



HARNESSING OUR SEAS AS A SUSTAINABLE MINERAL RESOURCE

THE CHALLENGE

Europe currently depends on imports of raw materials that are critical for economic development. These EU classified Critical Raw Materials (CRM) are increasingly needed in a range of high growth industrial sectors including advanced battery technology and polymer production alongside pharmaceutical and nutraceutical applications. There is an urgent need for technological innovation, allowing for CRM production in Europe which meets the highest expectations in terms of performance, cost and green credentials.

PROJECT OBJECTIVES

SEArcularMINE builds on the ancient and still widely used process of saltworks, where seawater goes through natural evaporation and crystallization in shallow basins. The resulting brine (bittern) contains high concentrations of valuable trace elements. The project will develop sustainable and cost-effective technologies that will contribute to securing European access to CRMs through a circular processing of the abundant bittern resources. The consortium brings together leading experts from academia and industry to:

- Develop 3 innovative technologies to target the extraction of Magnesium (Mg), Lithium (Li) and other trace-elements (Rb, Sr, Cs, Ga, Ge, Co).
- Establish multiple auxiliary processes to provide full circularity during the production process.
- Produce the required energy from salinity gradient power and on-site solar and wind energy.
- Generate modelling tools for simulation, sizing and evaluation of the processes to ensure optimal use of the resource for given framework conditions.
- Characterise and map bittern availability in Europe and the whole Mediterranean basin.
- Pave the way for further development, ensuring wide adoption and acceptance.

AT A GLANCE

INSTRUMENT: Horizon 2020 Research and Innovation Action

TOTAL BUDGET: €5,834,016

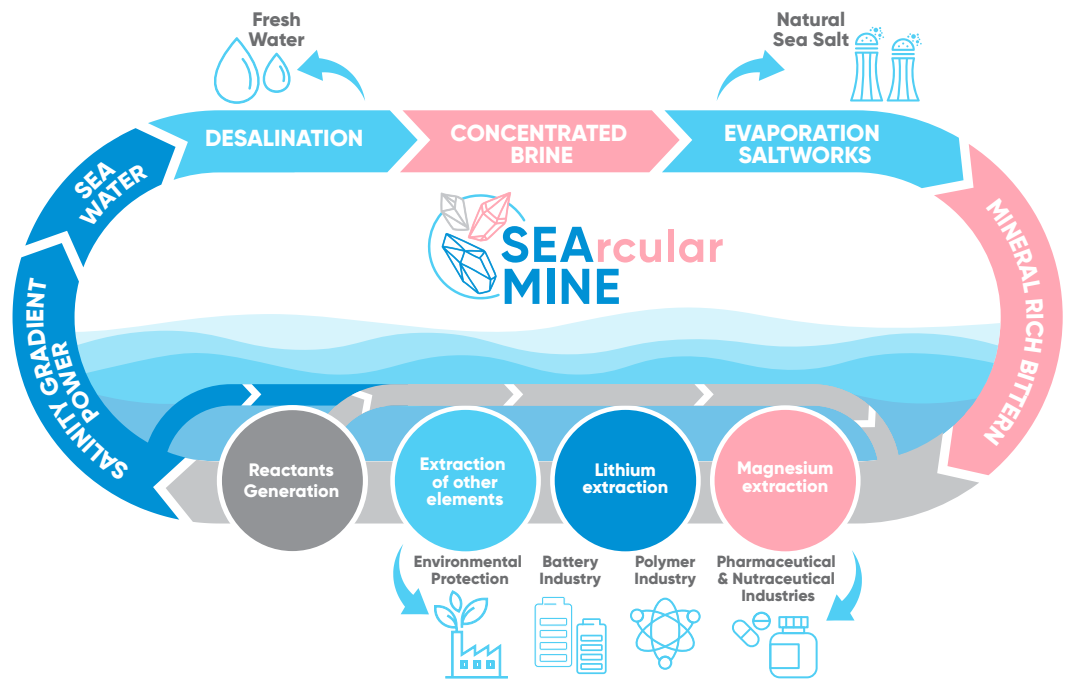
DURATION: June 2020 – May 2024 (48 months)

COORDINATOR: University of Palermo, Italy (UNIPA)

CONSORTIUM: 12 partners and one third party from 9 countries



CREATING A SUSTAINABLE CIRCULAR APPROACH TO MINERAL EXTRACTION



EXPECTED IMPACTS

SEArcularMINE's circular process concept will utilise waste streams and current infrastructure, safeguard environmental sustainability and contribute to the following impacts:

- Secure sustainable access to Mg, Li and other trace elements within the EU.
- Support the transition to a clean, low carbon economy via advanced technological development reliant on CRM access.
- Create a technology base for radical innovations that would help unlock substantial reserves of new or currently unexploited resources within the EU.
- Present an alternative to the high environmental costs of current extraction of finite global reserves, through a circular process which uses only seawater as an input, eliminates any requirements for external chemicals and strives to bring the demand for energy and freshwater close to zero.
- Mitigate freshwater scarcity at low cost by trialling the integration of the technologies with seawater desalination.

PROJECT PARTNERS

The **SEArcularMINE** consortium is composed of 12 partner organisations from universities, research institutes, SMEs and multinationals from 9 countries across Europe and the wider Mediterranean basin.



CONTACT US

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