

# What does ZELDA stand for?

Zelda means Zero Liquid Discharge desalination: brine treatment based on a combination of electro-separation processes and valuable compound recovery.

# Main project objective

The Life+ Zelda project aims to demonstrate and disseminate the technical feasibility and economical sustainability of decreasing the overall environmental impact of desalination systems for freshwater production by adopting brine management strategies based on the use of electro-dialysis metathesis (EDM) and valuable compound recovery processes, with the final aim of reaching a zero liquid discharge (ZLD) process.



## ZELDA Project

**Project Ref.:** LIFE12 ENV/ES/000901  
**Start Date:** July 2013  
**Final date:** June 2017  
**Total Budget:** 2,301,553.00 €

# ZELDA

Zero ● Liquid ● Discharge ● Desalination

## Project Coordinator



## Partners



ABENGOA WATER



[www.life-zelda.eu](http://www.life-zelda.eu)

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Pictures provided by CTM, Fujifilm and Abengoa



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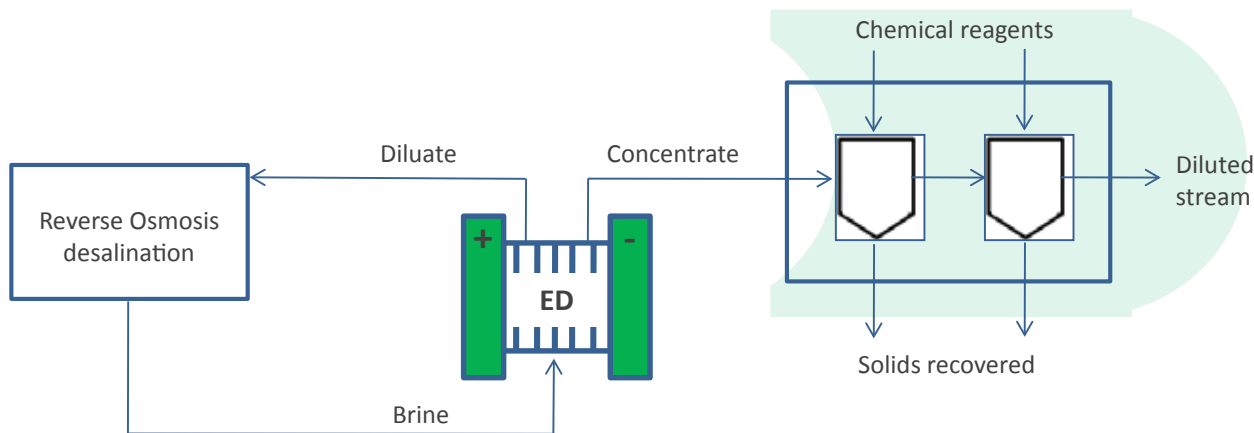
## Environmental problem targeted

Over the last decades, advances in desalination technology enabled the obtention of freshwater from seawater in regions with water scarcity. Although desalination technologies have a huge socio-economic positive impact, they also entail environmental drawbacks. Most of desalination plants use membranes to separate the water from the dissolved salts, that are

present in sea or brackish water, thus leaving a highly saline solution named concentrate. This concentrate is usually discharged back to the sea, causing a negative effect to the marine ecosystem. This impact is much more severe when this concentrated is discharged into surface or groundwater bodies due to higher salinity gradients. Zelda project proposes a new strategy based on concentration and recovery of the salts, to avoid their release and negative impact on the environment.



## Project Scheme



## Project Actions

- A detailed study of representative desalination plants will be performed in terms of their brine and feed water compositions.
- Novel ion-exchange membranes with increased performance will be tested and included in a pilot plant based on EDM.
- Several compound recovery strategies will be evaluated in order to select the best sea water and brackish water desalination plants.
- A ZLD system to recover valuable compounds will be designed, constructed and coupled to the EDM pilot plant.
- The EDM-ZLD system will be adapted and operated to treat the brine from a real seawater desalination plant.
- The new EDM-ZLD system will be implemented and operated to treat the brine from a real brackish water desalination plant.
- The environmental and economic impact of the new process will be assessed and compared with conventional brine management strategies by means of LCA and LCC.

## ZELDA Expected Results

- Versatile brine treatment system based on EDM-ZLD technology.
- Performance and operational costs of the new EDM-ZLD system to treat brines from both, seawater and brackish water desalination plants.
- Influence of the brine composition and operating conditions of the EDM-ZLD system on the overall sustainability of the desalination process.
- Increase the water recovery of the existing desalination plants
- Decrease the brine discharge into water bodies.
- Decrease the environmental impact of obtaining valuable compounds recovered via conventional mining activities.
- Increase the public awareness on the environmental impact of current brine discharge strategies.

