting and modelling approaches, currently employed in the management of WSS

Digital twin / modelling

Virtual model will be developed using real-time sensor data of the WSS, to analyze the current and simulate the future operation according to resources availability Energy resources integration

Relevant available

energy resources,
namely renewable local
generation, water
storage, pumping loads
and electricity provided
by the grid
incorporating Demand
Response actions will
be characterized

Optimization models

Development of

optimization
models
encompassing the
network infrastructure
of water and energy
components with the
aim of minimizing
the energy cost
for water companies

Prototype test in a real WSS

A software tool integrating the previous tasks will be used to validate the research findings through simulation of the optimal WSS operation. Models will be run in a real-world pilot WSS in real-time

Expected Outcomes:

- Providing an easy-to-use decision support tool to improve the overall WSS efficiency operation management
- Minimizing the energy bill of the water utilities by integrating energy resources available
- Reducing the GHG emissions promoting on-site renewable production in water facilities
- Demonstrating that **WSS** are suitable candidates to implement Demand Response programs and could create a great opportunity to provide power systems' stability, reliability and economic benefits







