

# Circular Processing of Seawater Brines from Saltworks for Recovery of Valuable Raw Materials



Università  
degli Studi  
di Palermo



Coordinator

2020 - 2024



Duration

## Objective

- SEArcularMINE project proposes innovative, sustainable and cost-effective technologies that will be developed up to TRL 4-5 using the ancient and still widely used process of saltwork where salt is produced from seawater via natural evaporation.
- The by-product of saltwork, also called remaining brine or bittern, is valorised via different technologies being developed for the recovery of three classes of raw materials.
- Three separate core technologies together with auxiliary units providing self-sufficient circular processing opportunity will be developed to obtain Magnesium, Lithium and various trace elements.
- Overall objective is to develop sustainable technologies that will enable secure access route for critical raw materials and others through a circular processing of abundant bittern resources.

## Innovative Aspects

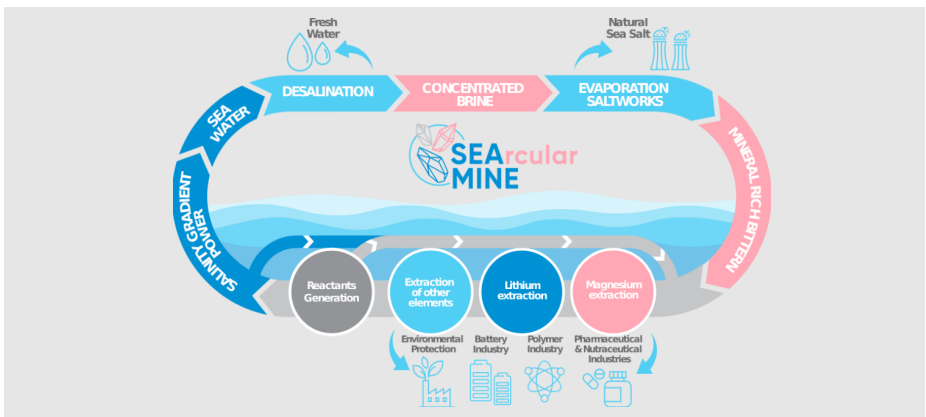
- Integrated green cycle to recover minerals from seawater bitterns
- Recovery from almost unlimited source
- Low cost technologies with respect to current state-of-art
- A circular approach promoting non-dependent energy and chemical supply on external market

## Technologies

- Reactive crystallisation of  $Mg(OH)_2$
- Li-selective membrane separation
- Selective sorption of TEs
- Innovative pre and post concentration
- On-site reactant generation
- On-site solar and/or wind energy (optional)
- The use of salinity gradient power



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 869467 (SEArcularMINE).



## Impacts

- Safeguarding environmental sustainability (including better energy and water efficiency and a reduction in waste, wastewater and emissions)
- Improving significantly the health and safety performance of the solutions provided throughout the whole life cycle considered.
- Creating a lower TRL technology base for radical innovations within the next decades
- In the longer term, improving the economic viability of operations and enhancing the competitiveness of, and creating added value and new jobs in raw materials producing, equipment manufacturing, information and communication technologies and/or downstream industries.

## Partners

## Ekodenge's Role

### Partner

- Life Cycle Assessment (LCA) for each technology
- Life Cycle Costing (LCC) for each individual technology
- LCA and LCC studies of integrated system model
- Lead and support the activities on Human and Ecosystem Health and Safety Status
- Support economic assessment and market analysis
- Support dissemination and communication activities
- Support data collection on bittern resources



Università  
degli Studi  
di Palermo



IBET



UNIVERSITAT POLITÈCNICA  
DE CATALUNYA  
BARCELONATECH



ENIG



SUEZ



Fraunhofer  
ISE



SOSALT  
SALT MAKING BY TEPAN



VTT



UNIVERSITY OF HELSINKI



- 📍 Hacettepe Teknokenti, 1.Ar-Ge Binası, No:18, 06800, Beytepe, Ankara, Turkey
- 📍 1-2 Paris Garden Southwark, London, SE1 8ND, UK

☎ T: (+90) 312 299 25 55  
F: (+90) 312 299 25 58

🌐 [www.ekodenge.com](http://www.ekodenge.com)  
✉ [info@ekodenge.com](mailto:info@ekodenge.com)

