

European Twinning for research in Solar energy to (2) water (H2O) production and treatment technologies
GA Number: 101079305
European Research Executive Agency REA.C3

Sol2H2O



Funded by
the European Union



Project presentation

Online, 30.06.2025

SoI2H2O

Objectives

- Strengthening networking between partners and the coordinator
- Improving its research profile through the valorisation of human resources and infrastructural synergies
- By developing a leading European facility for the development and testing of circular solar-powered water production and treatment technologies

Consortium partners:



UNIVERSIDADE
DE ÉVORA

- University of Évora



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di Palermo

- University of Palermo



- Plataforma Solar de Almería



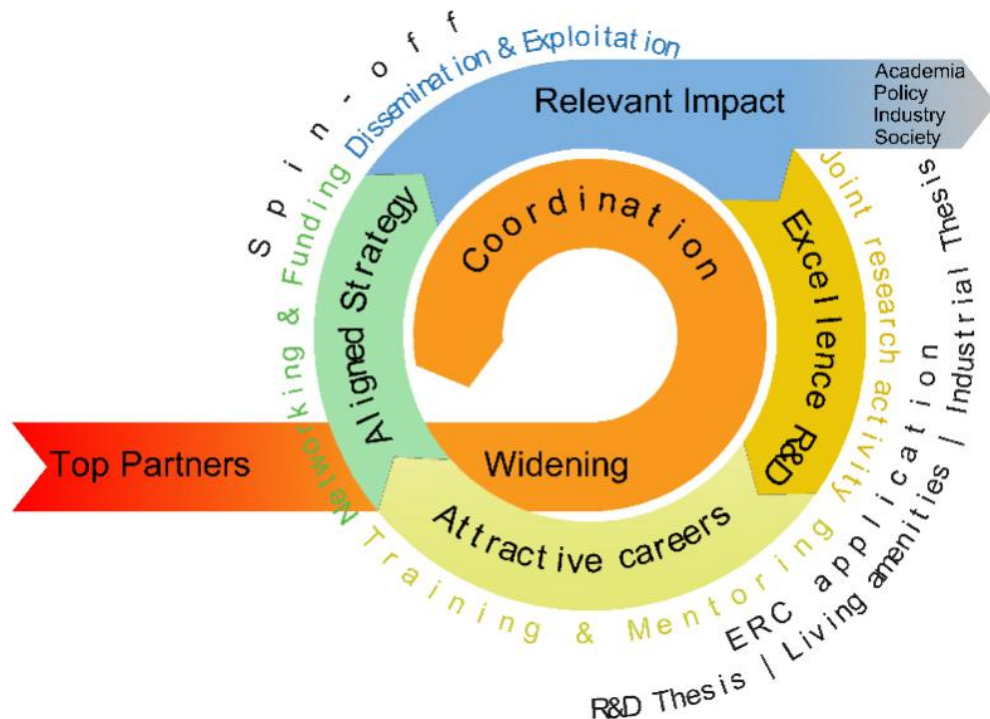
itc
INSTITUTO TECNOLÓGICO
DE CANARIAS

- Instituto Tecnológico de Canarias

Research Project



Widening Profile Raising



Objectives and project impacts

Solar-powered water production and “Zero-Liquid Discharge” solutions

With a technological focus on

- Reverse Osmosis Desalination Powered by Photovoltaic Systems (PV-RO)
- Vacuum-enhanced air-gap membrane distillation for freshwater production via brines and coupling with solar thermal energy
- Brine treatment processes for raw material recovery and zero liquid discharge (ZLD)

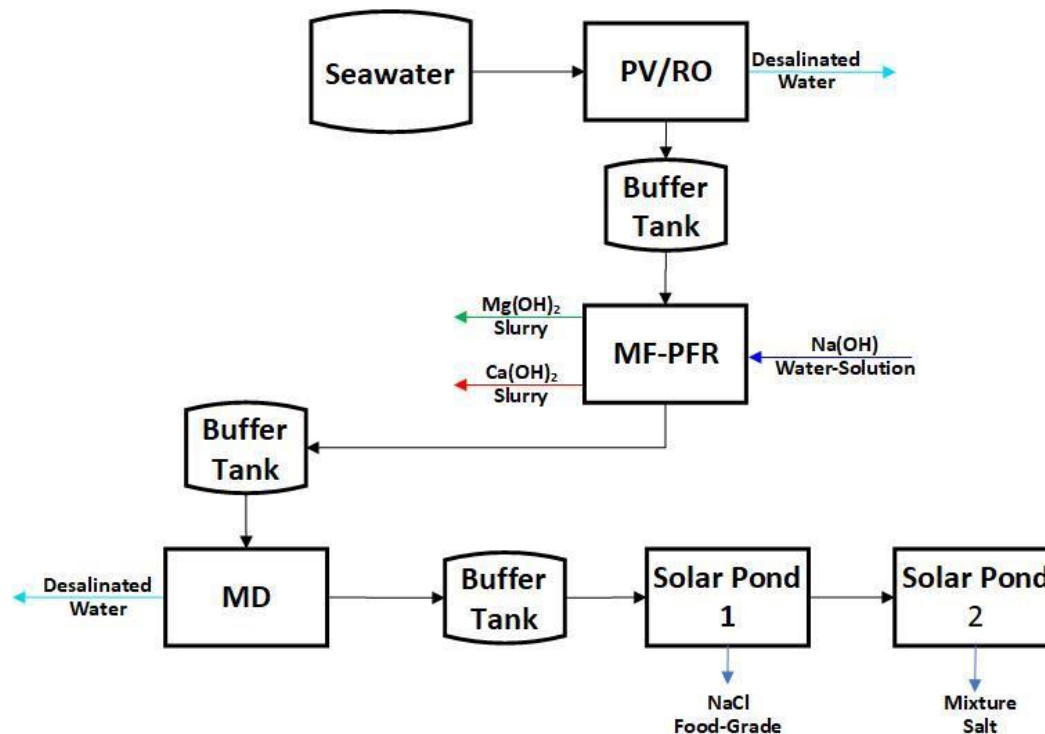
Solar energy in wastewater treatment

Conceptualization and construction of photo-reactors for different applications such as treatment of industrial and urban effluents for reuse (agricultural activities)

- Optimization of photo-reactors (CPC absorber tube diameter, change in agitation mechanism in raceway pond (RPR) reactors). Adaptation to effluent characteristics and treated water quality depending on intended use (reuse in irrigation);
- Combination with photovoltaic systems to supply energy to photo-reactor auxiliary equipment



Sol2H2O integrated process scheme



Sol2H2O



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<https://www.sol2h2o.uevora.pt/>

**Solar Water
Energy Nexus**

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Technological concept

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Pilot plant Sol2H2O



Conversion rate
<50%

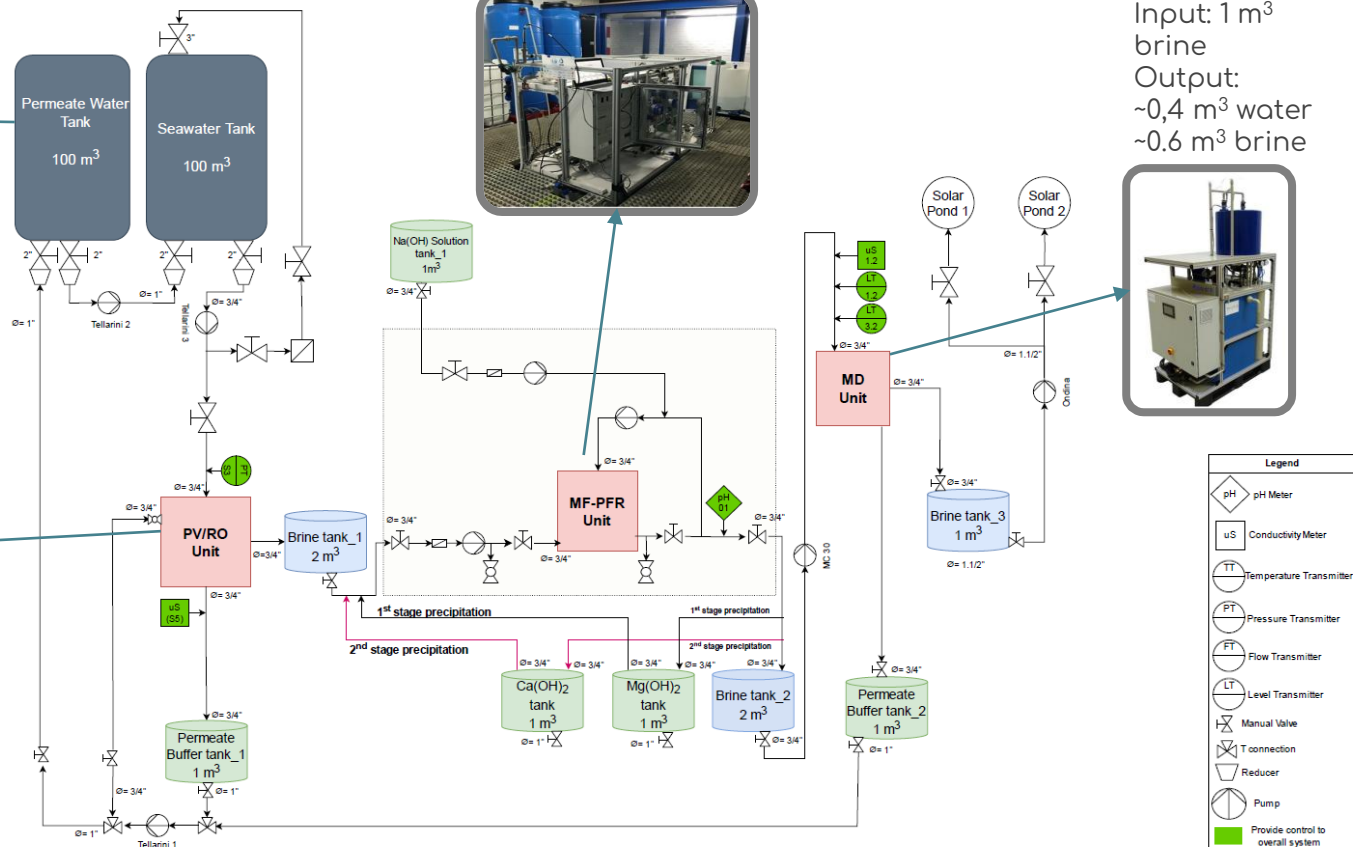


Input: 2 m³ SW
Output:
0,7 m³ water
~1.3 m³ brine

Input: 1 m³ RO brine
Output:
Ca(OH)₂ | Mg(OH)₂



Input: 1 m³
brine
Output:
~0,4 m³ water
~0.6 m³ brine



Pilot plant - Sol2H2O



Pilot plant - Sol2H2O

① Reverse Osmosis

② MF-PFR

③ MD



Pilot plant - Sol2H2O



System **testing** and
monitoring phase starting

- 1st e 2nd quarter 2025

Overview

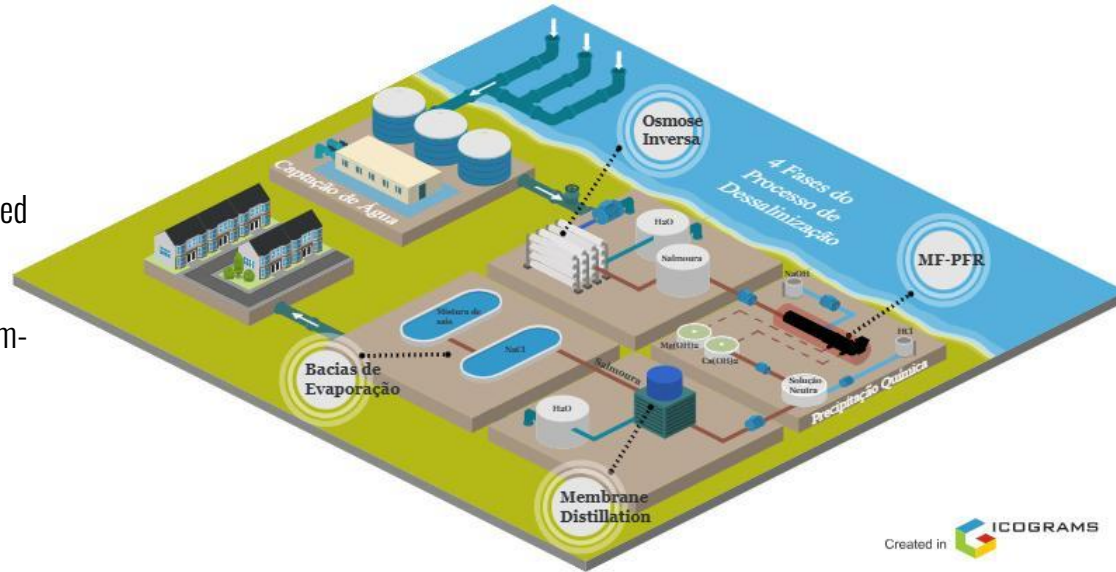
Seawater intake

Technologies

- Open intake:
 - reinforced concrete or plastic elements covered with concrete) and pumps (stainless steel)
- Well intake:
 - submersible motor pumps (cast iron, aluminum-bronze or stainless steel)
- Piping (polyethylene HDPE or PE)

TRL

- TRL 8-9 (commercial, customized)



Overview

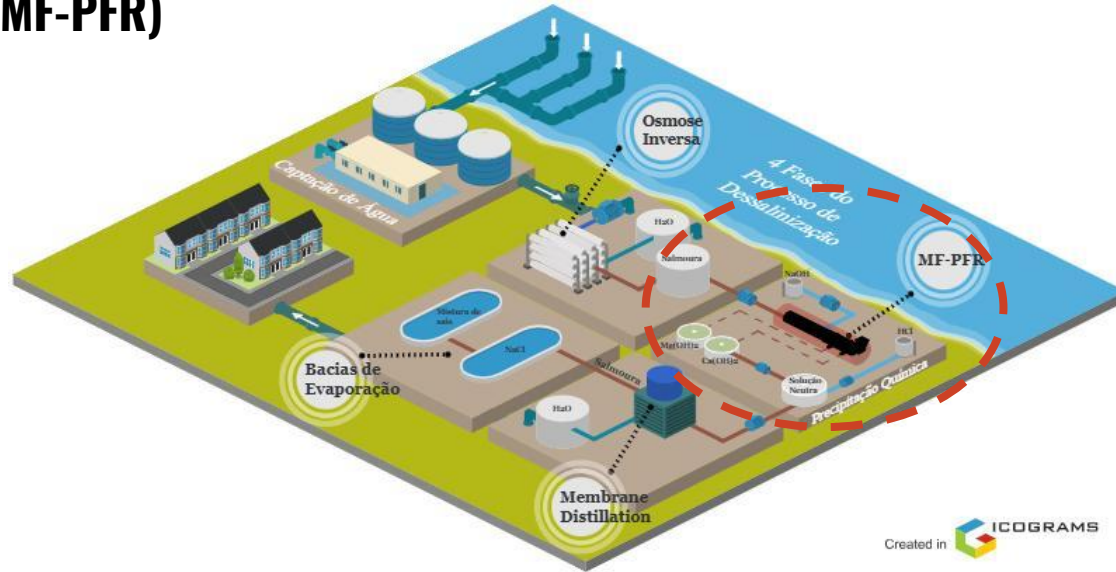
Multiple Feed - Plug Flow Reactor (MF-PFR)

Technologies

- Dosing pumps for the chemicals
- Chemicals (HCl, H₂SO₄, NaClO, antifouling)
- Support structure (stainless steel)
- Low pressure PVC hydraulic connections and in stainless steel
- Electrical and signal wiring

TRL

- Reactor TRL 3-6
- TRL 8-9 (commercial, customized)



Overview

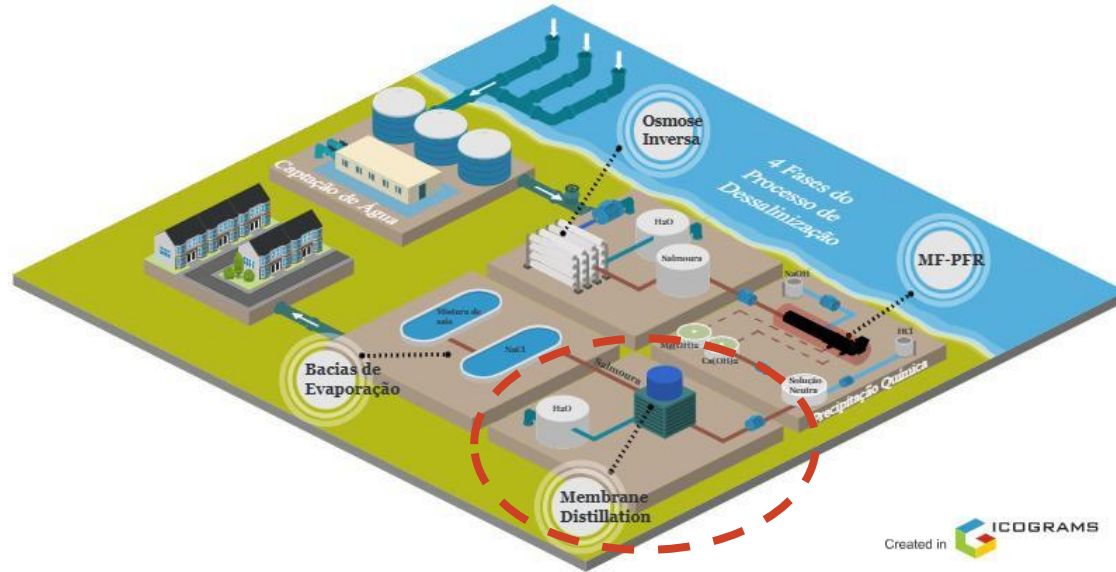
Membrane Distillation

Technologies

- Pumps
- Membranes
- Low pressure PVC hydraulic connections and in stainless steel
- Electrical and signal wiring

TRL

- Membranes (hydrophobic, PP, PVDF and PTFE) TRL 3-7
- TRL 8-9 (commercial, customized)



Overview

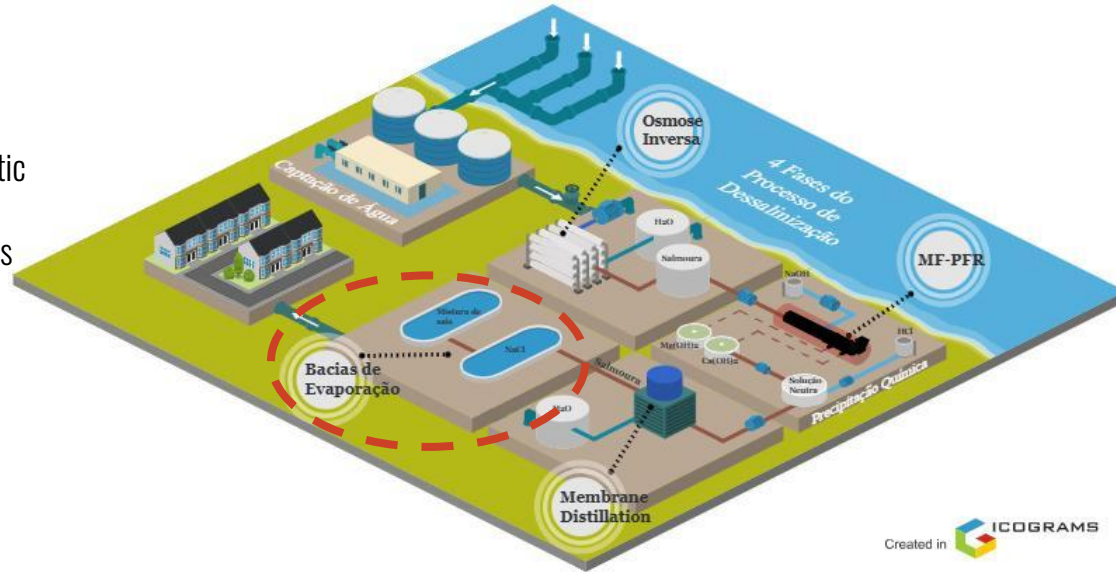
Solar Ponds

Technologies

- Reinforced concrete or concrete-covered plastic elements)
- Low pressure PVC hydraulic connections and in stainless steel
- Support structure (stainless steel)

TRL

- TRL 8-9 (commercial, customized)



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Thank you for your attention

Q&A

Online, 30.06.2025