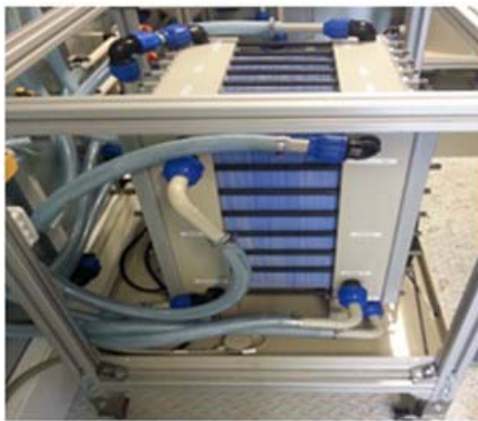




**ZELDA**  
Zero ● Liquid ● Discharge ● Desalination

Zero Liquid Discharge desalination:  
brine treatment based on  
electrodialysis metathesis  
and valuable compound recovery



# After LIFE Communication Plan

2013 - 2017

LIFE12 ENV/ES/000901

June 2017

## Project description

### BACKGROUND

Water scarcity problems have been a growing concern for the European Union. Currently, the seawater and brackish water desalination is considered to be one of the best options to face up the water scarcity problem. However, this technology generates high amounts of brine that must be managed. In coastal desalination plants, brine is discharged to the sea while in the inland desalination plants deep well injection and surface water or groundwater discharge are the most common options. Brine management has a high environmental impact, especially in the case of inland desalination plants hampering the implementation of desalination technologies



### 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.

### Strategy



## Methodology and results

- Monovalent membranes development
- Bench-scale experiments
- Design and construction of the pilot plant
- Pilot plant operation
  - Treatment of brackish water brine
  - Treatment of seawater brine
- Life Cycle and Life Cost Assessment



## RESULTS

- Versatile brine treatment system based on EDM-ZLD technology. Demonstration of the technology for brackish water and seawater brines.
- Implementation of new monovalent membranes developed by Fujifilm, that allow increasing capacity treatment and reducing the energy consumption.
- More than 80% of water recovery.
- Valuable compound recovery
  - ✓ Decrease the environmental impact of obtaining valuable compounds recovered via conventional mining activities.
  - ✓ Recovery of high purity  $Mg(OH)_2$ ,  $Na_2SO_4$  and  $NaCl$ .
  - ✓ Contribution to make de EDM-ZLD economical feasible
- Reduces or eliminates brine disposal costs (inland)

# Communication strategy

## COMMUNICATION TOOLS

- Project website:** [www.life-zelda.eu](http://www.life-zelda.eu)  
 Public information available about the project description and results achieved as well as access to graphic material produced in digital format (>30.000 visits).
- Deliverable graphical material:**  
 Layman Report (500 units), brochures for administration, engineering companies and general public (3000 units). This material is also available in digital format on the project website.
- Promotional video:** also available on the project website.  
<https://www.youtube.com/watch?v=BhDDw5F1mro>
- Information boards:** 5 LIFE+ information boards installed in the premises of the coordinator and associated beneficiaries and also at Almería SWDP, where the pilot plant is installed.
- Media:** news, articles and press releases

# ZELDA

Zero ● Liquid Discharge ► Desalination

**Environmental problem targeted**

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 electrodiolysis metathesis (EDM) and valuable compound recovery processes, with the final aim of reaching a zero liquid discharge (ZLD) process

Project Structure

C.1 Meeting the economical and environmental impact	A.1 Data collection from full scale desalination plants A.2 Process characterisation: Almería and El Abtal desalination plants.	D.0 Communication and dissemination actions
	B.1 Design and construction of the EDM stage B.2 Evaluation of compound recovery strategies B.3 Design and construction of the ZLD stage	
C.2 Implementation of the EDM-ZLD in Almería system seawater desalination plant C.3 Implementation of the EDM-ZLD system in El Abtal brackish water desalination plant		

**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
- ▲ Increase the public awareness on the environmental impact of current brine discharge strategies.
- ▼ Decrease the brine discharge into water bodies.
- ▼ Decrease the environmental impact of obtaining valuable compounds recovered via conventional mining activities.

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

The screenshot shows the ZELDA project website with a navigation menu (Home, The Project, Networking, News, Downloads, Pilot plant), a search bar, and a main content area featuring a photograph of the pilot plant and introductory text about the project's goals and objectives.

## COMMUNICATION ACTIONS

- Press releases
- Publications in sectorial magazines
- Attendance to several conferences and workshops:
  - ✓ Green Week 2014 (3<sup>rd</sup> -5<sup>th</sup> June 2014)
  - ✓ IWA World Water Congress and Exhibition (Lisbon, 21-26<sup>th</sup> September 2014)
  - ✓ World Water-Tech Investment Summit 2015 (London, 10-12 March 2015)
  - ✓ Desalination for Clean Water and Energy: Cooperation around the world (TelAviv, May 2017)
- General fairs and exhibitions:
  - ✓ 22<sup>nd</sup> International Water and Irrigation Exhibition (SMAGUA 2016) (Zaragoza, 8<sup>th</sup>-11<sup>th</sup> March 2016)
  - ✓ IFAT: World's leading trade fair for water, sewage, waste and raw materials management (Munich, 30<sup>th</sup> May-3<sup>rd</sup> June 2016)
- Networking with several LIFE projects:
- Open day in Brussels (21<sup>st</sup> June 2016)
- Workshop of LIFE PROJECTS organized by CTM (8<sup>th</sup> November 2016)
- Several visits to the pilot plant



*ZELDA at the EUROMED 2017 "Desalination for Clean Water and Energy: Cooperation around the world".*



*Open day in Brussels (21<sup>st</sup> June 2016). Target audience: scientists, technology developers, utility representatives, large water users, European and national/regional policy makers and finance experts.*



Visits to the pilot plant in the Almería's Desalination Plant. Students, companies from the sector and potential end-users visited the pilot plant.

**LIFE ZELDA: DESALINIZACIÓN CON DESCARGA LÍQUIDA A CERO; TRATAMIENTO DE LA SALMUERA BASADO EN ELECTROLÍISIS DE METATÉISIS Y RECUPERACIÓN DE COMPUESTOS DE VALOR AÑADIDO**

**LIFE ZELDA: ZERO LIQUID DISCHARGE DESALINATION; BRINE TREATMENT BASED ON ELECTROLYSIS METATHESIS AND VALUABLE COMPOUNDS RECOVERY**

**El estudio de perfilación de salmueras de desalminación**

**La nueva salmuera de grado de pureza industrializada en el mundo**

Launch of **ZELDA**  
Zero • Liquid • Discharge • Desalination

consortium has been successfully shaped and consists of Abengoa Water, CTM and Fujifilm. Most current brine treatment strategies discharge brines into the environment and one of the most important environmental impacts of these technologies, especially in those regions with high to salinity gradients.

The ZELDA project (LIFE12 ENV/ES/000901), aims to disseminate the technical feasibility and economical of decreasing the overall environmental impact of desalination systems. It adopts brine management strategies based on the use of electrodiolysis metathesis and valuable compound recovery processes with the final aim of reaching a zero liquid discharge process.

Connecting Waterpeople

INICIO MI AGUA ENTIDADES RANKING MAGAZINE BLOGS EMPLEO EVENTOS CURSO

**Almería acoge una planta piloto que estudiará cómo desalinizar diferentes tipos de salmuera**

0 f 0 t 0 in 0 113

La actualización se inscribe en el proyecto europeo ZELDA y cuenta con la participación de Eterecar, CTM, Abengoa, Fujifilm y la Water Supply and Sanitation Platform.

La desalminadora de Almería acoge una planta piloto para llevar a cabo una investigación

Several publications in sectorial magazines and press releases.

## Future dissemination activities

Future actions detailed above will be performed according to the regular activity of each beneficiary, with the active participation of a professional team from different participating entities.

The timescale where these actions will be performed depends on each one, but it can be estimated in a 1-5 years' period.

1 - Maintenance of the project Website
<b>DESCRIPTION</b>
<p>Through the website it will be possible to continue to have access to all the information related to the project.</p> <p>The project website will remain active for a period of not less than five years after project.</p> <p><a href="http://www.life-zelda.eu">www.life-zelda.eu</a></p>
<b>INSTITUTION RESPONSIBLE</b>
Fundació CTM Centre Tecnologic
<b>PERIOD/FREQUENCY</b>
<p>Periodically updates, depending on the changes, advances or improvements.</p> <p>5 years (until June 2022)</p>

2 – Distribution of dissemination material
<b>DESCRIPTION</b>
<p>Distribution of project graphic material, mainly brochures and Layman Report.</p> <p>Video Broadcasting project in dissemination events.</p> <p>Available in the project website and reprinting.</p>
<b>INSTITUTION RESPONSIBLE</b>
Fundació CTM Centre Tecnologic, Fujifilm, Abengoa, WssTP
<b>PERIOD/FREQUENCY</b>
2017-2019

3 – Promote the project in seminars, conferences and fairs
<b>DESCRIPTION</b>
<p>Partners will participate in those events of interest to promote and present the results achieved by the project. In these events, the dissemination materials will be distributed.</p> <p>Major conferences and fairs for the dissemination of the project:</p> <ul style="list-style-type: none"> <li>• ICDMT 2018: 20th International Conference on Desalination and membrane Technology</li> <li>• Euromembrane 2018</li> <li>• Desalination for the Environment Clean Water &amp; Energy 2018</li> <li>• IWA World Water Congress &amp; Exhibition</li> </ul>

<ul style="list-style-type: none"> <li>IFAT 2018: Int'l Trade Fair for Water, Sewage, Refuse and Recycling</li> </ul>
<b>INSTITUTION RESPONSIBLE</b>
Fundació CTM Centre Tecnologic, Fujifilm, Abengoa, WssTP
<b>PERIOD/FREQUENCY</b>
1/year during 2017-2019

4 – Publications and dissemination of the project in the media
<b>DESCRIPTION</b>
1 publication in a SCI journal. Identified journals to publish scientific articles: <ul style="list-style-type: none"> <li>Journal of membrane science</li> <li>Desalination</li> <li>Journal of cleaner production</li> <li>Journal of environmental management</li> </ul> 2 publications in technical non-reviewed journals or sectorial magazines
<b>INSTITUTION RESPONSIBLE</b>
Fundació CTM Centre Tecnologic, Fujifilm, Abengoa, WssTP
<b>PERIOD/FREQUENCY</b>
2017-2018

### *Estimated budget for the future communication plan*

<b>Activity</b>	<b>Partners</b>	<b>Budget</b>
Project website	CTM	2000
Reprinting dissemination material	WssTP	5000
Project presentation in seminars and conferences	All	8000
Dissemination of the Project in media (1 published articles and 2 publications in sectorial magazines)	All	5000



## Project identity

---

### Project data

Location: Spain

Code: LIFE12 ENV/ES/000901

Starting date: July 2013

Ending date: June 2017

Duration: 4 years

Total budget: € 2,301,533.00

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

 @zelda\_project

 Zelda Project

E-mail: [mireia.mesas@ctm.com.es](mailto:mireia.mesas@ctm.com.es)

### Project coordinator



### Project partners

**ABENGOA**

**FUJIFILM**



ZELDA project (2013-2017) was supported and financed by the LIFE+ program of the European Commission.

